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### 8.19 Toxins


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Aldicarb as a cause of food poisoning—Louisiana, 1998. MMWR Morb Mortal Wkly Rep. 1999; 48(13): 269-71p. Abstract: Cholinesterase-inhibiting pesticides (i.e., organic phosphates and carbamates), widely used in agriculture, can cause illness if they contaminate food or drinking water. Aldicarb, a regulated carbamate pesticide, is highly toxic, and the U.S. Environmental Protection Agency (EPA) requires applicators to be trained and certified. This report describes a foodborne outbreak of aldicarb poisoning that occurred when improperly stored and labeled aldicarb was used mistakenly in food preparation.

APIC position paper: prevention of device-mediated blood-borne infections to health care workers. 1992 Governmental Affairs Committee of the Association for Practitioners in Infection Control, Inc. Am J Infect Control. 1993; 21(2): 76-8p. Abstract: The Association for Practitioners in Infection Control, Inc. (APIC) is a multidisciplinary organization of over 9000 health care professionals who practice institutional epidemiology in the form of infection control and quality improvement within a variety of settings. As a national leader in prevention and control of infections, APIC supports efforts to reduce and eliminate device-mediated blood-borne infections.

Diagnosis and management of foodborne illnesses: a primer for physicians. MMWR Recomm Rep. 2001; 50(RR-2): 1-69p. Abstract: This primer is directed to primary care physicians, who are more likely to see the index case of a potential food-related disease outbreak. It is a teaching tool to update primary care physicians about foodborne illness and remind them of their important role in recognizing suspicious symptoms, disease clusters, and etiologic agents, and reporting cases of foodborne illness to public health authorities.

Foodborne botulism associated with home-canned bamboo shoots- Thailand, 1998. MMWR Morb Mortal Wkly Rep. 1999; 48(21): 437-9p. Abstract: On April 13, 1998, the Field Epidemiology Training Program in the Thailand Ministry of Public Health (TMPH) was informed of six persons with sudden onset of cranial nerve palsies suggestive of botulism who were admitted to a provincial hospital in northern Thailand. To determine the cause of the cluster, TMPH initiated an investigation on April 14. This report summarizes the results of the investigation, which indicate that the outbreak was caused by foodborne botulism from home-canned bamboo shoots.


Guidelines for the control of infection with Vero cytotoxin producing Escherichia coli (VTEC). Subcommittee of the PHLS Advisory Committee on Gastrointestinal Infections. Commun Dis Public Health. 2000; 3(1): 14-23p. Abstract: Increasing numbers of cases of Vero cytotoxin producing Escherichia coli (VTEC) O157 infection, well published incidents, and new scientific evidence make it appropriate to produce new guidelines for their control. This document reviews the clinical and epidemiological features of VTEC O157 infection, describes the principles of microbiological investigation and laboratory safety, and presents recommendations for the prevention of spread of VTEC O157. The recommendations consider direct spread of infection from animals, foodborne spread, the institutions in which spread is more likely to occur (nursing homes, schools, and children's day nurseries), and groups at particular risk of acquiring and transmitting infection (in essence, food handlers, and those unable to maintain high standards of hygiene for themselves and their carers).

Human tissue intended for transplantation—FDA. Interim rule; opportunity for public comment. Fed Regist. 1993; 58(238): 65514-21p. Abstract: The Food and Drug Administration (FDA) is issuing an interim rule to require certain infectious disease testing, donor screening, and recordkeeping to help prevent the transmission of AIDS and hepatitis through human tissue used in transplantation. The regulations are effective upon publication. FDA is taking this action in response to growing concerns that some human tissue products are being offered for transplantation use without even the minimum donor testing and screening needed to protect recipients against human immunodeficiency virus (HIV) infection and hepatitis infection. The new regulations require all facilities engaged in procurement, processing, storage, or distribution of human tissues intended for transplant to ensure that minimum required infectious disease testing has been performed and that records documenting such testing for each tissue are available for inspection by FDA. The regulations also provide authority for the agency to conduct inspections of such facilities and to detain, recall, or destroy tissue for which appropriate documentation is not available.

Microbiological safety evaluations and recommendations on sprouted seeds. National Advisory Committee on Microbiological Criteria for Foods. Int J Food Microbiol. 1999; 52(3): 123-53p. Abstract: In 1997, the National Advisory Committee on Microbiological Criteria for Foods (NACMCF/the Committee) was asked to review the current literature on sprout-associated outbreaks: identify the organisms and production practices of greatest public health concern: prioritize research needs: and provide recommendations on intervention and prevention strategies. In response to this charge, the Fresh Produce Work Group (FPWG) documented the relevant epidemiology and microbial ecology of sprout-associated outbreaks and reviewed current industry practices and initiatives related to the growing of seed and the production of sprouts. Sprouts have been identified as a special problem because of the potential for pathogen growth during the sprouting process. If pathogens are present on or in the seed, sprouting conditions may favor their proliferation. There is no inherent step in the production of raw sprouts to reduce or eliminate pathogens. Contaminated seed is the likely source for most reported sprout-associated outbreaks. Research has been initiated on methods to reduce or eliminate pathogenic bacteria on seeds and sprouts and some treatments show promise. However, to date, no single treatment has been shown to completely eliminate pathogens under experimental conditions used. Finally, the Committee found that, at the time of the charge, there was a lack of fundamental food safety knowledge along the continuum from seed production through sprout consumption. More recently, many have become aware of the potential for microbial contamination of seeds for sprout production. 3. Seed cleaning, storage, and handling practices should be systematically implemented to reduce the potential for microbial contamination of seeds for sprout production. 2. Good agricultural manufacturing practices, and hazard analysis and critical control point (HACCP) systems. 2. Good agricultural practices should be systematically implemented to reduce the potential for microbial contamination of seeds for sprout production. 3. Seed cleaning, storage, and handling practices that minimize the potential for microbial contamination should be developed and implemented. 4. Seeds should be treated with one or more treatments that have been shown to reduce pathogenic bacteria that may be present. Intervention strategies that deliver less than a given reduction (at this time, 5-log) in levels of Salmonella spp. and enterohemorrhagic Escherichia coli O157 should be coupled with a microbiological testing program. 5. Establish good manufacturing practices and food safety systems, including regulatory oversight, microbial testing, adoption of HACCP, and improved traceback, that systematically look for means to prevent seeds from serving as the vehicle for foodborne disease, and 6. Conduct research related to the microbiological safety of sprouted seeds, particularly in the areas of pathogen reduction or elimination, sources of contamination and its prevention, and preventing or retarding pathogen growth during sprouting.

Outbreaks of Norwalk-like viral gastroenteritis--Alaska and Wisconsin, 1999. MMWR Morb Mortal Wkly Rep. 2000; 49(10): 207-11p. Abstract: Norwalk-like viruses (NLVs) are the most common cause of epidemic gastroenteritis in the United States, resulting in illness in approximately 23 million persons each year. Persons of all ages are affected because previous infection confers only short-term immunity. Most NLV gastroenteritis outbreaks involve foodborne or person-to-person transmission. This report presents investigations of a foodborne NLV outbreak in Alaska and person-to-person transmission in Wisconsin.


Revised precautionary measures to reduce the possible transmission of Creutzfeldt-Jakob disease (CJD) by blood and blood products; guidance document; availability--FDA. Notice. Fed Regist. 1997; 62(184): 49694-5p. Abstract: The Food and Drug Administration (FDA) is announcing the availability of a guidance document entitled "Revised Precautionary Measures to Reduce the Possible Transmission of Creutzfeldt-Jakob Disease (CJD) by Blood and Blood Products," dated December 11, 1996. The guidance document is intended to provide recommendations to the blood industry and may include information useful to other interested persons.

Salmonellosis associated with a Thanksgiving dinner--Nevada, 1995. MMWR Morb Mortal Wkly Rep. 1996; 45(46): 1016-7p. Abstract: On November 28, 1995, the county coroner's office notified the Clark County Health District in Las Vegas, Nevada, about a death suspected to have resulted from a food-borne disease. This report summarizes the investigation of the outbreak of gastroenteritis among persons who attended a Thanksgiving dinner. The investigation documented Salmonella serotype Enteritidis (SE) infection associated with eating improperly prepared turkey and stuffing containing eggs and emphasizes the need to use a meat thermometer to ensure complete cooking of turkey and stuffing.

amounts of antibiotics for disease control. This provides favourable conditions for the spread and persistence of antimicrobial-resistant zoonotic bacteria such as Campylobacter and E. coli O157. The occurrence of antimicrobial resistance to antimicrobials used in human therapy is increasing in human pathogenic Campylobacter and E. coli from animals. There is an urgent need to implement strategies for prudent use of antibiotics in food animal production to prevent further increases in the occurrence of antimicrobial resistance in food-borne human pathogenic bacteria such as Campylobacter and E. coli.

Abe K. et al. Infective endocarditis caused by Campylobacter fetus after allogeneic tooth transplantation: a case report. Br J Oral Maxillofac Surg. 1996; 34(3) : 230-4p. Abstract: A patient developed infective endocarditis caused by Campylobacter fetus. He gave a history of recent dental extraction and allogeneic tooth transplantation. He was treated with various antibodies to which the organism was said to be sensitive, but it was not until the transplanted tooth was removed that he started to improve. The mode of infection was thought to be blood borne through the open tooth socket from the raw chicken that he ate regularly.

Abe K. et al. Economic impact of an Escherichia coli O157:H7 outbreak in Japan. J Food Prot. 2002; 65(1) : 66-72p. Abstract: We estimated the economic impact of an outbreak of foodborne diseases occurring from elementary school lunches in 1996 in which 268 persons in Iwate prefecture, Japan were infected with Escherichia coli O157:H7. This study assessed the impact of direct economic losses and indirect economic consequences due to this outbreak. The economic impact of the outbreak was estimated to be about 82,686,000 yen. The laboratory costs, about 21,204,000 yen, showed the highest ratio of the total cost of this outbreak (about 26%). Also, the cost of foodstuffs that were not purchased during the suspension of the lunch service (about 19%), personnel expenses paid to lunch service employees (about 17%), human illness costs (about 15%), and the repair costs of facilities (about 15%) showed up as a high ratio in the total cost, respectively. Because all patients were children, the productivity losses estimated were low as children were considered as dependants with no income. Instead, we estimated the lost income of the mothers of the children. The source of the contamination could not be identified. Therefore, no food industries suffered any setbacks where certain food items could not be used for daily consumption due to the outbreak.

Abram M. et al. Primary Listeria monocytogenes infection in gestating mice. Folia Microbiol (Praha). 1997; 42(1) : 65-71p. Abstract: The facultative intracellular Gram-positive bacterium Listeria monocytogenes is a food-borne pathogen of frequently underestimated importance. Pregnant women represent the high-risk group for L. monocytogenes infection. Abortion, stillbirth or neonatal infection can be the serious outcome of such an infection. Recovery from listeriosis, resistance mechanisms of the host and the effect of L. monocytogenes on fetal development still remain to be fully understood. The results of our experiments showed an increased susceptibility of gestating BALB/c mice to primary L. monocytogenes infection. The duration of listeriosis in gestating animals was almost twice longer than in the control group. Furthermore, it was clearly shown that the detrimental effect of L. monocytogenes on fetal development was more pronounced if the infection was acquired earlier during gestation.

Acker M.L. et al. An outbreak of Yersinia enterocolitica O:8 infections associated with pasteurized milk. J Infect Dis. 2000; 181(5) : 1834-7p. Abstract: In October 1995, an outbreak of Yersinia enterocolitica O:8 infections occurred in the Upper Valley of Vermont and New Hampshire. Ten patients were identified, median age 9 years (range, 6 months-44 years). Three patients were hospitalized; 1 underwent an appendectomy. Consumption of bottled pasteurized milk from a local dairy was associated with illness (matched odds ratio undefined; lower 95% confidence interval, 1.9). No deficiencies in pasteurization procedures or equipment were detected. Y. enterocolitica O:8 was isolated from 1 raw-milk sample and from a fecal sample from 1 dairy pig. The route of contamination was not determined; this outbreak likely resulted from postpasteurization contamination of milk. Dairy pigs were the most likely source of contamination. Milk bottles were likely contaminated by rinsing with untreated well water prior to filling or by other environmental routes. Educating dairy owners about Y. enterocolitica and postpasteurization contamination is necessary to prevent further outbreaks.

Aendekerk R.P. et al. Tick-borne encephalitis complicated by a polio-like syndrome following a holiday in central Europe. Clin Neurol Neurosurg. 1996; 98(3) : 262-4p. Abstract: We report a case of Central European tick-borne encephalitis (CETE) in a 54-year-old man, presenting with fever and neurological complications following a holiday in Austria. A disease resembling paralytic poliomyelitis may develop with upper and lower extremity paralysis, as is the case in our patient. Our patient was most likely infected by eating goat's cheese, made of unpasteurised goat's milk. The diagnosis was confirmed by a positive IgM antibody response to the virus in the serum.

Ahmed F.E. Programs of safety surveillance and control of fishery products. Regul Toxicol Pharmacol. 1992; 15(1) : 14-31p. Abstract: In the United States, fishery product safety at the federal level falls primarily under the authority of the Food and Drug Administration. However, other federal agencies play an important role. The Environmental Protection Agency is responsible for setting and recommending pesticide limits in seafood, and the National Marine Fisheries Service operates a voluntary inspection program. The Centers for Disease Control is responsible for the collection and evaluation of data characterizing the source of seafood-borne illness. Individual states also play a dominant role in the control of seafood-borne risk because of the important differences in consumption and contaminant levels across regions of the country. State public health, environmental protection, and resource management agencies have developed programs designed to mitigate that risk. Because of the complication and variability of the fishery industry, an effective safety system can be developed based on partnership among federal and state agencies, in which state governments retain the dominant role and the federal government develops and updates guidance programs and provides oversight. The international community has developed practices and protocols impacting the regulation of seafood safety in the United States. In view of developing trade agreements, the international community should address the criteria of setting equivalent contaminant levels and...
consider the option of establishing import contract criteria for fishery products.

Ahmed F.E. et al. Risk assessment and management of chemical contaminants in fishery products consumed in the USA. *J Appl Toxicol.* 1993; 13(6) : 395-410p. Abstract: In the USA a small proportion of fishery products are contaminated with appreciable amounts of potentially hazardous contaminants. However, risks to consumers are not generally high. Inorganic contaminants with the greatest potential for toxicity are antimony, arsenic, cadmium, lead, mercury, selenium and sulfites. Among organic compounds, toxicity are antimony, arsenic, cadmium, lead, mercury, high. Inorganic contaminants with the greatest potential for with appreciable amounts of potentially hazardous contaminants. It is recommended that: (i) existing State and Federal regulations and environmental monitoring be instituted, where Federal agencies develop a set of monitoring and inspection practices and state agencies assume responsibility for primary control, site closures and advisories issue; (ii) research and public education by government agencies and health professionals be expanded to determine actual risks and approaches to manage them; (iv) mandatory labeling be considered for specific contaminants; (v) a better system requiring international agreements be developed in order to minimize the differences among various national regulatory approaches.

Ahn K.K. et al. High plains disease of corn and wheat: ultrastructural and serological aspects. *J Submicrosc Cytol Pathol.* 1998; 30(4) : 563-71p. Abstract: Virus-like particles with unique size and morphology were consistently associated with a new eriophyid mite-borne disease of maize and wheat, the high plains disease. In cells of symptomatic leaves, double membrane-bound particles (DMPs), quasi-spherical structures 120-200 nm in diameter, were present throughout the cytoplasm in association with electron-dense amorphous inclusions. No DMPs and inclusions were observed in symptomless plants. The DMPs were morphologically indistinguishable from those associated with eriophyid mite-borne diseases of uncertain etiology: fig mosaic, rose rosette, yellow ringspot of redbud, thistle mosaic, wheat spot chlorosis and wheat spot mosaic diseases. The DMPs and associated viroplasm-like inclusions in maize and wheat were specifically immunogold labeled in situ with an antiserum to the 32 kDa protein associated specifically with the high plains disease. Thread-like structures, present in the purified preparations from diseased maize were also immunogold labeled with the antiserum. It is suggested that the thread-like structures are derived from the DMPs. In many cells of symptomatic maize and wheat samples, DMPs occurred together with.flexuous rod-shaped particles and cylindrical inclusions of wheat streak mosaic potyvirus (WSMV), indicating that these cells are infected doubly with WSMV and the agent represented by the DMPs.

al-Lahham A.B. et al. Prevalence of Salmonella, Shigella and intestinal parasites in food handlers in Irbid, Jordan. *J Diarrhoeal Dis Res.* 1990; 8(4) : 160-2p. Abstract: During a one-year period, 283 food handlers in Irbid, Jordan were investigated for the presence of potential enteropathogens in their stools. The prevalence rate of enteropathogens among non-Jordanian food handlers (48.0%) was significantly higher (p less than 0.05) than that of the Jordanian group (12.3%). The isolation rates of Salmonella and Shigella were 6% and 1.4% respectively. Multi-drug resistance was frequent among isolates of Salmonella group B and Shigella spp. Intestinal parasites detected in the stools of food handlers included Ascaris lumbricoides (4.9%), Giardia lamblia (3.9%), Schistosoma mansoni, (2.8%), hookworms 2.5%, *Hymenolepis nana* (1.8%), Trichuris trichiura (1.1%), Entamoeba histolytica (0.7%), and Taenia saginata (0.4%). This study emphasizes the importance of food handlers, particularly the non-Jordanians, in Jordan, as potential source of food-borne infection.

Allison L. et al. Genetic heterogeneity of *Escherichia coli* O157:H7 in Scotland and its utility in strain subtyping. *Eur J Clin Microbiol Infect Dis.* 1998; 17(12) : 844-8p. Abstract: From April 1994 to March 1995, seven outbreaks of *Escherichia coli* O157:H7 infection occurred throughout Scotland, including the largest milk-borne outbreak to date worldwide. Various vehicles of infection were identified, and there were 144 confirmed cases in total. All isolates associated with the outbreaks were subjected to detailed subtyping: phage typing, testing for carriage of verotoxin genes (VT), and pulsed-field gel electrophoresis. The outbreak strains were of three different phage types (2, 4, and 28). Those of phage type 2 and 28 were VT1+/VT2+, those of phage type 4 were VT1+/VT2+. To discriminate outbreak-associated isolates from the high sporadic background, real-time pulsed-field gel electrophoresis analyses were performed. The results demonstrated that, within each of the seven outbreak groups, the macrorestriction profiles observed were indistinguishable, whereas profiles for sporadic isolates were not. The consistent genetic heterogeneity observed within the Scottish *Escherichia coli* O157 population can be exploited in epidemiological investigations.

Alouf J. [Implications of bacterial protein toxins in infectious and food-borne diseases]. *C R Seances Soc Biol Fil.* 1998; 192(3) : 485-502p. Abstract: Among the 315 protein toxins elicited by gram positive and gram negative bacteria so far characterized, about 50 toxins are currently considered as totally or partially, responsible of the pathological manifestations and/or lethality resulting from host infection or intoxication (contaminated food) by relevant toxigenic bacteria. A certain number of criteria are required for the assessment of indisputable involvement of a toxin or an array of toxins (from the same bacteria) in infectious diseases: 1) The bacterial microorganism clearly identified as the pathogenic agent of the disease produces component(s) considered as toxin(s); 2) The administration to appropriate animal(s) of the toxin(s) separated from the relevant bacteria or produced by genetic engineering from a heterologous tox+ recombinant bacterial strain produces symptoms and pathophysiological disorders that mimic those observed in the natural disease or at least those elicited in experimental animals by the cognate toxin-producing bacteria; 3) The in vitro incubation of the isolated toxin(s) with appropriate animal organs, tissues or cells elicits certain pathophysiological, biochemical or metabolic manifestations.
observed in the host infected with the relevant toxinogenic bacteria; 4) Toxin concentration in the organism of the host infected by the toxinogenic bacteria should be compatible with the characteristics of the relevant disease. The toxins of pathogenic interest exhibit a variety of effects in bacterial diseases. Bacteria that colonize a wound or mucosal surface but do not invade target cells can produce toxins that act locally or enter the bloodstream and attack internal organs (e.g. Corynebacterium diphtheriae, Vibrio cholerae, ...). Bacteria growing in a wound can produce toxins that destroy host tissue and kill phagocytes in the immediate vicinity of the bacteria, thus facilitating bacterial growth and spread. On the basis of the above mentioned criteria, the following bacterial diseases among many others are toxin-associated (toxinoses): diphtheria, tetanus, botulism, whooping cough, diarrhea, bloody diarrhea, hemolytic uremic syndrome, cholera, scarlet fever, toxic shock syndrome, gas gangrene, B. fragilis diarrhea, anthrax, pseudomembranous colitis.

Altekruse S. et al. A comparison of Salmonella enteritidis phage types from egg-associated outbreaks and implicated laying flocks. *Epidemiol Infect.* 1993; 110(1): 17-22p. **Abstract:** Infections due to Salmonella enteritidis are increasing worldwide. In the United States, between 1985 and 1989, 78% of the S. enteritidis outbreaks in which a food vehicle was identified implicated a food containing raw or lightly cooked shell eggs. Under a US Department of Agriculture regulation published in 1990, eggs implicated in human food-borne S. enteritidis outbreaks were traced back to the source flock. The flock environment and the internal organs of a sample of hens were tested for S. enteritidis. We compared the S. enteritidis phage types of isolates from 18 human, egg-associated outbreaks and the 15 flocks implicated through traceback of these outbreaks. The predominant human outbreak phage type was recovered from the environment in 100% of implicated flocks and from the internal organs of hens in 88% of implicated flocks we tested. The results support the use of phage typing as a tool to identify flocks involved in human S. enteritidis outbreaks.

Altekruse S.F. et al. Microbial food borne pathogens. *Campylobacter jejuni.* *Vet Clin North Am Food Anim Pract.* 1998; 14(1): 31-40p. **Abstract:** Campylobacter jejuni is the most common food borne bacterial pathogen and leading cause of food borne disease in humans in the United States and other industrialized nations. Approximately four million cases of human campylobacteriosis occur each year in the United States. Although the majority of cases consist of limited diarrheal illness, severe sequelae can affect a small portion of patients with campylobacteriosis that may include reactive arthritis and Guillain-Barre syndrome. Animal reservoirs primarily include poultry (C. jejuni) and swine (C. coli). Pathogen reduction during poultry processing and safe handling of raw poultry in the kitchen are needed to prevent illness.

Altimira J. et al. Repeated oral dosing with Listeria monocytogenes in mice as a model of central nervous system listeriosis in man. *J Comp Pathol.* 1999; 121(2): 117-25p. **Abstract:** Human listeriosis is a food-borne disease of immunosuppressed or previously healthy adults. The repeated oral administration of a sublethal dose (5x10^9 colony-forming units) of Listeria monocytogenes for 7 or 10 consecutive days led to the development of severe central nervous system (CNS) lesions in 25% of experimental mice. Histopathological examination of the brain revealed rhombencephalitis and ventriculitis as two distinct inflammatory patterns, resembling those seen in human listeriosis. This model would seem to be potentially useful for research on pathogenesis, predisposing factors and therapy in CNS listeriosis in man. 1999 W.B. Saunders and Company Ltd.

Amin J. et al. Hepatitis A in Australia in the 1990s: future directions in surveillance and control. *Commun Dis Intell.* 1999; 23(5): 113-20p. **Abstract:** The national notification data from 1952 to 1997 was examined in order to characterise hepatitis A virus (HAV) infection in Australia in the 1990s, and to determine whether currently available surveillance data are sufficient to inform disease control strategies and vaccination policies. Hepatitis A annual notification rates declined dramatically from a high of 123 notifications per 100,000 persons in 1961, to 3 per 100,000 in 1989. During 1991-97, the hepatitis A notification rate was 12 per 100,000 persons per year, although rates varied substantially between States and Territories. The Northern Territory had the highest notification rate of 52 per 100,000 persons per year. Seventy-six per cent of cases were adults, although in most regions notification rates were significantly higher in children than adults. Nationally, the male to female ratio was 1.7:1 (p < 0.001). The Northern Territory was the only area with no significant difference in notifications between the sexes. Large outbreaks were detectable through the notification system but risk factors for transmission could only be inferred from age and sex distribution of notifications, and from previous outbreak reports. National hepatitis A surveillance would be improved by collecting basic risk factor data, which identify cases as food-borne, sporadic, related to another case, or travel related. In addition, a population based serosurvey to measure age-specific hepatitis A susceptibility would assist vaccination policy development. Serosurveillance data are also needed, in conjunction with enhancements of the notification data, to provide baseline information against which the impact of changes in vaccination policy can be assessed.

Andersen K.R. et al. [Outbreak of food-borne gastroenteritis caused by a Norwalk-like virus. Evaluation of methods for confirmation of the etiology in suspected viral gastroenteritis]. *Tidsskr Nor Laegeforen.* 1996; 116(28): 3325-8p. **Abstract:** Acute gastroenteritis is a common disease and can be food-borne. We describe an outbreak of acute gastroenteritis, probably caused by Norwalk-like virus, which struck 250 people in the course of one week in a small Norwegian community. The source of the infection was probably an infected food handler in a bakery who contaminated cream cakes with the virus. The sensitivity of electronmicroscopy and analyses of IgG antibodies in serum to detect the etiologic agent was very low. The sensitivity to Norwalk Virus Polymerase Chain Reaction was much higher, and this was a considerable diagnostic benefit during the epidemic. Close cooperation between the local health authorities, the food control authorities, the bakery and the public was necessary to diagnose the etiology, source and spread of this food-borne infection.

Andersen K. et al. A single conserved amino acid in the coat protein gene of pea seed-borne mosaic potyvirus modulates the ability of the virus to move systemically in Chenopodium quinoa. *Virology.* 1998; 241(2): 304-11p. **Abstract:** Two isolates of pea seed-borne mosaic potyvirus, DPDI and NY, which both infect pea (Pisum sativum) systemically, differ in
improvements in the sensitivity of chemical analyses have enabled the identification of chemicals arising from waste disposal sites in the soil, air, drinking water, and food supplies of neighboring residential areas, albeit usually at very low concentrations. This knowledge has created great concerns among the affected populations and their public health agencies. The responsibility for interpreting the potential severity of the health effects of these environmental contaminants has fallen to those scientists experienced in epidemiology. This has led to a subdivision, reactive epidemiology, which describes investigations focused on specific events, usually under emotion-laden circumstances, rather than scientific merit. The reactive epidemiologist is rigidly constrained as to the size, timing, and location of the study. There is a strong requirement for public communication skills. New data bases are needed including "sentinel" diseases that are linked to exposure to chemicals, records of land use, and residency data for the population at risk.

Anderson H.A. et al. Environmental contaminants in human milk. J Expo Anal Environ Epidemiol. 2000; 10(6 Pt 2): 755-60p. Abstract: Environmental contaminants can be stored in the mother's body or can be transiently present from current diet, occupational exposures or personal habits. These chemicals can be transferred prenatally to the developing fetus or postnatally from breast milk to the nursing infant. Exposures through breast milk can be substantial, especially when the mother has significant ongoing exposures or has accumulated an unusually high body burden of persistent chemicals. Several studies demonstrate that organochlorines (OCs) acquired from breast milk elevate a child's body burden for several years. The decline of persistent OC residues in Western countries suggests that these exposures through breast milk will also diminish. Heavy metals such as lead and mercury are also present in milk, but the pharmacokinetics are quite different from OCs. Less persistent environmental agents, including solvents, polycyclic aromatic hydrocarbons, certain pesticides, and nicotine, can also be detected in milk. There is little information on currently used pesticides and other more recently identified environmental agents for which exposures are common today. Epidemiologic research has established that pre- and postnatal exposures to environmental contaminants including lead and OCs are associated with developmental deficits in early childhood. Therefore, characterization of these contaminants in breast milk can add to our knowledge of potential environmental exposures among children.

Angelillo I.F. et al. Consumers and foodborne diseases: knowledge, attitudes and reported behavior in one region of Italy. Int J Food Microbiol. 2001; 64(1-2): 161-6p. Abstract: A survey was conducted to investigate knowledge, attitudes and related behavior on foodborne diseases and food-handling practices among consumers in one region of Italy. A self-administered questionnaire was offered to a random sample of mothers of children attending public schools. Of the 394 responding mothers, 36% knew about all four salads served at the banquet (relative risk = 3.8, 95% confidence interval: 2.5, 5.6). Norwalk-like virus was detected by reverse transcription-polymerase chain reaction assay in 32 of 59 stool samples from eight states. Nucleotide sequences of a 213-base pair fragment from 16 stool specimens collected from cases in eight states were identical, confirming a common source outbreak. Two of 15 workers at caterer A had elevated immunoglobulin A titers to an antigenically related Norwalk-like virus strain. This study highlights the value of molecular techniques to complement classic epidemiologic methods in outbreak investigations and underscores the critical role of food handlers in the spread of foodborne disease associated with Norwalk-like virus.

Anderson A.D. et al. Multistate outbreak of Norwalk-like virus gastroenteritis associated with a common caterer. Am J Epidemiol. 2001; 154(11): 1013-9p. Abstract: In February 2000, an outbreak of gastroenteritis occurred among employees of a car dealership in New York. The same meal was also supplied to 52 dealerships nationwide, and 13 states reported illness at dealerships where the banquet was served. A retrospective cohort study was conducted to identify risk factors associated with the illness. Stool samples were collected to detect Norwalk-like virus, and sera were drawn and tested for immunoglobulin A antibodies to the outbreak strain. By univariate analysis, illness was significantly associated with consumption of any of four salads served at the banquet (relative risk = 3.8, 95% confidence interval: 2.5, 5.6). Norwalk-like virus was detected by reverse transcription-polymerase chain reaction assay in 32 of 59 stool samples from eight states. Nucleotide sequences of a 213-base pair fragment from 16 stool specimens collected from cases in eight states were identical, confirming a common source outbreak. Two of 15 workers at caterer A had elevated immunoglobulin A titers to an antigenically related Norwalk-like virus strain. This study highlights the value of molecular techniques to complement classic epidemiologic methods in outbreak investigations and underscores the critical role of food handlers in the spread of foodborne disease associated with Norwalk-like virus.

Anderson H.A. Evolution of environmental epidemiologic risk assessment. Environ Health Perspect. 1985; 62 389-92p. Abstract: Epidemiology has historically played an important role in the recognition of causes for diseases affecting the health of the public. Initially, epidemiology was concerned with infectious diseases. Later it became involved in metabolic and dietary deficiency diseases. Most recently, epidemiology has addressed the question of the public health effects of chemicals from production facilities, accidental spills, and chemical waste disposal sites. Concurrent improvements in the sensitivity of chemical analyses have resulted in the identification of chemicals arising from waste disposal sites in the soil, air, drinking water, and food supplies of neighboring residential areas, albeit usually at very low concentrations. This knowledge has created great concerns among the affected populations and their public health agencies. The responsibility for interpreting the potential severity of the health effects of these environmental contaminants has fallen to those scientists experienced in epidemiology. This has led to a subdivision, reactive epidemiology, which describes investigations focused on specific events, usually under emotion-laden circumstances, rather than scientific merit. The reactive epidemiologist is rigidly constrained as to the size, timing, and location of the study. There is a strong requirement for public communication skills. New data bases are needed including "sentinel" diseases that are linked to exposure to chemicals, records of land use, and residency data for the population at risk.
risk of food poisoning (93.2%), and that the awareness of the temperature of the refrigerator is crucial in reducing risk of food poisoning (90.1%). Only 53.9% reported washing hands before and after touching raw or unwrapped food and 50.4% reported using soap to wash hands. A total of 75.6% clean kitchen benches after every use and 81.1% use hot water and soap for this purpose. Only 25.6% thaw food in the refrigerator and 49.9% put leftovers in the refrigerator soon after meals. Washing hands before and after touching unwrapped food was significantly higher in women living in larger families and who had been informed by physicians about foodborne diseases. Educational programs and the counseling efforts of physicians, particularly focused to less educated subjects, are greatly needed.

Angulo F.J. et al. Origins and consequences of antimicrobial-resistant nontyphoidal Salmonella: implications for the use of fluoroquinolones in food animals. Microb Drug Resist. 2000; 6(1): 77-83p. Abstract: Human Salmonella infections are common; most infections are self-limiting, however severe disease may occur. Antimicrobial agents, while not essential for the treatment of Salmonella gastroenteritis, are essential for the treatment of thousands of patients each year with invasive infections. Fluoroquinolones and third-generation cephalosporins are the drugs-of-choice for invasive Salmonella infections in humans; alternative antimicrobial choices are limited by increasing antimicrobial resistance, limited efficacy, and less desirable pharmacodynamic properties. Antimicrobial-resistant Salmonella results from the use of antimicrobial agents in food animals, and these antimicrobial resistant Salmonella are subsequently transmitted to humans, usually through the food supply. The antimicrobial resistance patterns of isolates collected from persons with Salmonella infections show more resistance to antimicrobial agents used in agriculture than to antimicrobial agents used for the treatment of Salmonella infections in humans. Because of the adverse health consequences in humans and animals associated with the increasing prevalence of antimicrobial-resistant Salmonella, there is an urgent need to emphasize non-antimicrobial infection control strategies, such as improved sanitation and hygiene, to develop guidelines for the prudent usage of antimicrobial agents, and establishment of adequate public health safeguards to minimize the development and dissemination of antimicrobial resistance and dissemination of Salmonella resistant to these agents.


Applebaum G.D. et al. Spinal brucellosis in a southern California resident. West J Med. 1997; 166(1): 61-5p. Abstract: Dynamic changes in patient demography that are currently altering the regional epidemiology of brucellosis attest to the need for physicians to reacquaint themselves with a disease that has been largely forgotten in the United States. This is especially the case in California, which has a large immigrant population and where brucellosis clearly appears to have evolved from an occupational to a food-borne illness. In our recent clinical experiences with several cases of brucellosis, food-borne transmission of the organism is the presumptive cause of the disease, as no causes were associated with occupational risks for exposure to the organism. This suggests that given a clinical history consistent with brucellosis, physicians working with patient groups at risk for food-borne exposure must inquire about the ingestion of unpasteurized dairy products specifically and early during the patient visit. A history of travel to areas endemic for brucellosis may further aid diagnosis. Although a predominance of nonspecific clinical signs and symptoms (such as fevers or arthralgias) often makes the clinical diagnosis difficult, the frequency and characteristic patterns of localized disease should heighten clinicians' index of suspicion and lower the threshold for a serologic investigation. Prominent musculoskeletal complaints (especially back pain) accompanied by constitutional symptoms such as fever, malaise, and weight loss may be consistent with brucellosis and a history of unpasteurized dairy ingestion should be elicited. Radiographic evidence that localizes the source of back pain as caused by sacroiliitis or spondylitis is highly suggestive of brucellosis in appropriate patients. In such cases, serologic tests should be persuaded early if warranted by the clinical impression.

Aranda M.A. et al. A heat shock transcription factor in pea is differentially controlled by heat and virus replication. Plant J. 1999; 20(2): 153-61p. Abstract: Since some heat-inducible genes [heat shock (hs) genes] can be induced by virus infection in pea [e.g. Hsp70; Aranda et al. 1996, Proc. Natl Acad. Sci. USA 93, 15289-15293], we have investigated the effect that heat and virus replication may have on the expression of a heat-shock transcription factor gene (Hsf). We have characterized what appears to be the only member of the Hsf family in pea, PsHsfA. Similar to Hsp70, PsHsfA is heat-inducible in vegetative and embryonic tissues, which is concordant with the presence of heat shock elements (HSEs) and stress responsive elements (STRES) on its promoter sequence. The expression of PsHsfA during virus replication was studied in pea cotyledons and leaves, and compared to that of Hsp70. In situ hybridization experiments showed that whereas Hsp70 is induced, there is no detectable increased accumulation of PsHsfA RNA associated with the replication of pea seed-borne mosaic potyvirus (PShMV). These experiments indicate that there is a selective control of virus-induced hs gene expression, and suggest that different regulatory pathways control hs gene expression during heat shock and virus replication.

Aranda M.A. et al. Induction of HSP70 and polyubiquitin expression associated with plant virus replication. Proc Natl Acad Sci U S A. 1996; 93(26): 15289-93p. Abstract: By examining the front of virus invasion in immature pea embryos infected with pea seed-borne mosaic virus (PShMV), the selective control of different host genes has been observed. From our observations, the early responses to PShMV replication can be grouped into three classes, inhibited host gene expression, induced host gene expression, and no effect on a normal host function. The expression of two heat-inducible genes encoding HSP70 and polyubiquitin was induced coordinately with the onset of virus replication and the down-regulation of two other genes encoding lipoxygenase and heat shock cognate protein. The down-regulation was part of a general suppression of host gene expression that may be achieved through the degradation of
host transcripts. We discuss the possibilities of whether the induction of HSP70 and polyubiquitin genes represents a requirement for the respective protein products by the virus or is merely a consequence of the depletion of other host transcripts. The former is feasible, as the induction of both genes does result in increased HSP70 and ubiquitin accumulation. This also indicates that, in contrast to some animal virus infections, there is not a general inhibition of translation of host mRNAs following PSbMV infection. This selective control of host gene expression was observed in all cell types of the embryo and identifies mechanisms of cellular disruption that could act as triggers for symptom expression.

Armstrong T.W. et al. A tiered approach to assessing children's exposure: a review of methods and data. *Toxicol Lett.* 2002; 127(1-3) : 111-9p. Abstract: From a public health view, there are many important issues to improving children's and adolescent's health, for example, prenatal and childhood nutrition, immunizations, infectious disease control, and drug/alcohol/tobacco control. There has been increasing emphasis worldwide on protecting children from adverse health effects due to environmental factors, including chemicals. For well-studied contaminants (e.g. lead) the risks to children are reasonably known and appropriate risk management actions, in a public health context, can be undertaken. For a number of other chemicals, hazard and exposure data are less complete, and risk-based priorities are consequently less substantive. The US EPA's Voluntary Children's Chemical Evaluation Program proposal prompted additional efforts to develop and improve methods and data for assessing children's exposure. The goal is to efficiently identify the substances and conditions that present the highest potential risks to children, so that resources can be applied efficiently to assure their health improvement. The methods we illustrate use an iterative (tiered) approach for (a) screening level and (b) more detailed exposure assessments relevant to children. We also review and reference the key information sources available for such assessments and analyze the information and method's strengths and limitations.

Asher D.M. Bovine sera used in the manufacture of biologicals: current concerns and policies of the U.S. Food and Drug Administration regarding the transmissible spongiform encephalopathies. *Dev Biol Stand.* 1999; 99 41-4p. Abstract: Since 1993, consistent with its statutory responsibility to ensure that regulated products are safe, pure, and free of extraneous organisms, the United States Food and Drug Administration (FDA) has requested that, with certain exceptions, bovine-derived materials from animals born in or residing in countries where bovine spongiform encephalopathy has occurred, should not be used to manufacture products intended for humans. FDA's Center for Biologics Evaluation and Research (CBER) has specifically recommended that serum used to produce biologicals be obtained from sources certified to be free from contaminants and adventitious agents, such as the agent responsible for the production of Bovine Spongiform Encephalopathy. The United States Department of Agriculture (USDA) has prohibited importation of such serum for use in products. FDA staff are aware that bovine blood, including foetal blood, and placental tissues and fluids that might contaminate foetal serum have not been found to contain the infectious agent of BSE, and that those tissues are considered by most authorities to have little risk for transmitting disease to humans or animals. However, studies of BSE have been limited in size and sensitivity, and several experimental studies of scrapie and CJD in rodents found their blood to be infectious. In addition, a recent unpublished study of BSE (requiring confirmation) reported finding infectivity in the bone marrow of cattle. Possible transmission of BSE from cows to calves, although unlikely to constitute a major mode for maintaining the BSE outbreak, has also not been rigorously ruled out. Considering the special nature of biological products, especially of vaccines intended for widespread use in children, it seems prudent for U.S. regulatory authorities to continue current conservative policies that discourage or prohibit the use of bovine serum from countries with BSE.

Atrens D.M. The questionable wisdom of a low-fat diet and cholesterol reduction. *Soc Sci Med.* 1994; 39(3) : 433-47p. Abstract: The prevalent wisdom that a low-fat diet and cholesterol reduction are essential to good cardiovascular health is coming under increased scrutiny. An examination of the foundations of this view suggests that in many respects it was ill-conceived from the outset and, with the accumulation of new evidence, it is becoming progressively less tenable. Cross-sectional, longitudinal and cross-cultural investigations have variously suggested that the relationship between dietary fat intake and death from heart disease is positive, negative and random. These data are incompatible with the view that dietary fat intake has any causal role in cardiovascular health. Although hypercholesterolemia is associated with increased liability to death from heart disease, it is as frequently associated with increased overall life expectancy as with decreased life expectancy. These findings are incompatible with labelling hypercholesterolemia an overall health hazard. Moreover, it is questionable if the cardiovascular liability associated with hypercholesterolemia is either causal or reversible. The complex relationships between diet, serum cholesterol, atherosclerosis and mortality and their interactions with genetic and environmental factors suggest that the effects of simple dietary prescriptions are unlikely to be predictable, let alone beneficial. These cautions are borne out by numerous studies which have shown that multifactorial primary intervention to lower cholesterol levels is as likely to increase death from cardiovascular causes as to decrease it. Importantly, the only significant overall effect of cholesterol-lowering intervention that has ever been shown is increased mortality. The stress and helplessness associated with misappréhensions as to the dangers of dietary fat and the asceticism inherent in the war on cholesterol have considerable implications for health practices. Recent research in behavioral immunology suggests that stress and helplessness are likely to compromise immunity and promote ill-health.

Ayotte P. et al. Arctic air pollution and human health: what effects should be expected? *Sci Total Environ.* 1995; 160-161 529-37p. Abstract: Persistent contaminants such as heavy metals and organochlorine compounds are transported from distant sources to the Arctic by oceanic and atmospheric currents. Natives inhabiting the Arctic can be exposed, because they exist at the highest trophic level of the arctic aquatic food chain, along which biomagnification of contaminants occurs. We reviewed the data available on heavy metal and organochlorine body burden in natives from different regions of Nunavik (northern Quebec) and assessed the potential risk of health effects. In addition, we investigated the relationship between each contaminant...
plasma level and omega-3 fatty acid content of plasma phospholipid, a surrogate measure for aquatic food consumption. Cadmium exposure appears to be unrelated to the consumption of species from the aquatic food chain (r = 0.0004; P = 0.99), whereas PCBs and mercury were (r = 0.49 and 0.52, respectively; P < or = 0.0001). Mean blood mercury levels measured in northern Quebec natives were below those associated with significant neurological disorders. Typical daily intakes of dioxin-like compounds, PCBs, DDE, and dieldrin were estimated from the mean concentration in milk fat and pharmacokinetic models. The calculated PCB intake (0.3 microgram/kg/day) exceeds the acceptable daily intake, with effects on reproduction and development being the most relevant to assess in future epidemiological studies.

**B**

**Backer H.D. et al.** High incidence of extra-intestinal infections in a Salmonella Havana outbreak associated with alfalfa sprouts. *Public Health Rep.* 2000; 115(4) : 339-45p. **Abstract:** OBJECTIVE: To determine a vehicle and point source for an outbreak of Salmonella Havana. METHODS: The authors conducted a case-control study and traceback investigation of 14 residents of California and four from Arizona with onsets of illness from Apr 15, 1998, to June 15, 1998, and Salmonella Havana infections with identical PFGE patterns. RESULTS: Seventeen of 18 patients were women. Seventeen were adults 20-89 years of age. Nine (50%) had diarrheal illness, 6 (33%) had urinary tract infections, 2 (11%) had sepsis, and one had an infected surgical wound after appendectomy. Four patients were hospitalized, and one died. Eating alfalfa sprouts was associated with S. Havana infection (OR = 10.0; 95% confidence interval 1.2, 83.1; P = 0.01). CONCLUSIONS: This outbreak resulted in a high incidence of extra-intestinal infections, especially urinary tract infections, and high morbidity. Raw alfalfa sprouts, often considered a safe "heath food," can be a source of serious foodborne disease outbreaks.

**Baht R.V. et al.** Monitoring and assessment of dietary exposure to chemical contaminants. *World Health Stat Q.* 1997; 50(1-2) : 132-49p. **Abstract:** The results of the Global Environment Monitoring System/Food Contamination Monitoring and Assessment Programme (GEMS/Food) and other monitoring programmes for priority contaminants in the diet, including lead, cadmium, mercury, polychlorinated biphenyls, organochlorine and organophosphorus pesticide residues and aflatoxin, are presented. These results are assessed with respect to established acceptable or tolerable intakes for these contaminants. While the assessments generally confirm the effectiveness of government efforts to prevent or reduce food contamination in industrialized countries, better exposure estimates for infants and children and other vulnerable groups should be calculated. In developing countries, little reliable information is available on the occurrence of food contamination. Without such information, the health of hundreds of millions of people may be threatened. For these countries, and especially those that employ older agricultural and industrial technologies, basic food contamination monitoring and assessment programmes should be established for at least those contaminants of priority concern. These programmes form an essential basis for developing effective intervention strategies and for efficient management of health and environment resources. In all countries, accidental and sporadic contamination is an ever present danger and continual vigilance is necessary to protect public health. All countries should identify institutions with the analytical capability to support epidemiological investigations of outbreaks of disease that may be associated with consumption of chemically contaminated food. All countries should participate in GEMS/Food to promote health-oriented, population-based monitoring at the national level.

**Baker D.R. et al.** Variation in virulence in the gnotobiotic pig model of O157:H7 Escherichia coli strains of bovine and human origin. *Adv Exp Med Biol.* 1997; 412:53-8p. **Abstract:** Escherichia coli strains of serotype O157:H7 have been implicated in outbreaks and sporadic cases of food-borne illness, including diarrhea, hemorrhagic colitis, hemolytic uremic syndrome and thrombotic thrombocytopenic purpura. Food-producing animals, particularly cattle, are believed to be reservoirs of the organism. Whether all strains of bovine origin pose human health risk is unknown and was the impetus for this investigation. We compared the virulence of ten SLT-I, SLT-II, and eae DNA probe-positive O157:H7 strains from cattle to 10 like strains associated with human diarrhea disease outbreaks for virulence in one day-old gnotobiotic pigs. All strains caused diarrhea, and only four pigs inoculated with either of two bovine strains failed to develop that condition. Signs of central nervous system disease, death, debilitation requiring euthanasia before the end of an eight day observation period, and/or encephalomalacia occurred in 32/42 pigs inoculated with the strains isolated from human beings, 13/39 pigs inoculated with strains from cattle, and 7/7 pigs inoculated with a positive control strain. More strains of human origin (9/10) than bovine origin (5/10) caused these effects. The results of this study indicate considerable variability in virulence of O157:H7 strains possessing the same known virulence determinants, and suggest that disease outbreaks tend to be caused by the more virulent of these strains.

**Bakhshi S.S.** Appointment of medical officers of health (food safety) is essential for achieving food safety objectives in the UK. Response to food borne illness section (4.44-4.49) of the White Paper, the Food Standard Agency—a force for change, MAFF January 1998. *Public Health.* 1998; 112(3) : 139-42p. **Abstract:** National surveys reveal that the public has lost confidence in the safety of food. There is lack of co-ordination and failure to overcome institutional barriers at many levels throughout the food chain. The abolition of the post of medical officer of health and the public health departments of local government over which it presided, in view of many, including members of parliament, has been the most damaging of all changes to the public health and many have asked for the restoration of this post. Health departments have no overall statutory responsibility for food safety. The medical expertise of medical officers of health provided the executive authority with the necessary support in managing and controlling outbreaks of food poisoning, a point emphasised in the recommendations made by an inquiry set up by the government following the worst ever outbreak of food poisoning in Lanarkshire, Scotland, UK. Only such an appointment at local level will restore public confidence in food safety.

group A beta hemolytic streptococcus (GAS) pharyngitis occurred in an Israeli airforce base between 15 and 18 April, 1992. An epidemiologic investigation was conducted in a random sample of the base personnel. The effectiveness of prophylactic administration of penicillin to healthy individuals during the outbreak in preventing secondary spread of the disease was evaluated. 197 patients with pharyngitis were seen at the base clinic during the outbreak. The epidemiologic investigation indicated that the outbreak was food-borne. Consumption of processed white cheese that had been prepared without using a proper hand washing technique, 24 h before lunch on 15 April 1992, and subsequently kept at room temperature for 5 h, was significantly associated with GAS infection of the epidemic strain (p < 0.05). The food handler who processed the cheese had anterior cervical lymphadenopathy and GAS T type 8/25/Imp19 (the epidemic type) was found in his throat culture. The secondary respiratory attack rate among the healthy base personnel (n > 1,000) was 1.6%. 40 base personnel were treated by penicillin prophylaxis and had a secondary attack rate of 0%. The medical personnel who were on duty during the outbreak had a secondary attack rate of 75% (p < 0.001). The use of penicillin prophylaxis did not have an advantage in preventing secondary respiratory spread of streptococcal pharyngitis. Penicillin prophylaxis might reduce the high secondary attack rate of the disease in risk groups such as the medical personnel.

Bar-Dayan Y. et al. Food-borne and air-borne streptococcal pharyngitis--a clinical comparison. *Infection*, 1997; 25(1): 12-5p. Abstract: Different vehicles of transmission of the same pathogen may induce different clinical manifestations of the disease. The hypothesis was tested that the clinical manifestation of food-borne streptococcal pharyngitis is different from air-borne streptococcal pharyngitis. The symptoms and signs of 77 patients with endemic air-borne streptococcal pharyngitis compared to 103 patients with epidemic food-borne streptococcal pharyngitis (T type 8/25/imp19, M protein negative) and 11 patients with secondary air-borne epidemic streptococcal pharyngitis (T type 8/25/imp19, M protein negative) were prospectively evaluated. The patients with food-borne streptococcal pharyngitis had a significantly higher frequency of sore throat, fever, pharyngeal erythema, tonsillar enlargement and submandibular lymphadenopathy and a lower frequency of coryza and cough compared to the patients with endemic air-borne streptococcal pharyngitis. Although both food-borne and air-borne streptococcal infection caused upper respiratory tract infection, the clinical manifestation of food-borne streptococcal pharyngitis was more severe and more confined to the pharynx compared to the endemic air-borne disease. Involvement of the nasal mucosa and bronchial tree was more common in air-borne streptococcal pharyngitis than in the food-borne disease.

Barrett T.J. et al. Laboratory investigation of a multistate food-borne outbreak of Escherichia coli O157:H7 by using pulsed-field gel electrophoresis and phage typing. *J Clin Microbiol.*, 1994; 32(12): 3013-7p. Abstract: Two hundred thirty-three isolates of Escherichia coli O157:H7 were analyzed by both pulsed-field gel electrophoresis (PFGE) and bacteriophage typing. All 26 isolates from persons whose illness was associated with a recent multistate outbreak of E. coli O157:H7 infections linked to the consumption of undercooked hamburgers and all 27 isolates from incriminated lots of hamburger meat had the same phage type and the same PFGE pattern. Twenty-five of 74 E. coli O157:H7 isolates from Washington State and 10 of 27 isolates from other states obtained during the 6 months before the outbreak had the same phage type as the outbreak strain, but only 1 isolate had the same PFGE pattern. PFGE thus appeared to be a more sensitive method than bacteriophage typing for distinguishing outbreak and non-outbreak-related strains. The PFGE patterns of seven preoutbreak sporadic isolates and five sporadic isolates from the outbreak period differed from that of the outbreak strain by a single band, making it difficult to identify these isolates as outbreak or non-outbreak-related. Phage typing and PFGE with additional enzymes were helpful in resolving this problem. While not as sensitive as PFGE, phage typing was helpful in interpreting PFGE data and could have been used as a simple, rapid screen to eliminate the need for performing PFGE on unrelated isolates.

Batt C.A. Molecular diagnostics for dairy-borne pathogens. *J Dairy Sci.*, 1997; 80(1): 220-9p. Abstract: Advances in diagnostic assays based on nucleic acids will revolutionize the ability of the industry to maintain the safety of dairy foods. Two complementary assay formats are explored, one of which permits the rapid detection of bacterial pathogens and the other the identification of reservoirs of these pathogens. The first format is an assay based on the polymerase chain reaction that employs homogeneous detection (TaqMan polymerase chain reaction detection; Perkin Elmer, Applied Biosystems Division, Foster City, CA) of the target sequence. This assay has been applied to the detection of Listeria monocytogenes. A primary problem with current assays that are based on polymerase chain reaction is the complexity of sample handling and the quantification of the initial target number. This fluorogenic assay takes advantage of the endogenous 5,3'-endonuclease activity in Taq DNA polymerase. Approximately 100 samples can be analyzed in 2 to 3 h with a sensitivity of < 50 cells and a dynamic range of > 1000-fold. The TaqMan polymerase chain reaction detection assay is a robust format that is readily applicable to a wide array of other pathogens found in foods and in the environment. The second format is an instrument for automated ribosomal RNA analysis
Berg T. et al. Food-borne disease in the 21st century. What challenges await us? *Postgrad Med.* 1999; 106(2): 109-12, 115-6, 119p. Abstract: As the world shrinks and international commerce expands, food-borne illness is likely to become a major public health focus worldwide. Improved surveillance, community education, thorough understanding of the food production chain, use of HACCP strategies, and ionizing radiation are all important for reducing the risks. Primary care physicians play a crucial role in surveillance and early reporting, as well as in educating the public on the importance of basic food safety.

Bender J.B. et al. Bacterial pathogens. However, there is a number of bacteria humans. These diseases can only rarely be traced back to contact with fish or water. Critical motives are the wearing of gloves for work which may easily lead to skin abrasions (f. i. gutting of fish) and total abstinence of raw seafood. As their occurrence is independent of the common indicator bacteria, A. sp. are to be included in hygienic monitoring programmes for any water.

Berg T. et al. International legislation on trace elements as contaminants in food: a review. *Food Addit Contam.* 2002; 19(10): 916-27p. Abstract: Environmental contaminants such as trace elements may be present in all foods. Foods, raw materials and ingredients for food production are to an increasing extent traded across borders. Hence, there is a need for international legislation on trace elements as contaminants in food. In 1961, the FAO and WHO established the Codex Alimentarius to elaborate international food legislation. Contaminants in food are handled by the Codex Committee for Food Additives and Contaminants (CCFAC). The Codex Alimentarius system for developing legislation concerning trace elements as contaminants in food is based upon the Codex General Standard for Contaminants and Toxins in Food (GSCFT). By October 2001, the principles for setting maximum limits (MLs) for contaminants in food are agreed, and work is in progress on MLs for trace elements such as lead and cadmium in the various food categories. The status for the proposals is presented and discussed. The EU Regulation 466/2001 of 8 March 2001 sets MLs for lead and cadmium in various foods. This regulation will apply from 5 April 2002. The EU regulation is more detailed but similar to the Codex draft standards for lead and cadmium in food. In future, legislators and administrators in the Codex and EU and analytical chemists will discuss how to use more and better analytical data as risk-management tools to protect public health. Trace elements' speciation is an important aspect of this discussion.

Bernoth E.M. [The occurrence of bacteria pathogenic for humans in freshwater fish]. *DTW Dtsch Tierartzl Wochenschr.* 1990; 97(7): 285-90p. Abstract: Freshwater fish are of minor importance as vectors of food-borne disease in humans. These diseases can only rarely be traced back to bacterial pathogens. However, there is a number of bacteria with facultative pathogenicity for man, which are part of the natural aquatic environment. Among these bacteria, the motile aeromonads (A. sp.) have become more and more important. A review is presented on A. sp. infections which have been traced back to contact with fish or water. Critical discussion of these cases reveals that the etiological relevance of A. sp. remains unclarified. However, bacteria of this group can be associated with sometimes fatal infections in humans after contact with fish or water. As A. sp. are ubiquitous in water and can survive even in chlorinated tap water, infections are not necessarily restricted to contact with fish. Persons at risk (patients with chronic or malignant diseases, immunocompromised hosts, children, people with frequent contact with water) should be informed about the perceived risks of aeromonads and how to avoid infection. Preventive measures are the wearing of gloves for work which may easily lead to skin abrasions (f. i. gutting of fish) and total abstinence of raw seafood. As their occurrence is independent of the common indicator bacteria, A. sp. are to be included in hygienic monitoring programmes for any water.

Bess R.E. et al. Risk factors for positive mantoux tuberculin skin tests in children in San Diego, California: evidence for boosting and possible foodborne transmission. *Pediatrics.* 2001; 108(2): 305-10p. Abstract: OBJECTIVES: Source case finding in San Diego, California, rarely detects the source for children with tuberculosis (TB) infection or disease. One third of all pediatric TB isolates in San Diego are Mycobacterium bovis, a strain associated with raw dairy products. This study was conducted to determine risk factors for TB infection in San Diego. DESIGN: Case-control study of children <=5 years old screened for TB as part of routine health care visit. Asymptomatic children with a positive (>/=10 mm) Mantoux skin test (TST) were matched by age to 1 to 2 children with negative TST from the same clinic. We
assessed risk factors for TB infection through parental interview and chart review. RESULTS: A total of 62 cases and 97 controls were enrolled. Eleven cases and 25 controls were excluded from analysis because of previous positive skin tests. Compared with controls, cases were more likely to have received BCG vaccine (73% vs 7%, odds ratio [OR] 44), to be foreign born (35% vs 11%, OR 4.3), and to have eaten raw milk or cheese (21% vs 8%, OR 3.76). The median time between the most recent previous TST and the current test was 12 months for cases and 25 months for controls. Other factors associated with a positive TST included foreign travel, staying in a home while out of the country, and having a relative with a positive TST. There was no association between contact with a known TB case. In a multivariable model, receipt of BCG, contact with a relative with a positive TST, and having a previous TST within the past year were independently associated with TB infection. CONCLUSIONS: We identified several new or reemerging associations with positive TST including cross border travel, staying in a foreign home, and eating raw dairy products. The strong associations with BCG receipt and more recent previous TST may represent falsely positive reactions, booster phenomena, or may be markers for a population that is truly at greater risk for TB infection. Unlike studies conducted in nonborder areas, we found no association between positive TB skin tests and contact with a TB case or a foreign visitor. Efforts to control pediatric TB in San Diego need to address local risk factors including consumption of unpasteurized dairy products and cross-border travel. The interpretation of a positive TST in a young child in San Diego who has received BCG is problematic.

Beyer W. et al. Suitability of repetitive-DNA-sequence-based PCR fingerprinting for characterizing epidemic isolates of Salmonella enterica serovar Saintpaul. J Clin Microbiol. 1998; 36(6): 1549-54p. Abstract: Three molecular typing methods, repetitive-sequence-based PCR (rep-PCR) fingerprinting, plasmid profiling, and arbitrarily primed PCR fingerprinting, were used to characterize isolates of Salmonella enterica serovar Saintpaul. Most of the isolates were obtained from epidemic human cases of food-borne salmonellosis, together with some from the food material suspected to be the source of infection, and a few were obtained from other cases apparently not related to the epidemic. All three methods adequately discriminated the epidemic strain from other strains of the serovar. In addition several isolates from human cases which are not identical to the epidemic strain were found. These isolates therefore must have been responsible for some sporadic infections, which were only temporally related to the epidemic. These strains showed a high degree of similarity to a strain isolated from a turkey. rep-PCR fingerprinting with REP-Dt primers and primer ERIC1R, applicable even to crude cell lysates, offers an attractive choice as a primary method for the discrimination of various Salmonella serotypes as well as isolates within serotype Saintpaul.


Bhatia B.B. Current status of food-borne parasitic zoonoses in India. Southeast Asian J Trop Med Public Health. 1991; 22 Suppl 36-41p. Abstract: Food-borne parasitic zoonoses have a major impact on the health and economy in developing countries in the tropics and sub-tropics. Complex socio-economic and socio-cultural factors impact on the maintenance of parasitic zoonoses. In addition to human disease, some of these parasites are responsible for economic loss to livestock production. Throughout India, problems of food-borne parasitic zoonoses differ because of varied food habits. Other factors, however, such as unhygienic living conditions, lack of education, poor personal hygiene, poverty and occupation, also contribute to the dissemination of parasitic infections. The present status of various food-borne parasitic zoonoses are briefly given here.

Bibb W.F. et al. Analysis of clinical and food-borne isolates of Listeria monocytogenes in the United States by multilocus enzyme electrophoresis and application of the method to epidemiologic investigations. Appl Environ Microbiol. 1990; 56(7): 2133-41p. Abstract: To investigate the microbiology and epidemiology of the 1,700 sporadic cases of listeriosis that occur annually in the United States, we developed a multilocus enzyme electrophoresis (MEE) typing system for Listeria monocytogenes. We studied 390 isolates by MEE. Eighty-two electrophoretic types (ETs) were defined. Two distinct clusters of ETs, ET group A (ETGA) and ET group B (ETGB), separated at a genetic distance of 0.440, were identified. Strains of ETGB were associated with perinatal listeriosis (P = 0.03). All strains of H antigen type a were in ETGA, while all strains of H antigen type b were in ETGB. Among 328 clinical isolates from cases of listeriosis, 55 ETs of L. monocytogenes were defined. Thirty-four ETs were identified among 62 isolates from food products. The mean number of strains per ET (5.2) was significantly higher among clinical isolates than among food-borne isolates. Examination of isolates from outbreaks further documented the link between cases and contaminated food products. In one investigation, we found 11 different ETs, ruling out a single common source as a cause of that outbreak. By examining a large number of isolates collected over a specified time in diverse geographic locations in the United States, we have begun to establish a baseline for the study of the epidemiology of listeriosis by MEE.

Birmingham M.E. et al. Epidemic cholera in Burundi: patterns of transmission in the Great Rift Valley Lake region. Lancet. 1997; 349(9057): 981-5p. Abstract: BACKGROUND: After a 14-year hiatus, epidemic cholera swept through Burundi between January and May, 1992. The pattern of transmission was similar to that in 1978, when the seventh pandemic first reached this region. Communities affected were limited to those near Lake Tanganyika and the Rusizi River. The river connects Lake Tanganyika with Lake Kivu to the north in Zaire and Rwanda. METHODS: To identify sources of infection and risk factors for illness, an epidemiological study was carried out in Rumonge, a lake-shore town where 318 people were admitted to hospital with cholera between April 9 and May 31, 1992. The investigation included a case-control study of 56 case-patients and 112 matched controls. FINDINGS: Attack rates according to street increased with the street's proximity to Lake Tanganyika (chi 2 test for linear trend, p < 0.01) which suggests that exposure to the lake was a risk factor for illness. Comparison of the 56 case-patients with matched controls showed that bathing in the lake (odds ratio 1.6, attributable risk percentage 37%) and drinking its water (2.7, 14%) were independently and significantly (p < 0.05) linked with illness. No food-borne risk factors were identified. Vibrio cholera 01 was isolated from Lake Tanganyika during, but not after, the outbreak in Rumonge. Isolates from the lake and from...
patients with acute watery diarrhoea had the same serotype, biotype, and antimicrobial susceptibility profiles. The number of cases rapidly declined when access to the lake was blocked. INTERPRETATION: This study identifies bathing in contaminated surface water as a major risk factor for cholera in sub-Saharan Africa, and suggests that improving the quality of drinking water alone will have only limited impact on the transmission of the disease in the Great Rift Valley Lake region. The similarity in the patterns of transmission during the 1978 and 1992 epidemics suggests that extensive use of the Great Lakes and connecting rivers for transportation and domestic purposes may be the reason for the explosive cholera outbreaks that occur sporadically in this region.

Bloom H.G. et al. Aeromonas hydrophila diarrhea in a long-term care setting. *J Am Geriatr Soc.* 1990; 38(7): 804-6p. **Abstract:** Infectious diarrheal diseases can be a serious problem in long-term care institutions. Aeromonas hydrophila, a facultative, anaerobic gram-negative rod, has not been implicated previously in an acute diarrheal outbreak in this setting. We report 17 patients with this disorder all characterized by the acute onset of painless, nonbloody diarrhea. Thirteen of 17 (76%) patients had two to four loose bowel movements and a duration of illness of less than 48 hours. Eleven of 17 (65%) patients were afebrile. Stool cultures were obtained in 11 patients; 4 (36%) were positive for *A. hydrophila*. The disease was fatal in one patient who experienced profuse diarrhea and developed fever, tachycardia, and hypotension. The original source of the *A. hydrophila* was not identified but transmission is known to be water- or food-borne. Although usually mild and self-limited, *A. hydrophila* infection as noted in one patient can be fulminant and severe. *A. hydrophila* diarrhea responds to antibiotic therapy; it is important to consider in the differential diagnosis of acute diarrheal illness among older persons in an institutional setting.

Blum S. et al. Intestinal microflora and the interaction with immunocompetent cells. *Antonie Van Leeuwenhoek.* 1999; 76(1-4): 199-205p. **Abstract:** The intestinal mucosal surface is colonised by the comensal microflora that attains very high numbers of bacterial cells in the distal intestine, more specifically in the colon. At the same time these extensive areas are the interface with the external environment, through which most pathogens initiate infectious processes in mammals. Intestinal mechanisms of defense need to discriminate accurately between comensal, symbiotic microflora, and exogenous pathogens. Today we do not fully understand the essence of the mechanism of discrimination but, probably, innate as well as adaptive immune responses participate in this process. We have explored, in in vitro models, the capacity of mucosal immunocompetent cells to discriminate amongst signals delivered by different types of bacteria. We have found at least two different patterns of innate response to gram-negative and gram-positive bacteria, and within this last group big differences are observed between species. We have only worked with non-pathogenic bacteria in what may represent the modulation of the physiological host status. The understanding of these modulatory functions could render a unique possibility for the use of food-borne bacteria to prevent or correct intestinal problems associated with food allergy, inflammatory bowel disease, and autoimmunity.

Bodger K. et al. Clinical economics review: gastroenterology. *Aliment Pharmacol Ther.* 1996; 10(1): 55-60p. **Abstract:** In the prevailing climate of cost containment, doctors are increasingly expected to consider the economic consequences of treatment choices. Clinical (or medical) economics attempts to apply economic principles to the description and analysis of the costs of medical interventions, so as to identify how best to spend scarce health care resources. Such economic evaluations may assess the overall financial burden of a disease to society as a whole (macro-economics), or attempt to compare alternative treatment strategies for a specific clinical situation (micro-economics). In addition to expenditure on drugs and investigations (direct medical costs), economic studies may consider a variety of other costs. These include direct costs borne by patients (e.g. prescription charges, travel, food), indirect costs to society owing to lost productivity (resulting from morbidity or premature mortality) and even intangible costs which assign a monetary value to outcomes of disease such as pain, distress and anxiety. Four main types of economic analysis are in current use. Cost-minimization analysis attempts to identify the least expensive option in situations where there are a range of equally effective treatments for a given clinical condition, whereas cost-effectiveness analysis allows management strategies differing both in cost and efficacy to be compared. The cost-effectiveness of health care programmes targeting different disease states may also be compared using cost-utility analysis, in which health benefits are translated into a common utility-based unit of outcome, such as the Quality Adjusted Life Year (QALY). Cost-benefit analysis attempts to quantify health outcomes in monetary terms, so that the net result provides an assessment of value-for-money of health interventions. Gastrointestinal disorders are amongst the commonest of complaints, and considerable health care resources are consumed in treatment. Issues of cost-effectiveness are likely to assume increasing importance in gastroenterology because of the ever expanding range of drug choice; the increasing number of high cost treatments and the development of new therapeutic interventions.

Boenke A. Contribution of European research to risk analysis. *Food Addit Contam.* 2001; 18(12): 1135-40p. **Abstract:** The European Commission’s, Quality of Life Research Programme, Key Action 1-Health, Food & Nutrition is mission-oriented and aims, amongst other things, at providing a healthy, safe and high-quality food supply leading to reinforced consumer confidence in the safety, of European food. Its objectives also include the enhancing of the competitiveness of the European food supply. Key Action 1 is currently supporting a number of different types of European collaborative projects in the area of risk analysis. The objectives of these projects range from the development and validation of prevention strategies including the reduction of consumers risks; development and validation of new modelling approaches, harmonization of risk assessment principles methodologies and terminology; standardization of methods and systems used for the safety evaluation of transgenic food; providing of tools for the evaluation of human viral contamination of shellfish and quality control; new methodologies for assessing the potential of unintended effects of genetically modified (genetically modified) foods; development of a risk assessment model for Cryptosporidium parvum related to the food and water industries, to the development of a communication platform for genetically modified organism, producers, retailers, regulatory authorities and consumer groups to improve safety
assessments of Life Programme (QLP), Key Action 1 – Food, Nutrition & Health aims at providing a healthy, safe, and high-quality food supply leading to reinforced consumer’s confidence in the safety of the European food. Key Action 1 is currently supporting several European projects investigating analytical methods for food control including sensors, risk analysis, and food safety standardisation. Their objectives range from the development and validation of prevention strategies for mycotoxin formation via the development of a communication platform for Genetically Modified Organisms (GMO), validation and standardisation of diagnostic Polymerase Chain Reaction (PCR) for food-borne pathogens, up to the evaluation of the potential cancer-preventing activity of pro- and pre-biotic (“SYNBIOIC”) combinations in human volunteers. This paper also informs on future research needs in food safety.

Boenke A. Quality of Life Programme – food, nutrition, and health – projects promotion. Arch Hig Rada Toksikol. 2001; 52(1): 11-21p. Abstract: The EC Quality of Life Programme (QLP), Key Action 1 – Food, Nutrition & Health aims at providing a healthy, safe, and high-quality food supply leading to reinforced consumer’s confidence in the safety of the European food. Key Action 1 is currently supporting several European projects investigating analytical methods for food control including sensors, risk analysis, and food safety standardisation. Their objectives range from the development and validation of prevention strategies for mycotoxin formation via the development of a communication platform for Genetically Modified Organisms (GMO), validation and standardisation of diagnostic Polymerase Chain Reaction (PCR) for food-borne pathogens, up to the evaluation of the potential cancer-preventing activity of pro- and pre-biotic (“SYNBIOIC”) combinations in human volunteers. This paper also informs on future research needs in food safety.

Boerlin P. et al. Typing of human, animal, food, and environmental isolates of Listeria monocytogenes by multilocus enzyme electrophoresis. Appl Environ Microbiol. 1991; 57(6): 1624-9p. Abstract: To elucidate some aspects of the epidemiology of listeriosis in Switzerland, 181 strains of Listeria monocytogenes isolated from humans, animals, food, and the environment have been analyzed by multilocus enzyme electrophoresis at 21 enzyme loci. The clone responsible for several recent food-borne outbreaks in Switzerland and in North America (marked by electrophoretic type 1 and serovar 4b) has been found frequently among strains isolated from animals. Thus, animals may represent a major source of diffusion of this clone in the environment and in food, in which it has been found only sporadically, however. Two other unrelated clones (including strains belonging to serovars 1/2b and 1/2c) have often been isolated from meat but not from animals. These findings indicate that contamination of meat with L. monocytogenes might originate mainly from the environment in which it is processed rather than from animals themselves. This could explain the differences in the distribution of L. monocytogenes serovars isolated from meat and from animals.

Bolton F.J. et al. Verocytotoxin-producing Escherichia coli O157: public health and microbiological significance. Br J Biomed Sci. 1998; 55(2): 127-35p. Abstract: Escherichia coli O157 was recognised as a human pathogen in the late 1970s, its public health significance being recognised in 1982 when it was implicated in a large outbreak of infection associated with a fast- food restaurant in North America. Incidence of infection in the population is relatively low compared to other enteric pathogens; however, this organism causes a spectrum of disease increasing in severity from a mild diarrhoeal illness to haemorrhagic colitis, haemolytic uraemic syndrome (HUS) and, in some cases, death. Production of verocytotoxin and intimin, and the presence of a 60 kDa plasmid are thought to be important virulence factors; however, many currently unidentified factors may also contribute. The infectious dose of this organism is low and reports of food-borne, water-borne and person-to-person transmission have occurred, including several laboratory-acquired infections. Techniques for isolation, identification and confirmation of these organisms, based on cultural, immunological and molecular detection, are described. Additionally, schemes have been developed to type these organisms for epidemiological investigation, and the roles of phage typing and genotyping are discussed. These enable identification of sources and the introduction of intervention strategies for prevention of spread in the community.

Bonny G. et al. Toxicity of the chlordane metabolite oxychlordane in female rats: clinical and histopathological changes. Food Chem Toxicol. 2003; 41(2): 291-301p. Abstract: Due to widespread usage of the pesticide chlordane until the 1980’s, this toxic and persistent mixture has accumulated in the food chain. The Arctic acts as a global sink for these and other persistent organic pollutants, which bioaccumulate in the marine and freshwater food chains. As a result, humans consuming diets high in Arctic fish and marine mammal fat can ingest higher levels of chlordane contaminants than humans consuming "southern" diets. The most abundant constituents of the chlordane mixture are trans-chlordane, cis-chlordane, trans-nonachlor, cis-nonachlor and heptachlor; oxychlordane is the major metabolite of the chlordanes and nonachlors. In humans the predominant chlordane-related contaminants detected in breast milk and adipose tissues are trans-nonachlor and oxychlordane. The present studies were undertaken to provide toxicological data on oxychlordane for the purpose of clarifying target organ toxicity and risks to human health associated with ingesting contaminated foods. Female rats were gavaged with oxychlordane at doses ranging from 0.01 to 10 mg/kg body weight/day for up to 28 days. In terms of general toxicity oxychlordane had a steep dose-response curve: 10 mg/kg oxychlordane was acutely toxic and 1 mg/kg oxychlordane caused no measurable effects. Weight loss, reduced feed consumption and thymic atrophy were the hallmarks of acute oxychlordane toxicity. At lower doses rats showed signs of hepatic changes indicative of microsomal enzyme induction. Oxychlordane was more bioaccumulative and was toxic at levels approximately 8 times lower than trans-nonachlor and cis-nonachlor. Thus, ingestion of trans-nonachlor and related chlordane contaminants in foods results in the formation of a metabolite that is more toxic and bioaccumulative than the parent contaminants.

Bonner C. et al. Analysis of outbreaks of infectious intestinal disease in Ireland: 1998 and 1999. Ir Med J. 2001; 94(5): 140, 142-4p. Abstract: Surveillance of general outbreaks of infectious gastroenteritis was introduced in 1998 by the Food Safety Authority of Ireland (FSAI), in co-operation with the eight health boards. A total of 67 general outbreaks of gastroenteritis in Ireland were reported to the FSAI in 1998 and 1999. Over 1900 people were ill as a result of these outbreaks. Four percent required hospitalisation and there were two deaths. The duration of the outbreaks varied between one day and 38 days. Salmonellae (44%) and small round structured viruses (SRSV) (12%) were the most commonly reported pathogens. In 25% of the outbreaks the aetiology was unknown. The commonest settings were restaurants, hotels and take-aways, which accounted for 45% (30/67) of all outbreaks. Sixteen percent of all outbreaks occurred in hospitals and residential institutions. Over half of
the outbreaks were reported to be foodborne, 63% of which were due to various serotypes of Salmonella enterica. Eggs were implicated as the vehicle of infection in 13% of all outbreaks. An infected food handler was identified in almost one third of outbreaks, although it could not be established if this had contributed directly to the outbreak.

Bottone E.J. Yersinia enterocolitica: the charisma continues. Clin Microbiol Rev. 1997; 10(2) : 257-76p. Abstract: Yersinia enterocolitica, a gram-negative coccobacillus, comprises a heterogeneous group of bacterial strains recovered from animal and environmental reservoirs. The majority of human pathogenic strains are found among distinct serogroups (e.g. O:3, O:5,27, O:8, O:9) and contain both chromosome- and plasmid (60 to 75 kb)-mediated virulence factors that are absent in "avirulent" strains. While Y. enterocolitica is primarily a gastrointestinal tract pathogen, it may produce extraintestinal infections in hosts with underlying predisposing factors. Postinfection sequelae include arthritis and erythema nodosum, which are seen mainly in Europe among patients with serogroups O:3 and O:9 infection and HLA-B27 antigen. Y. enterocolitica is acquired through the oral route and is epidemiologically linked to porcine sources. Bacteremia is prominent in the setting of immunosuppression or in patients with iron overload or those being treated with desferrioxamine. Metastatic foci following bacteremia are common and often involve the liver and spleen. Of particular concern is blood transfusion-related bacteremia. Evidence has accumulated substantiating the role of Y. enterocolitica as a food-borne pathogen that has caused six major outbreaks in the United States. The diagnosis of Y. enterocolitica gastroenteritis is best achieved through isolation of the bacterium on routine or selective bacteriologic media. When necessary, serogrouping, biogrouping, and assessment for plasmid-encoded virulence traits may aid in distinguishing virulent from "avirulent" strains. Epidemiologically, outside of identified food-borne outbreaks, the source (reservoir) of Y. enterocolitica in sporadic cases is speculative. Therefore, prevention and control measures are difficult to institute.

Bovee-Oudenhoven I. et al. Calcium in milk and fermentation by yoghurt bacteria increase the resistance of rats to Salmonella infection. Gut. 1996; 38(1) : 59-65p. Abstract: Calcium in milk products stimulates gastric acid secretion and inhibits the cytolitic activity of intestinal contents. Based on these effects, it was hypothesised that calcium might lessen the severity of food borne intestinal infections. The possible differential effects of a low calcium milk and normal milk products (milk, acidified milk, and pasteurised yoghurt) on the resistance of rats to a salmonella infection was therefore studied. Rats were infected orally with Salmonella enteritidis just after food consumption. The first day after infection, faecal salmonella counts of the yoghurt fed rats were significantly lower than those of the other groups. Thereafter, faecal salmonella excretion declined rapidly in all high calcium groups, whereas rats fed the low calcium milk continued to excrete high numbers of salmonella. The reduced colonisation resistance to salmonella of rats fed low calcium milk might be caused by the high cytolitic activity of faecal water or a high iron concentration in faecal water, already present before infection, or both. The reduced resistance of these rats corresponded with a large infection induced increase in the cytolitic activity of faecal water, an appreciable reduction in apparent iron absorption, and a large increase in faecal mucin and alkaline phosphatase excretion.

In yoghurt fed rats, only minor infection induced changes in luminal parameters were noticed. The rats fed milk and acidified milk always showed intermediate reactions. In conclusion, in addition to fermentation by yoghurt bacteria, calcium in milk products strongly enhanced the resistance to salmonella infection by lowering luminal cytolitic activity or diminishing the availability of iron for pathogen growth, or both.

Brenner E.D. et al. Characterization of LeMir, a root-knot nematode-induced gene in tomato with an encoded product secreted from the root. Plant Physiol. 1998; 118(1) : 237-47p. Abstract: A tomato gene that is induced early after infection of tomato (Lycopersicon esculentum Mill.) with root-knot nematodes (Meloidogyne javanica) encodes a protein with 54% amino acid identity to miraculin, a flavorless protein that causes sour substances to be perceived as sweet. This gene was therefore named LeMir (L. esculentum miraculin). Sequence similarity places the encoded protein in the soybean trypsin inhibitor family (Kunitz). LeMir mRNA is found in root, hypocotyl, and flower tissues, with the highest expression in the root. Rapid induction of expression upon nematode infection is localized to root tips. In situ hybridization shows that LeMir is expressed constitutively in the root-cap and root-tip epidermis. The LeMir protein product (LeMir) was produced in the yeast Pichia pastoris for generation of antibodies. Western-blot analysis showed that LeMir expression is up-regulated by nematode infection and by wounding. LeMir is also expressed in tomato callus tissue. Immunoprint analysis revealed that LeMir is expressed throughout the seedling root, but that levels are highest at the root/shoot junction. Analysis of seedling root exudates revealed that LeMir is secreted from the root into the surrounding environment, suggesting that it may interact with soil-borne microorganisms.


Brooks H.J. et al. Non-O157 Vero cytotoxin producing Escherichia coli: aetiological agents of diarrhoea in children in Dunedin, New Zealand. Comp Immunol Microbiol Infect Dis. 1997; 20(2) : 163-70p. Abstract: Strains of Escherichia coli that produce Vero cytotoxin (VTEC) commonly cause diarrhoea, haemorrhagic colitis and haemolytic-uraemic syndrome in many northern hemisphere countries. In these countries, serotype O157:H7/H-predominates and has caused large food-borne outbreaks of infection. In contrast, few cases of infection with this serotype have been reported in New Zealand. Over a 3-month period, 484 stool specimens submitted to medical laboratories in Dunedin were screened for E. coli O157:H7/H-using sorbitol MacConkey agar, Y1 and Vero cell assays. Where possible, Vero cytotoxin production was confirmed by an ELISA test. Specimens from children aged 12 years or less were additionally screened for non-O157 VTEC. In the specimens of the children tested, O157:H7/H-VTEC was not isolated, but VTEC belonging to other serogroups were isolated from the children. Of interest was the detection of other species of Enterobacteriaceae, which produced a cytopathic effect on Vero cells. This study confirms the low incidence of infection with O157:H7/H-VTEC in New Zealand and suggests that non-O157 VTEC is a more important cause of diarrhoeal disease.
Brouwer A. et al. Report of the WHO working group on the assessment of health risks for human infants from exposure to PCDDs, PCDFs and PCBs. *Chemosphere*. 1998; 37(9-12): 1627-43p. **Abstract:** In a world Health Organization working group consisting of 12 scientific representatives from 6 different countries met to reassess the health risks to infants associated with perinatal exposure to polychlorinated aromatic hydrocarbons (PHAHS). Following a review of previous WHO/EURO consultations, as part of their comprehensive programme on PCDDs, PCDFs and PCBs, current exposure information and recent experimental and epidemiologic data were discussed. Exposure assessments within the past decade have revealed that in the case of breast milk samples concentrations of PCDDs/DFs and PCBs have shown a continual decline, in certain countries by up to 50%. New experimental data has revealed that a variety of structural, functional and behavioural alterations can be induced in rodent species following exposure to PHAHS while the Dutch collaborative PCB/dioxin study has illustrated subtle clinical, endocrine and mental/psychomotor development effects can occur in breast fed infants. The provisional conclusions of the working group were: 1) current evidence does not warrant altering the previous WHO recommendation for promotion/support of breast feeding and 2) based on new clinical data which supports the biological plausibility of certain observed experimental observations, continued and enhanced effort should be directed towards identifying and controlling sources of environmental input for these contaminants.

Brown G.H. et al. Cyclospora: review of an emerging parasite. *Pharmacotherapy*. 1999; 19(1): 70-5p. **Abstract:** Cyclospora is a parasite traditionally associated with diarrhea in travelers to endemic countries. Recently, several cases of cyclosporiasis were reported in nontravelers in the United States and Canada, implicating various fruits and vegetables as vehicles of infection. The life cycle of cyclospora is not fully known, but is believed to involve both sexual and asexual stages of proliferation. Food- and water-borne transmission of infection have been implicated. Patients infected with Cyclospora cayetanensis have protracted watery diarrhea. Various generalized symptoms are also present, making cyclosporiasis indistinguishable from infectious diarrhea caused by other microorganisms. Diagnosis depends on identifying the organism by microbiologic examination of stool samples. Treatment consists of supportive care, maintenance of fluid and electrolyte status, symptomatic relief, and antibiotic therapy. Trimethoprim-sulfamethoxazole is the only antibiotic available that is effective in eradicating the organism.

Brown J.S. Jr Geographic correlation of multiple sclerosis with tick-borne diseases. *Mult Scler* 1996; 1(5): 257-61p. **Abstract:** An arboviral theory of multiple sclerosis (MS) is presented. Although high MS rates correlate with the distribution of certain population, high rates also correlate with the distribution of Ixodes genus tick viruses. These ticks and viruses are globally distributed by polar- migrating seabirds which are important food sources for island and coastal communities with high MS. Investigation of tick-borne viruses, especially those found in seabirds, in MS is warranted.

Brugha R. et al. A community outbreak of food-borne small round-structured virus gastroenteritis caused by a contaminated water supply. *Epidemiol Infect*. 1999; 122(1): 145-54p. **Abstract:** In August 1994, 30 of 135 (23%) bakery plant employees and over 100 people from South Wales and Bristol in the United Kingdom, were affected by an outbreak of gastroenteritis. Epidemiological studies of employees and three community clusters found illness in employees to be associated with drinking cold water at the bakery (relative risk 3.3, 95%, CI 1.6-7.0), and in community cases with eating custard slices (relative risk 19.8, 95%, CI 2.9-135.1) from a variety of stores supplied by one particular bakery. Small round-structured viruses (SRSV) were identified in stool specimens from 4 employees and 7 community cases. Analysis of the polymerase and capsid regions of the SRSV genome by reverse transcription-polymerase chain reaction (RT-PCR) demonstrated viruses of both genogroups (1 and 2) each with several different nucleotide sequences. The heterogeneity of the viruses identified in the outbreak suggests that dried custard mix may have been inadvertently reconstituted with contaminated water. The incident shows how secondary food contamination can cause wide-scale community gastroenteritis outbreaks, and demonstrates the ability of molecular techniques to support classical epidemiological methods in outbreak investigations.

Bryan R.T. et al. Emerging infectious diseases in the United States, Improved surveillance, a requisite for prevention. *Ann N Y Acad Sci*. 1994; 740: 346-61p. **Abstract:** Emerging infectious diseases such as prolonged diarrheal illness due to water-borne Cryptosporidium, hemorrhagic colitis and renal failure from food-borne E. coli O157:H7, and rodent-borne hantavirus pulmonary syndrome as well as reemerging infections such as tuberculosis, pertussis, and cholera vividly illustrate that we remain highly vulnerable to the microorganisms with which we share our environment. Prompt detection of new and resurgent infectious disease threats depends on careful monitoring by modern surveillance systems. This article focuses on five important elements of improved surveillance for emerging infections: 1) strengthening the national notifiable disease system, 2) establishing sentinel surveillance networks, 3) establishing population-based emerging infections programs, 4) developing a system for enhanced global surveillance, and 5) applying new tools and novel approaches to surveillance.

Buchholz U. et al. Haff disease: from the Baltic Sea to the U.S. shore. *Emerg Infect Dis*. 2000; 6(2): 192-5p. **Abstract:** Haff disease, identified in Europe in 1924, is an unexplained rhabdomyolysis in a person who ate fish in the 24 hours before onset of illness. We describe a series of six U.S. patients from 1997 and report new epidemiologic and etiologic aspects. Although Haff disease is traditionally an epidemic foodborne illness, these six cases occurred in two clusters and as one sporadic case.

Buchholz U. et al. A risk-based restaurant inspection system in Los Angeles County. *J Food Prot*. 2002; 65(2): 367-72p. **Abstract:** The majority of local health departments perform routine restaurant inspections. In Los Angeles County (LAC), California, approximately $10 million/year is spent on restaurant inspections. However, data are limited as to whether or not certain characteristics of restaurants make them more likely to be associated with foodborne incident reports. We used data from the LAC Environmental Health Management Information System (EHMIS), which records the results of all routine restaurant inspections as well as data regarding all consumer-generated foodborne incidents that
led to a special restaurant inspection by a sanitarian (investigated foodborne incidents [IFBIs]). We analyzed a cohort of 10,267 restaurants inspected from 1 July 1997 to 15 November 1997. We defined a "case restaurant" as any restaurant with a routine inspection from 1 July 1997 to 15 November 1997 and a subsequent IFBI from 1 July 1997 to 30 June 1998. Noncase restaurants did not have an IFBI from 1 July 1997 to 30 June 1998. We looked for specific characteristics of restaurants that might be associated with the restaurant subsequently having an IFBI, including the size of restaurant (assessed by number of seats), any previous IFBIs, the overall inspection score, and a set of 38 violation codes. We identified 158 case restaurants and 10,109 noncase restaurants. In univariate analysis, middle-sized restaurants (61 to 150 seats; n = 1,681) were 2.8 times (95% confidence interval [CI] = 2.0 to 4.0) and large restaurants (>150 seats; n = 621) were 4.6 times (95% CI = 3.0 to 7.0) more likely than small restaurants (< or =60 seats; n = 7,965) to become case restaurants. In addition, the likelihood of a restaurant becoming a case restaurant increased as the number of IFBIs in the prior year increased (chi2 for linear trend, P value = 0.0005). Other factors significantly associated with the occurrence of an IFBI included a lower overall inspection score, the incorrect storage of food, the reuse of food, the lack of employee hand washing, the lack of thermometers, and the presence of any food protection violation. In multivariate analysis, the size of restaurant, the incorrect storage of food, the reuse of food, and the presence of any food protection violation remained significant predictors for becoming a case restaurant. Our data suggest that routine restaurant inspections should concentrate on those establishments that have a large seating capacity or a poor inspection history. Evaluation of inspection data bases in individual local health departments and translation of those findings into inspection guidelines could lead to an increased efficiency and perhaps cost-effectiveness of local inspection programs.

Buchrieser C. et al. Pulsed-field gel electrophoresis applied for comparing Listeria monocytogenes strains involved in outbreaks. Can J Microbiol. 1993; 39(4): 395-401p. Abstract: Recent food-borne outbreaks of human listeriosis as well as numerous sporadic cases have been mainly caused by Listeria monocytogenes serovar 4b strains. Thus, it was of interest to find out whether a certain clone or a certain few clones were responsible for these cases and especially for outbreaks. We used pulsed-field gel electrophoresis of large chromosomal DNA restriction fragments generated by Apal, Smal, or NotI to analyse 75 L. monocytogenes strains isolated during six major and eight smaller recent listeriosis outbreaks. These strains could be divided into 20 different genomic varieties. Thirteen of 14 strains isolated during major epidemics in Switzerland (1983-1987), the United States (California, 1985) and Denmark (1985-1987) demonstrated indistinguishable DNA restriction patterns. In contrast, strains responsible for the outbreaks in Canada (Nova Scotia, 1981), the United States (Massachusetts, 1983), France (Anjou, 1975-1976), New Zealand (1969), and Austria (1986) and some smaller outbreaks in France (1987, 1988, 1989) were each characterized by particular combinations of DNA restriction patterns. Seventy-seven percent of the tested strains could be classified into the previously described Apal group A (Brosch et al. 1991), demonstrating a very close genomic relatedness. Because 49% of the epidemic strains selected for this study belonged to phagovar 2389/47/108/340, fifty-six additional strains of these phagovars, isolated from various origins, were also typed to determine whether differences in DNA restriction profiles between epidemic and randomly selected strains of the same phagovars could be pointed out. Variations in DNA patterns appeared more frequently within randomly selected strains than within epidemic strains.

Bula C.J. et al. An epidemic of food-borne listeriosis in western Switzerland: description of 57 cases involving adults. Clin Infect Dis. 1995; 20(1): 66-72p. Abstract: This article describes 57 cases of listeriosis that occurred in adults in western Switzerland during an outbreak associated with the consumption of a soft cheese. Twenty-one percent of the cases were of bacteremia, 40% were of meningitis, and 39% were of meningoencephalitis. Overall, 42% of the patients had an underlying disease and 54% were > 65 years of age. Patients with bacteremia were significantly older than those with meningitis or meningoencephalitis (median ages, 75, 69, and 55 years, respectively). The epidemic strain, defined by phage typing, was isolated in three-quarters of the listerial cases observed during the epidemic period and did not appear to differ significantly from the nonepidemic strains in terms of virulence. The overall mortality associated with the 57 cases was 32%. Among the patients' characteristics, age and type of clinical presentation were independent predictors of death in a multivariate logistic regression model (pseudo-r2 [coefficient of determination], .26; both P values < .05), and a presentation of meningoencephalitis was associated with an increased death risk (odds ratio, 6.5; 95% confidence interval, 1.1-39.5; P < .05). Neurological sequelae developed in 30% of the survivors of CNS listeriosis.

Burger J. et al. Exposure of South Carolinians to commercial meats and fish within their meat and fish diet. Sci Total Environ. 2002; 287(1-2): 71-81p. Abstract: There has been considerable interest in the public's exposure to a variety of contaminants through the consumption of wild fish and game, yet there is little information on consumption of commercial meats and fish, or the relationship between commercial and self-caught fish. We conducted a dietary survey in 1999 to estimate exposure levels of 464 individuals from people attending the Palmetto Sportsmen's Classic. Mean consumption was similar for beef, chicken/turkey, and wild-caught fish, and much lower for pork and store-bought fish, and still lower for restaurant fish. There were no ethnic differences in the consumption of most commercial fish and meats, although the differences for chicken approached significance. There were significant ethnic differences in consumption of wild-caught fish. Women ate significantly less of all meat types, except store-bought fish. People over 45 ate less beef than younger people, and people younger than 32 ate significantly more chicken than others. There were no significant differences in consumption patterns as a function of income, except for chicken and wild-caught fish; people with higher incomes ate more chicken than others, and people with lower incomes ate more wild-caught fish than others. When all wild-caught and commercial fish and meats are considered, there are significant differences only for ethnicity and gender. Blacks consume significantly more fish than Whites, and men consume significantly more than women.

process of ecological risk assessment should involve the ability to predict adverse outcomes of particular environmental contaminants or human intrusions. Ecological risk assessment generally focuses on populations, communities, and ecosystems, rather than on individual health. We explore the importance of life history strategies of aquatic turtles to their risk from environmental contaminants and other human activities using three examples: the wood turtle Clemmys insculpta, a freshwater species; the diamondback terrapin Malaclemys terrapin, a littoral species; and marine turtles as a group. These turtles are partly herbivorous and are at low or intermediate levels on the food chain, yet are particularly vulnerable due to their life history strategies of being long-lived with relatively low survival of young. They suffer a variety of natural mortality factors that include predation, starvation, and disease, as well as inundation and destruction of nesting beaches and their eggs by storms. Yet they also face a number of anthropogenic hazards, including toxic chemicals and floatables (plastics); capture for food, other products, and pets; incidental mortality in fishing gear; disturbance while nesting or moving on land; injuries or death by collision with boats; and increased predator exposure because of humans. The three turtle species (or groups of species) examined have experienced these natural and anthropogenic pressures differentially, with resultant differences in the rates of population declines. Because they are lower on the food chain than other obligate carnivores, they are less vulnerable to toxics, and to date, toxics seem a relatively inconsequential environmental risk to turtles.

Burger J. et al. Science, policy, stakeholders, and fish consumption advisories: developing a fish fact sheet for the Savannah River. Environ Manage. 2001; 27(4): 501-14p. Abstract: In recent years there has been a startling rise in the issuance of fish consumption advisories. Unfortunately, compliance by the public is often low. Low compliance can be due to a number of factors, including confusion over the meaning of advisories, conflicting advisories issued by different agencies, controversies involving health benefits versus the risks from consuming fish, and an unwillingness to act on the advisories because of personal beliefs. In some places, such as along the Savannah River, one state (South Carolina) had issued a consumption advisory while the other (Georgia) had not, although at present, both states now issue consumption advisories for the Savannah River. Herein we report on the development of a fish fact sheet to address the confusing and conflicting information available to the public about consuming fish from the Savannah River. The process involved interviewing fishers to ascertain fishing and consumption patterns, evaluating contaminant levels and exposure pathways, discussing common grounds for the provision of information, and consensus-building among different regulatory agencies (US Environmental Protection Agency, South Carolina Department of Health and Environmental Control, Georgia Department of Natural Resources) and the Department of Energy. Consensus, a key ingredient in solving many different types of "commons" problems, was aided by an outside organization, the Consortium for Risk Evaluation with Stakeholder Participation (CRESPI). The initial role for CRESPI was to offer scientific data as a basis for groups with different assumptions about risks to reach agreement on a regulatory response action. The process was an example of how credible science can be used to implement management and policies and provide a basis for consensus-building on difficult risk communication issues. The paper provides several lessons for improving the risk process from stakeholder conflicts, through risk assessment, to risk management. It also suggests that consensus-building and risk communication are continuing processes that involve assimilation of new information on contaminants and food-chain processes, state and federal law, public policy, and public response.

Burger J. et al. Fishing, consumption, and risk perception in fisherfolk along an east coast estuary. Environ Res. 1998; 77(1): 25-35p. Abstract: Increasingly public and governmental agencies are concerned about the safety of fish and shellfish that recreational fishermen consume. Fishing behavior, consumption patterns, and risk perceptions were examined for people fishing and crabbing in Barnegat Bay, NJ. Women fished in significantly larger groups than men, and their groups included more children. Subjects fished an average of seven times per month and crabbled three times per month; they caught fish on most outings, and 80% ate their catch. Subjects consumed fish an average of five times a month, eating just under 10 oz (ca. 280 g) per meal. Only 25% of the fish consumed by women, and 49% of the fish consumed by men, are self-caught. Nearly 90% of the people believe the fish and crabs from Barnegat Bay are safe to eat, although about 40% have heard some warnings about their safety. Most people heard about advisories from newspapers or television. Most subjects believe that saltwater fish are safer than freshwater fish and that fish they catch themselves or buy in a bay store are safer than those from a supermarket. People generally do not have a clear understanding of the relationship between contaminants and fish size or trophic level, suggesting an avenue for risk reduction.

Burger J. et al. Factors in exposure assessment: ethnic and socioeconomic differences in fishing and consumption of fish caught along the Savannah River. Risk Anal. 1999; 19(3): 427-38p. Abstract: South Carolina has issued fish consumption advisories for the Savannah River based on mercury and radionuclide levels. We examine differences in fishing rates and fish consumption of 258 people interviewed while fishing along the Savannah River, as a function of age, education, ethnicity, employment history, and income, and test the assumption that the average consumption of fish is less than the recreational value of 19 kg/year assumed by risk assessors. Ethnicity and education contributed significantly to explaining variations in number of fish meals per month, serving size, and total quantity of fish consumed per year. Blacks fished more often, ate more fish meals of slightly larger serving sizes, and consumed more fish per year than did Whites. Although education and income were correlated, education contributed most significantly to behavior; people who did not graduate from high school ate fish more often, ate more fish per year, and ate more whole fish than people who graduated from high school. Computing consumption of fish for each person individually indicates that (1) people who eat fish more often also eat larger portions, (2) a substantial number of people consume more than the amount of fish used to compute risk to recreational fishermen, (3) some people consume more than the subsistence level default assumption (50 kg/year) and (4) Blacks consume more fish per year than Whites, putting them at greater risk from contaminants in fish. Overall, ethnicity, age, and education contributed to variations in fishing behavior and consumption.
Butler J.C. et al. Emerging infectious diseases in Alaska and the Arctic: a review and a strategy for the 21st century. *Alaska Med.* 1999; 41(2): 35-43p. **Abstract:** Emergence of new, previously unknown, and drug-resistant infectious diseases pose a major threat to global health. The emergence of infectious diseases in Alaska and the Arctic parallels the resurgence of infectious diseases worldwide. The Centers for Disease Control and Prevention has developed a strategy to revitalize the capacity to protect the public from emerging infectious diseases by improving four major public health activities: surveillance and response, applied research, infrastructure and training, and prevention and control. The plan targets high-priority emerging infectious disease problems and particular groups of people at increased risk. These target areas encompass a number of diseases of special concern in Alaska, such as drug-resistant Streptococcus pneumoniae infections, foodborne botulism, alveolar hydatid disease, viral hepatitis, Helicobacter pylori infections, Haemophilus influenzae type b bacteremia and meningitis, and infections of immunocompromised persons, pregnant women and newborns, and tourists. To address these and other emerging infectious disease issues, including the threat of bioterrorism in Alaska and the Arctic, future issues of Alaska Medicine will include updates on specific emerging infectious diseases for health care providers, clinical laboratory workers, and community public health professionals who form the front lines for recognizing, treating, and preventing emerging infectious diseases.

Butte W. et al. Pollutants in house dust as indicators of indoor contamination. *Rev Environ Contam Toxicol.* 2002; 175: 1-46p. **Abstract:** This review summarizes occurrence of organic and inorganic contaminants in house dust and the contribution of house dust as a marker of indoor exposure. Several studies have identified house dust as an important route of toxicant exposure. Often levels of pollutants found in house dust, including compounds banned long ago, are significant sources of exposure for the general population, especially children. House dust is a sink and repository for semivolatile organic compounds and particle-bound matter. Analyses of compounds in house dust are a measure of indoor contamination but may also provide valuable information for assessment of human indoor exposure. The objective of analyzing house dust are to describe the extent, distribution, and determinants of exposure; to identify possible sources of indoor contamination, or to record elevated indoor exposure leading to intervention or sanitation. House dust and compounds adsorbed to house dust may enter the human body by inhalation of suspended and resuspended particles, through nondietary ingestion of dust, through ingestion of particles adhering to food, surfaces in the homes, and on the skin as well as by absorption through the skin. The quantity of dust inhaled and deposited in the differing parts of the alveolar tract is dependent on the aerodynamic diameter. Exposure to house dust does not exclusively and may not even predominantly occur via inhalation, however. For instance, ingestion of house dust particles adhering to food, objects, and the skin or direct absorption through the skin may be primary routes of exposure (Lewis et al. 1994). Samples referred to as "house dust" vary significantly because house dust may be of different origin, amount, and composition and the method of sampling the dust influences the properties of the sample used for analysis. Passive and active sampling methods are described and discussed. For the analysis of organic pollutants in house dust, the < or = 63-microns fraction should be favored because variances caused by inhomogeneity of the subsample are low. Results from studies on house dust are presented for polychlorinated biphenyls (PCB), polycyclic aromatic hydrocarbons (PAH), plasticizers (phthalates, phenols), flame retardants, other organic xenobiotics, and inorganic constituents. If available, medians as a measure of the average concentration and the 90th or 95th percentiles are added as reference values. The review of the literature points out that ingestion of house dust may be a major route of exposure to pesticides for infants and toddlers. So far, only a few guideline values or limiting values for house dust exist. For lead in house dust, the health risk is regulated only in the U.S. and for PAH in the Federal Republic of Germany. Risk associated with the ingestion of contaminated dust by small children (age, 1-6 years; mean body weight, 16 kg) can be estimated using the chronic oral reference dose (RfD) and a daily intake of 100 mg house dust. The tentative benchmark house dust concentrations that are believed to be without health effect for small children were calculated for several compounds from their current RfD. Comparison with the maximum concentrations reviewed for chlorpyrifos, DDT, and diazinon indicates that the tolerable exposure concentration in house dust might be exceeded and that chlorpyrifos especially can be considered as a potential hazard to householders. The role of house dust as an exposure source is gaining more attention over the years but several open questions related to health remain to be resolved. Pesticides applied outside or within the household that are absorbed and preserved by house dust can lead through the everyday activities of children and infants to increased exposure. Residential exposure including house dust resides contribute to combined exposure from dietary and nondietary sources. It is justified to shift more attention to indoor pollution by house dust contamination and to improve the risk assessment of nondietary ingestion, but any health-based standard must be accompanied by a specific dust sampling method.

Campbell K.R. et al. The accumulation and effects of environmental contaminants on snakes: a review. *Environ Monit Assess.* 2001; 70(3): 253-301p. **Abstract:** In any ecological risk assessment, a full complement of the relevant members of the ecosystems being studied should be considered. Reptiles in general, and snakes in particular, are important although often neglected components of terrestrial and aquatic ecosystems and should be included in any study on environmental contamination. By neglecting reptiles, the risks posed by a particular contaminant cannot be fully assessed. Since all snakes are secondary, tertiary, and top predators, they are susceptible to the bioaccumulation of environmental contaminants. Their unique life histories make their roles in food webs diverse and important, and they are crucial to the proper functioning of many ecological processes. We review and summarize organic and inorganic contaminant and radionuclide/radiation residue and lethal and sublethal effects data for snakes to stress the importance of snakes and encourage their inclusion in ecological risk assessments, to demonstrate the paucity of available contaminant data on snakes and reveal the main information gaps, to encourage further ecotoxicological studies on snakes, and to facilitate the use of existing snake contaminant data in ecological risk assessments. This review is the most
Campbell K.R. et al. Lizard contaminant data for ecological risk assessment. *Rev Environ Contam Toxicol.* 2000; 165: 39-116p. **Abstract:** This review is the most comprehensive currently available of the effects and accumulation of environmental contaminants on lizards. The importance of lizards was emphasized in hope that they be included in ecological risk assessments as well as any study on environmental contamination. Some studies presented here indicated that lizards are ideal bioindicators. They are important as a component of biodiversity, and many species are listed as threatened or endangered. In addition, lizards are a significant part of many ecosystems as well as an important link in many food chains. There are large gaps in data for many environmental contaminants, particularly data on lizards. Ecotoxicological studies on a wide variety of lizard species are needed; both laboratory and field studies would provide useful information. Because the majority of lizards are insectivores, studies of the effects and accumulation of pesticides are essential. A few current studies are available from Africa and Australia, but most, especially those conducted in the U.S., were not current. Studies are needed on the effects and accumulation of ubiquitous contaminants, such as heavy metals and PCBs. Because of the many contaminated sites and the significant waste disposal problem, studies are needed on the effects and accumulation of radionuclides on lizards. Furthermore, effects of multiple stressors must be studied. Last, studies are needed linking the effects of contaminants to tissue residues. It is hoped that the convenience of having the vast majority of lizard environmental contaminant data available in one document will encourage its use.

Campbell K.R. et al. A logical starting point for developing priorities for lizard and snake ecotoxicology: a review of available data. *Environ Toxicol Chem.* 2002; 21(5) : 894-8p. **Abstract:** Reptiles, specifically lizards and snakes, usually are excluded from environmental contamination studies and ecological risk assessments. This brief summary of available lizard and snake environmental contaminant data is presented to assist in the development of priorities for lizard and snake ecotoxicology. Most contaminant studies were not conducted recently, list animals found dead or dying after pesticide application, report residue concentrations after pesticide exposure, compare contaminant concentrations in animals from different areas, compare residue concentrations found in different tissues and organs, or compare changes in concentrations over time. The biological significance of the contaminant concentrations is rarely studied. A few recent studies, especially those conducted on modern pesticides, link the contaminant effects with exposure concentrations. Nondestructive sampling techniques for determining organic and inorganic contaminant concentrations in lizards and snakes recently have been developed. Studies that relate exposure, concentration, and effects of all types of environmental contaminants on lizards and snakes are needed. Because most lizards eat insects, studies on the exposure, effects, and accumulation of insecticides in lizards, and their predators, should be a top priority. Because all snakes are upper-trophic-level carnivores, studies on the accumulation and effects of contaminants that are known to bioaccumulate or biomagnify up the food chain should be the top priority.

Caramello S. et al. [Listeriosis as an infection of food origin]. *G Battieriol Virol Immunol.* 1990; 83(1-12) : 125-31p. **Abstract:** After analysing the etiopathogenesis and transmission process of the microorganism, the Authors have examined the latest and documented outbreaks owing to food-borne strains of Listeria monocytogenes in Europe and in North America. The considered studies indicate an increase of listeriosis cases caused by infected food, especially food of animal origin, such as meat and milk-dairy products.

Carney W.P. Echinostomiasis--a snail-borne intestinal trematode zoonosis. *Southeast Asian J Trop Med Public Health.* 1991; 22 Suppl : 206-11p. **Abstract:** Numerous echinostome trematodes are found in the intestines of birds and mammals throughout the world, and echinostomiasis in humans has been attributed to approximately 16 different species. In humans it is usually regarded as a rare intestinal parasite of little clinical importance except in heavy infections. Diagnosis of echinostomiasis is made by identification of eggs during fecal examination; however, speciation of echinostomes requires morphological study of adult worms following anthelmintic treatment. The complex life cycles of echinostomes are all linked to freshwater habitats. A mammalian or avian definitive host, one or two molluscan hosts, and one or two freshwater stages are usually required to complete the life cycle. In addition, amphibians and fish have been implicated in the transmission of some species. Prevention of human cases is dependent on eating habits, since raw or insufficiently cooked molluses, and to a lesser extent fish and amphibians, are sources of infection for humans. Human cases have been effectively, albeit accidentally, controlled by the introduction of fish which prey on the larval stages of the essential molluscan hosts.

Carrington C.D. et al. Methods for projecting long-term dietary exposure from short-term survey data for environmental contaminants. *Toxicol Ind Health.* 2001; 17(5-10) : 176-9p. **Abstract:** Public health risk assessments often involve dietary exposures over long periods of time. However, most information about dietary consumption habits comes from short-term surveys that are conducted for periods of three days or less. When employed for characterizing long-term exposures, short-term surveys are likely to underestimate the number of persons consuming a particular food, while overestimating the amount consumed by each individual. Direct application of short-term data is particularly misleading for foods that are consumed infrequently. If a more accurate population estimate for chronic dietary intake is needed for a risk assessment, then two general techniques may be considered. The first method is simpler, while the second is more accurate. Both methods require information about the size of the population consuming the food over the long-term period. The simpler fractional adjustment method reduces consumption across the entire distribution by the ratio of consumer population sizes. Since this method will tend to underestimate high-end exposures and overestimate low-end exposures, it is most useful as a quick bounding exercise. Since short-term surveys are better at characterizing the behavior of frequent consumers, a second method employs an exponential function to reduce the low end of the population distribution by a greater amount than the high end. If available, additional information may be used to select the parameter values for the exponential adjustment. Otherwise, an uncertainty range may be used for the parameter values. Since the frequency-based method is more complex, it is

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**Abstract:** After analysing the etiopathogenesis and transmission process of the microorganism, the Authors have examined the latest and documented outbreaks owing to food-borne strains of Listeria monocytogenes in Europe and in North America. The considered studies indicate an increase of listeriosis cases caused by infected food, especially food of animal origin, such as meat and milk-dairy products.
most valuable when used as part of a chronic exposure simulation. Examples of both methods are given for the estimation of chronic wine consumption.

Carter L.W. Influences of nutrition and stress on people at risk for neutropenia: nursing implications. *Oncol Nurs Forum.* 1993; 20(8): 1241-50p. **Abstract:** Neutropenia may be influenced by malignancy type, treatment, age extremes, inadequate nutrition, or psychological stress. Of these five factors, only nutrition and stress are amenable to nursing intervention and management. The increasing trend of providing treatment in the outpatient setting and managing the patient with neutropenia in the home challenges nurses to develop innovative methods of care. This article offers suggestions to assist nurses in the creative management of individuals at risk for neutropenia by maximizing nutrition and minimizing psychological stress. This discussion addresses the physiology of the inflammatory immune response; pathophysiology of neutropenia; factors that may influence the risk of infection, such as sustained stress, dietary fiber, antioxidant vitamins, and food-borne bacteria; and interventions that reduce the potential for neutropic sepsis. Nursing implications that reduce the risk of neutropic infection include patient education related to nutrition, stress management, and self-care.

Chan H.M. et al. Evaluation of the population distribution of dietary contaminant exposure in an Arctic population using Monte Carlo statistics. *Environ Health Perspect.* 1997; 105(3): 316-21p. **Abstract:** Organochlorines and heavy metals have bioaccumulated in Arctic wildlife, which is an important food source for the Inuit. In this study, we have developed a statistical model to describe the population distribution of contaminant exposure and the usual intake of the high-end contaminant consumers. Monte Carlo methods are used to account for variations due to seasonal dietary pattern and contaminant concentrations. Distribution of the dietary intake of the contaminants of most concern—mercury, polychlorinated biphenyls (PCBs), chlordane, and toxaphenes—are described. Over 50% of the residents had dietary exposure levels exceeding the tolerable daily intake or provisional tolerable daily intake for Hg, toxaphene, and chlordane (83, 91, and 71% for men and 73, 85, and 56% for women, respectively). The high-end consumers (i.e. the 95th centile) have intake levels 6 times higher than the provisional tolerable weekly intake of Hg, and over 20 times the tolerable daily intake of chlordane and toxaphene. Assessment of health risks of the relative high contaminant exposure in this community must also consider the nutritional, economical, cultural, and social importance of these traditional foods. A comprehensive risk management scheme has yet to be developed.

Chan H.M. et al. A database for environmental contaminants in traditional food in northern Canada. *Int J Circumpolar Health.* 1998; 57 Suppl 1: 567-71p. **Abstract:** The potential health effects of environmental contaminants in traditional food on indigenous peoples in Northern Canada have been a growing concern. We have conducted an extensive literature review on contaminant levels in Northern Canada through searches of commercial, private, and government databases for the years 1986-1995, including MEDLine, Agricola, Biological Abstracts, Current Contents, Applied Science and Technology, Biosis, CABCD, Aquatic Sciences and Fisheries Abstracts, CRIS/ICAR, and the Northern Aquatic Food Chain Contaminant Database. More than 20,000 data items were identified in over 50 published articles, unpublished data, government reports, and review articles. Ranges of levels of 13 contaminants in major traditional food groups collected from four geographical regions (Yukon, MacKenzie, Keewatin, Baffin and Northern Quebec) were calculated. Exposure levels, particularly according to different dietary patterns, were estimated and discussed in relation to guideline levels.

Chan H.M. et al. Assessment of dietary exposure to trace metals in Baffin Inuit food. *Environ Health Perspect.* 1995; 103(7-8): 740-6p. **Abstract:** Chronic metal toxicity is a concern in the Canadian Arctic because of the findings of high metal levels in wildlife animals and the fact that traditional food constitutes a major component of the diet of indigenous peoples. We examined exposure to trace metals through traditional food resources for Inuit living in the community of Qikiqtarjuaq on Baffin Island in the eastern Arctic. Mercury, cadmium, and lead were determined in local food resources as normally prepared and eaten. Elevated concentrations of mercury (> 50 micrograms/100 g) were found in ringed seal liver, narwhal mattak, beluga meat, and beluga mattak, and relatively high concentrations of cadmium and lead (> 100 micrograms/100 g) were found in ringed seal liver, mussels, and kelp. Quantified dietary recalls taken seasonally reflected normal consumption patterns of these food resources by adult men and women (> 20 years old) and children (3-12 years old). Based on traditional food consumption, the average daily intake levels of total mercury for both adults (65 micrograms for women and 97 micrograms for men) and children (38 micrograms) were higher than the Canadian average value (16 micrograms). The average weekly intake of mercury for all age groups exceeded the intake guidelines (5.0 micrograms/kg/day) established by the Joint Food and Agriculture Organization/World Health Organization Expert Committee on Food Additives and Contaminants. The primary foods that contributed to metal intake for the Baffin Inuit were ringed seal meat, caribou meat, and kelp. We review the superior nutritional benefits and potential health risks of traditional food items and implications for monitoring metal contents of food, clinical symptoms, and food use.

Chan T.Y. Shellfish-borne illnesses. A Hong Kong perspective. *Trop Geogr Med.* 1995; 47(6): 305-7p. **Abstract:** This article provides an overview of the spectrum of infectious and toxic illnesses that may occur following the consumption of contaminated shellfish in Hong Kong. These include hepatitis A, hepatitis E, infections due to vibrio species, paralytic shellfish poisoning, neurotoxic shellfish poisoning and heavy metal poisoning. Possible preventive measures are discussed.

Charbonneau D.L. et al. A method of assessing the efficacy of hand sanitizers: use of real soil encountered in the food service industry. *J Food Prot.* 2000; 63(4): 495-501p. **Abstract:** In many outbreaks of foodborne illness, the food worker has been implicated as the source of the infection. To decrease the likelihood of cross-contamination, food workers must clean and disinfect their hands frequently. To ensure their effectiveness, hand disinfectants should be tested using rigorous conditions that mimic normal use. Currently, several different methods are used to assess the efficacy of hand disinfectants. However, most of these methods were designed with the health care worker in mind and do not model the specific contamination situations encountered by the food worker. To fill this void, we developed a model that uses soil
from fresh meat and a means of quantifying bacteria that is encountered and transferred during food preparation activities. Results of studies using various doses of para-chloro-meta-xylene and triclosan confirm that the method is reproducible and predictable in measuring the efficacy of sanitizers. Consistent, dose-dependent results were obtained with relatively few subjects. Other studies showed that washing hands with a mild soap and water for 20 s was more effective than applying a 70% alcohol hand sanitizer.

**Cheftel E. et al.** [Toxic food infection caused by Shigella flexneri in a military unit]. *Sante*. 1997; 7(5): 295-9p. Abstract: Food borne disease outbreaks have increased in France, but outbreaks caused by Shigella are rare, accounting for only 73 cases (1.62%) in 1993. We report a food borne outbreak of Shigella flexneri strain 3 infection in a fire fighting unit in Paris between July 13th and 17th 1995. Forty of the 127 firemen suffered symptoms including acute diarrhea (80%), fever (50%) and blood and mucus in stools (1 case, 2.5%). Epidemiological investigation generated an unimodal epidemic curve suggesting a single source of contamination with no secondary cases. The median incubation period was between 43 hours 30 minutes and 51 hours 30 minutes. This is consistent with food borne Shigella infection. Statistical analysis of a case-control study implicated a mixed salad containing frozen shellfish from Asia (shrimps and mussels), served at lunch and dinner on July 13th 1995. Shigella was not detected in this salad by microbiological methods. However, inoculation with as little as 100 organisms can cause symptoms. There was low-level contamination with Escherichia coli (940 cfu/g) due to cross-contamination. Shigella flexneri strain 3 was isolated from 11 of 18 stool cultures, but was never isolated from cultures of stools provided by the cooks. All isolates had identical antibiotic resistance profiles. They were resistant to ampicillin and ticarcillin, moderately sensitive to amoxicillin-clavulanic acid, highly sensitive to aminosides, erythromycin and quinolones. This identical pattern in all isolates suggests a common source of contamination. Plasmid-based multiple resistance is common in this organism. Therefore, antibiotics should only be given to patients with evident clinical signs of infection. Treatment was symptom-based in all but 4 patients, who had acute diarrhea and were treated with ciprofloxacin. This antibiotic is well tolerated, has rapid bactericidal action and significantly reduces the duration of the symptoms and excretion of Shigella, thus preventing secondary contamination with this highly infectious bacterium. Thus, food borne outbreaks of Shigella can occur in countries with a high standard of living because of the increase in mass catering (e.g. fast food restaurants) and importation of foodstuffs from developing countries with endemic shigellosis. This is a public health problem because of the morbidity and absenteeism due to illness, particularly when the patients are firemen responsible for emergency management.

**Chen E.R.** Current status of food-borne parasitic zoonoses in Taiwan. *Southeast Asian J Trop Med Public Health*. 1991; 22 Suppl 62-4p. Abstract: More than 50 species of zoonotic parasites (nematodes-18 spp., trematodes-19 spp., cestodes-10 spp., protozoa-2 spp., and arthropods-2 spp.) have been reported in Taiwan. Among them, Angiostrongylus cantonensis, Clonorchis sinensis and Taenia saginata are the most important and most common food-borne parasites. Angiostrongyliasis is highly endemic in southern and eastern Taiwan. About 80% of patients are children below 15 years of age, mostly infected after eating Achatina fulica during May and September. Patients residing in the mountainous and remote areas are more susceptible than those in the urban districts. Cipangopaludina chinensis and Ampullarium canaliculatus are additional important sources of infection. Albendazole is effective in treating infections in animals. Levamisole has been shown to shorten and lighten the course and symptoms in clinical trials. Clonorchiasis is endemic in Miao-li in northern, Sun-moon lake in central, and Mei-nung in southern Taiwan. Recent surveys, however, have shown endemic areas to be more extensive. Praziquantel, 3 doses of 20 mg/kg body weight for one day, is an effective treatment. Taeniasis saginata is mainly caused by eating raw beef or viscera of wild animals by the aborigines. A single dose of 150 mg praziquantel cures almost 100%.


**Chiba S. et al.** Sapporo virus: history and recent findings. *J Infect Dis*. 2000; 181 Suppl 2 S303-8p. Abstract: Morphologically distinct calciviruses of human origin were first found in stools of children with gastroenteritis in 1976. Sapporo virus, or human calicivirus Sapporo, with typical surface morphology was first detected during a gastroenteritis outbreak in a home for infants in Sapporo, Japan, in 1977. Since then, morphologically and antigenically identical virus has been detected frequently in the same institution in association with outbreaks of gastroenteritis. Sapporo virus is widely distributed worldwide, as evidenced by the appearance of antigenically or genetically similar viruses and seroepidemiologic findings. Sapporo virus plays an important role in outbreaks of infantile gastroenteritis and is less important in foodborne outbreaks. Sapporo virus has been approved as the type species of the genus "Sapporo-like viruses in the family Caliciviridae. The history of and recent findings, as obtained by newly developed techniques, about Sapporo viruses are presented.

**Chirife J. et al.** Water activity, water glass dynamics, and the control of microbiological growth in foods. *Crit Rev Food Sci Nutr*. 1996; 36(5): 465-513p. Abstract: Water is probably the single most important factor governing microbial spoilage in foods, and the concept of water activity (a(w)) has been very valuable because measured values generally correlate well with the potential for growth and metabolic activity. Despite some drawbacks (e.g., solute effect), the concept of a(w) has assisted food scientists in their effort to predict the onset of food spoilage as well as to control food-borne disease hazards in food products. In the last decade the concept of a(w) has been challenged. It has been suggested that reduced-moisture food products (e.g., low and intermediate) may be nonequilibrium systems and that most of them are in the amorphous metastable state, which is very sensitive to changes in moisture content and temperature. It has been proposed that the glass transition temperature Tg (temperature at which the glass-rubber transition occurs), is a parameter that can determine many product properties, the safety of foods among them. The concept of water dynamics, originating in a food polymer science approach, has been suggested instead of a(w) to better predict the microbial stability of intermediate-moisture foods. The usage of a(w) to predict microbial safety of foods
has been discouraged on the basis that (1) in intermediate-moisture foods the measured water vapor pressure is not an equilibrium one, and because $a(w)$ is a thermodynamic concept, it refers only to equilibrium; and (2) the microbial response may differ at a particular $a(w)$ when the latter is obtained with different solutes. This review analyzes these suggestions on the basis of abundant experimental evidence found in the literature. It is concluded that nonequilibrium effects (e.g., inability of water to diffuse in a semisolid food) appear to be in many cases slow within the time frame (food's shelf life) of the experiments and/or so small that they do not affect seriously the application of the $a(w)$ concept as a predictor of microbial stability in foods. The claims that a food science polymer approach to understanding the behavior of aqueous sugar glasses and concentrated solutions may be used to predict the microbial stability of food systems is not substantiated by experimental evidence. This approach does not offer, at the present time, a better alternative to the concept of $a(w)$ as a predictor of microbial growth in foods. It is also recognized that $a(w)$ has several limitations and should be always used carefully, and this must include precautions regarding the possible influences of nonequilibrium situations. This aspect may be summarized by simply saying that anyone who is going to employ the term water activity must be aware of the implications of its definition.

Chiu L. et al. Analysis of costs borne by families of patients hospitalized for stroke. Chung Hua I Hsueh Tsa Chih (Taipei). 1998; 61(5): 267-75p. Abstract: BACKGROUND: Studies focusing on the economic impact of cancer on families have emphasized that costs of chronic disease are substantial for patients and their families. However, little effort has been devoted to measuring the costs of care for families of patients hospitalized with stroke. METHODS: A total of 215 stroke patients and their families from four teaching hospitals in the Taipei metropolitan area were monitored from the date of the patient's admission to hospital until the date of discharge. The value of labor contributed by families was estimated by assigning the current monetary market rate of providing health aide to the time families spent caring for patients in hospital. Lost earnings of patients and families, expenditure for medical care, and expenses for food, clothes, adult diapers, transportation and other miscellaneous items were determined and summed to arrive at the total family cost of providing care. RESULTS: The average cost of care for one family per inpatient day was NT$4,358.20. A total of 98.6% of the families incurred labor costs, which accounted for about half of family costs for providing care. Hospital bills accounted for almost 19% of total family costs. The income loss for families and patients accounted for about 25% of total family costs. Expenses for food, clothes, transportation, diapers and other illness-related miscellaneous items accounted for about 12% of total family costs. Multiple regression analyses demonstrated that the number of family members involved in giving care and the length of stay are important predictors for the total cost of care. Average total family costs per day increased by 24.3% when an additional family member was involved in providing care. Total family costs increased 2.5% for each hospital day. CONCLUSIONS: If direct and indirect nonmedical costs are not included in the total cost calculation for providing hospital care to stroke patients, the economic impact of care on families is likely to be underestimated.

Chung P.R. et al. Snail-borne parasitic zoonoses in Korea. Southeast Asian J Trop Med Public Health. 1991; 22 Suppl 391-5p. Abstract: A total of 22 snail-borne parasites causing various parasitic zoonoses in Korea are listed and reviewed. All of these parasites are indigenous except Heterophyes heterophyes, H. dispar and Angiostrongylus cantonensis detected in patients who traveled outside of Korea.

Clarke S.C. et al. Development of a risk assessment methodology for evaluating potential impacts associated with contaminated mud disposal in the marine environment. Chemosphere. 2000; 41(1-2): 69-76p. Abstract: In order to assess impacts associated with disposal of contaminated mud arising from Hong Kong's dredging and reclamation projects, a methodology has been formulated to determine the level of risk posed by consumption of seafood/marine prey species to humans and to the Chinese White Dolphin (Sousa chinensis). This methodology improves on previously used techniques by incorporating risks for organic contaminants, accounting for doses from sources other than seafood, and incorporating additional local knowledge on Sousa chinensis behaviour. It thus represents an advance in risk assessment techniques and a new integration of risk assessment and monitoring in environmental management.


Cole D.C. et al. Dietary intakes and plasma organochlorine contaminant levels among Great Lakes fish eaters. Arch Environ Health. 2002; 57(5): 496-509p. Abstract: Nutritional intakes and contaminant burdens should be assessed jointly in individuals who are at high risk of environmental exposures to contaminants through food. In this study, the authors used shore surveys and community contacts to recruit 91 individuals who frequently consumed Great Lakes fish. These individuals provided dietary intake information and fasting blood samples for lipid and contaminant analyses. Participants ate an annual median of 88 meals of Great Lakes fish. Asian-Canadians consumed more total fish meals (i.e., Great Lakes, non-Great Lakes, and other) (medians = 213.0 females, 223.0 males) than Euro-Canadians (medians = 131.0 females, 137.5 males). The higher total fish consumption by Asian-Canadians was associated with a lower percentage of energy derived from fat, higher protein and iron intakes, and higher plasma concentrations of omega-3 essential fatty acids (e.g., median docosahexaenoic acid levels [microgram/l] in Asian-Canadian females = 5.48, males = 4.38; in Euro-Canadian females = 2.93, males = 2.27). Plasma organochlorine contaminant lipid weight concentrations varied by country of origin and by gender (e.g., median total polychlorinated biphenyls [microgram/kg] in Asian-Canadian females = 490.6, males = 729.0; in Euro-Canadian females = 336.6, males = 355.5). Age was the most consistent predictor (+ve) of contaminant concentrations, followed by years spent in Canada (for Asian-Canadians). Associations with sport fish consumption variables were less consistent than for the aforementioned predictors. Given both the health benefits and potential risks of fish consumption, policies that address diverse ethnocultural groups should support continued
consumption of sport fish, but from less-contaminated sources than are currently used.

Coleman M.E. et al. A simulation of microbial competition in the human colonic ecosystem. *Appl Environ Microbiol.* 1996; 62(10) : 3632-9p. Abstract: Many investigations of the interactions of microbial competitors in the gastrointestinal tract used continuous-flow anaerobic cultures. The simulation reported here was a deterministic 11-compartment model coded by using the C programming language and based on parameters from published in vitro studies and assumptions were data were unavailable. The resource compartments were glucose, lactose and sucrose, starch, sorbose, and serine. Six microbial competitors included indigenous nonpathogenic colonizers of the human gastrointestinal tract (Escherichia coli, Enterobacter aerogenes, Bacteroides ovatus, Fusobacterium varium, and Enterococcus faecalis) and the potential human enteropathogen Salmonella typhimurium. Flows of carbon from the resources to the microbes were modified by resource and space controls. Partitioning of resources to the competitors that could utilize them was calculated at each iteration on the basis of availability of all resources by feeding preference functions. Resources did not accumulate during iterations of the model. The results of the computer simulation of microbial competition model and for various modifications of the model. The results were based on few measured parameters but may be useful in the design of user-friendly software to aid researchers in defining and manipulating the microbial ecology of colonic ecosystems as relates to food-borne disease.

Collie R.E. et al. Evidence that the enterotoxin gene can be episomal in Clostridium perfringens isolates associated with non-food-borne human gastrointestinal diseases. *J Clin Microbiol.* 1998; 36(1) : 30-6p. Abstract: Clostridium perfringens enterotoxin (CPE) is responsible for the diarrheal and cramping symptoms of human C. perfringens type A food poisoning. CPE-producing C. perfringens isolates have also recently been associated with several non-food-borne human gastrointestinal (GI) illnesses, including antibiotic-associated diarrhea and sporadic diarrhea. The current study has used restriction fragment length polymorphism (RFLP) and pulsed-field gel electrophoresis (PFGE) analyses to compare the genotypes of 43 cpe-positive C. perfringens isolates obtained from diverse sources. All North American and European food-poisoning isolates examined in this study were found to carry a chromosomal cpe, while all non-food-borne human GI disease isolates characterized in this study were determined to carry their cpe on an episome. Collectively, these results provide the first evidence that distinct subpopulations of cpe-positive C. perfringens isolates may be responsible for C. perfringens type A food poisoning versus CPE-associated non-food-borne human GI diseases. If these putative associations are confirmed in additional surveys, cpe RFLP and PFGE genotyping assays may facilitate the differential diagnosis of food-borne versus non-food-borne CPE-associated human GI illnesses and may also be useful epidemiologic tools for identifying reservoirs or transmission mechanisms for the subpopulations of cpe-positive isolates specifically responsible for CPE-associated food-borne versus non-food-borne human GI diseases.

Collins M.T. Mycobacterium paratuberculosis: a potential food-borne pathogen? *J Dairy Sci.* 1997; 80(12) : 3445-8p. Abstract: Mycobacterium paratuberculosis commonly infects dairy cattle, leading to Johne's disease, which is also known as paratuberculosis. The infection is chronic, progressive, and incurable. As the infection progresses, excretion of M. paratuberculosis in feces and milk occurs, and the bacterium spreads through the blood to multiple internal organs. Consequently, raw products originating from cattle may harbor M. paratuberculosis. Thermal treatments, such as pasteurization, are commonly relied on to kill food-borne bacterial pathogens that can infect humans. The small number of studies conducted to determine the thermal resistance of M. paratuberculosis suggest that it is less susceptible to destruction by heat killing than are milkborne zoonotic bacterial pathogens such as Listeria spp. or Mycobacterium bovis. Published reports concerning the thermal resistance of M. paratuberculosis in milk are reviewed herein, and key issues concerning the efficacy of pasteurization for elimination of M. paratuberculosis from milk are summarized.

Connell D.W. et al. Risk to breeding success of fish-eating Ardeids due to persistent organic contaminants in Hong Kong: evidence from organochlorine compounds in eggs. *Water Res.* 2003; 37(2) : 459-67p. Abstract: Eggs of two Ardeid species, the Little Egret (Egretta garzetta) and the Black-crowned Night Heron (Nycticorax nycticorax), were collected from two egrets located in the New Territories of Hong Kong with one located near the internationally acclaimed wetland reserve, the Mai Po Marshes, and the other in a remote site (A Chau). The eggs were analysed for organochlorine (OC) compounds including the DDTs, PCBs, hexachlorocyclohexanes (HCHs) and the chlordanes (CHLs). All of the OCs under investigation were detected in the eggs of both species with significantly higher levels in the Little Egret (DDTs, 560-2200; PCBs, 270-1700; CHLs, 81-470 ng g(-1) wet weight) than the Night Heron (DDTs, 210-1200; PCBs, 85-600; CHLs 59-75 ng g(-1) wet weight). The DDTs consisted mainly of DDE with levels ranging from 85% to 95% of the total. The HCHs were at about the same levels in both species (8.4-30 ng g(-1) wet weight). All of the OCs had linear concentration probability distributions on a log-normal basis which were used to evaluate exposure associated with these compounds as part of a probabilistic risk analysis. A linear dose/response relationship was used to establish the threshold level (1000 ng g(-1) wet weight) at which there was a significant level of reduction in the survival of young above zero and the variability in DDE concentrations at this effect level. Using a threshold level of 1000 ng g(-1), the calculated Risk Quotient (RQ) had a 12.4% probability of RQ exceeding unity with the Night Heron, and 40.9% with the Little Egret. These results indicate that the DDTs in eggs would be expected to be associated with adverse effects on the survival of young of both species, particularly the Little Egret.

Connelly N.A. et al. Evaluating risk communication: examining target audience perceptions about four presentation formats for fish consumption health advisory information. *Risk Anal.* 1998; 18(5) : 649-59p. Abstract: Information format can influence the extent to which target audiences understand and respond to risk-related information. This study examined four elements of risk information presentation format. Using printed materials, we examined target audience perceptions about: (a) reading level; (b) use of diagrams vs. text; (c) commanding versus cajoling tone; and (d) use of qualitative vs. quantitative information.
presented in a risk ladder. We used the risk communication topic of human health concerns related to eating noncommercial Great Lakes fish affected by chemical contaminants. Results from the comparisons of specific communication formats indicated that multiple formats are required to meet the needs of a significant percent of anglers for three of the four format types examined. Advisory text should be reviewed to ensure the reading level is geared to abilities of the target audience. For many audiences, a combination of qualitative and quantitative information, and a combination of diagrams and text may be most effective. For most audiences, a cajoling rather than commanding tone better provides them with the information they need to make a decision about fish consumption. Segmenting audiences regarding information needs and communication formats may help clarify which approaches to take with each audience.

Conte M.P. et al. Listeria monocytogenes infection of Caco-2 cells: role of growth temperature. *Res Microbiol.* 1994; 145(9) : 677-82p. **Abstract:** The aim of the present study was to evaluate the role of temperature in the virulence of Listeria monocytogenes, a Gram-positive facultative intracellular food-borne pathogen. The capacity of bacteria grown at 37, 25 and 4 degrees C to develop haemolytic activity, to enter the Caco-2 enterocyte-like cell line and to multiply intracellularly was investigated. We demonstrated that L. monocytogenes penetration was not significantly influenced by the growth temperature of cultures and that bacteria grown at low temperature were capable of synthesizing internalin and, during the infection process, of restoring the haemolytic phenotype which is normally lacking in the extracellular environment at 4 and 25 degrees C. It can be concluded that L. monocytogenes, frequently present in numerous environmental sources and also in refrigerated food products, produces at low temperature, the virulence factors necessary to invade intestinal cells.

Cooper J. et al. Listeriosis. *Vet Clin North Am Food Anim Pract.* 1998; 14(1) : 113-25p. **Abstract:** Listeria monocytogenes is ubiquitous in nature and is part of the normal flora of the distal portion of the intestinal tract of numerous animal species. Listeriosis is an emerging food borne disease that is responsible for approximately 1,700 cases of human illness each year and 650 deaths. Listeria is the cause of three main disease entities in animals and humans: neural, visceral, and reproductive. Clinical signs associated with the three forms are discussed along with diagnosis, therapy, prevention, and control.

Copeland T.L. et al. Use of probabilistic methods to understand the conservatism in California's approach to assessing health risks posed by air contaminants. *Air Waste.* 1994; 44(12) : 1399-413p. **Abstract:** Many state and federal agencies have prepared risk assessment guidelines, which describe methods for quantifying health risks associated with exposure to vapors and particulates emitted from point and area sources (e.g., California Air Pollution Control Officers Association [CAPCOA] under the Air Toxics "Hot Spots" Act [Assembly Bill 2588] and the U.S. Environmental Protection Agency [EPA] under the Clean Air Act). In general, these guidelines recommend or require the use of upperbound "point" estimates for numerous exposure parameters. This methodology yields a single risk estimate, which is intended not to underestimate the true risk and may significantly overstate it. This paper describes a risk assessment of a facility's airborne emissions using a probabilistic approach, which presents a range and distribution of risk estimates rather than a single point estimate. The health risks to residents living near a food processing facility, as estimated using techniques recommended by California AB2588, are compared to the results of a probabilistic analysis. Polychlorinated dibenzo-p-dioxins (PCDDs) and polychlorinated dibenzofurans (PCDFs) were identified as the emitted chemicals of concern. The point estimate method recommended by CAPCOA resulted in estimates that were greater than the 99.99th percentile risk predicted by the probabilistic analysis. As shown in other assessments of persistent airborne chemicals, secondary or indirect exposure pathways (i.e., ingestion of beef, ingestion of cow's milk, and ingestion of mother's milk) rather than inhalation, were the greatest contributors to risk. In this analysis, the probability distributions for the cancer potency factor and ingestion of cow's milk had the largest impact on the results of the 33 exposure factors considered.

Cossart P. Interactions of the bacterial pathogen Listeria monocytogenes with mammalian cells: bacterial factors, cellular ligands, and signaling. *Folia Microbiol (Praha).* 1998; 43(3) : 291-303p. **Abstract:** Listeria monocytogenes is a food borne pathogen which has the very unique property of crossing three barriers during infection eliciting meningitis, meningo-encephalitis and abortions with a mortality rate of about 30%. Indeed, after crossing the intestinal barrier, Listeria disseminates via the lymph and the blood, to the brain and/or the placenta after crossing the brain-blood barrier and/or the placental barrier. During disease, this organism infects a variety of tissues and cell types in which it is mostly intracellular due to its capacity to induce its own phagocytosis into cells which are normally nonphagocytic. The strategies used by Listeria to enter cells are different from those used by other well known invasive pathogens. Listeria thus appears as a fine model to study the molecular and cellular basis of bacterial invasion. In addition, not only during entry into cells but also during intra- and intercellular movement, Listeria exploits mammalian cell functions and is thus a novel tool for elucidating some unsolved fundamental aspects of cell biology, such as ligand receptor signaling and actin cytoskeleton rearrangements. In this review, the molecular and cellular basis of entry of Listeria into cells and of its intracellular motility will be discussed.

Cowden J.M. Foodborne infectious risks: do we need a wide system of data collection and survey? The lessons learned from the study of infectious intestinal disease in England. *Rev Epidemiol Sante Publique.* 2002; 50(1) : 89-92p. **Abstract:** In 2000, the United Kingdom Government's Food Standards Agency published "A report of the study of infectious intestinal disease in England". This report was the result of over a decade's endeavour and cost well in excess of 2 million pound sterling (approximately 3.3 million euros). The study originated in 1989. In response to national epidemics of foodborne infection with Salmonella enteritidis phage type 4 and Listeria monocytogenes, the Government set up the Committee on the Microbiological Safety of Food (the Richmond Committee). This committee wished to know the actual level of clinical disease in the population giving rise to the laboratory reports of gastro-intestinal pathogens in national surveillance data and recommended studies to achieve this objective. In addition, successors to the to Richmond Committee decided that it would be of value to collect information from both cases and controls, including
Curry A. et al. Emerging pathogens: Isospora, Cyclospora and microsporidia. *Parasitology.* 1998; 117 Suppl S143-59p. Abstract: Isospora belli, Cyclospora cayetanensis as well as several species of microsporidia are recognized as emerging protozoan pathogens of humans. All are obligate intracellular parasites, with Isospora and the microsporidia being primarily associated with immunocompromised hosts. Cyclospora is a cause of traveller's diarrhoea, and is responsible for water-borne and food-borne outbreaks of disease. Drug treatment is available for these infections. Improved diagnostic methods including the autofluorescence of I. belli and C. cayetanensis oocysts have assisted in the routine detection of these pathogens. Since the recognition of immunosuppression due to HIV infection, microsporidia have become recognized as important human pathogens with a continuing expansion of the parasite-associated clinico-pathological spectrum. The small size, intracellular nature and poor staining properties with many histological stains result in under-reporting of microsporidial infections. Trichrome stain and optical brighteners are used to detect spores in faeces, urines, respiratory secretions and other aspirates. Electron microscopy remains an important diagnostic method but its sensitivity is relatively poor. Molecular techniques should overcome current diagnostic limitations. The ability to extract DNA and amplify by PCR directly from clinical samples has increased the usefulness of molecular methods. Restriction fragment length polymorphism analysis of amplicons can be used to determine genus, species and strain types of various microsporidia. Increased specificity is required in primer design because current primers used for amplifying non-microsporidian DNA also amplify microsporidian DNA. Diagnosis and pathogen characterisation rely increasingly on PCR-based approaches, and the sequence analysis approach becomes increasingly feasible and affordable. However, robust, reliable and sensitive methods are still required for dissecting pathogenesis, epidemiology, transmission routes and sources of infections.

Cunney R.J. et al. Investigation of an outbreak of gastroenteritis caused by Norwalk-like virus, using solid phase immune electron microscopy. *J Hosp Infect.* 2000; 44(2): 113-8p. Abstract: In February 1993, 95 persons (47 patients and 48 staff members) were affected by an hospital outbreak of viral gastroenteritis. Using direct electron microscopy (EM) the causative agent was identified as a small round structured virus. This was confirmed as a Norwalk-like virus using solid phase immune electron microscopy (SPIEM). Of 94 stool samples examined, 12 (13%) samples containing small round structured viruses (SRSV) were SPIEM positive for Norwalk-like virus. A further 25 (27%) samples contained small round featureless virus (SRFV) identified by direct EM and were negative on SPIEM. The illness was characterized by preceding influenza-like symptoms in 76% of cases followed by vomiting (76%), diarrhoea (79%) and abdominal pain (79%). One fatality was recorded. The outbreak lasted for 15 days, with a peak incidence of new cases amongst patients and staff occurring on day 5. It was controlled through a combination of ward closures, patient cohorting, suspension of duties for affected staff and disinfection procedures. Difficulties were encountered in the education of staff and in the implementation of environmental control measures. Screening of hospital catering services and a case control study, carried out among affected staff members, failed to identify a foodborne source. Consumption of tap water in the hospital was commoner among affected staff members than among controls, but this did not reach significance (p = 0.1).

Dalton C.B. et al. The cost of a food-borne outbreak of hepatitis A in Denver, Colo. *Arch Intern Med.* 1996; 156(9): 1013-
Daniels N.A. et al. A foodborne outbreak of gastroenteritis associated with Norwalk-like viruses: first molecular traceback to deli sandwiches contaminated during preparation. J Infect Dis. 2000; 181(4): 1467-70p. Abstract: In March 1998, an outbreak of acute gastroenteritis occurred among students at a Texas university. Overall, 125 ill students sought medical care. Case-control studies revealed that illness was significantly associated with eating foods from the university's main cafeteria deli bar on 9 and 10 March. Stool specimens from 9 (50%) of 18 ill students and samples of deli ham showed evidence of Norwalk-like viruses (NLVs) by reverse-transcribease (RT) polymerase chain reaction (PCR) assay. A food handler who prepared sandwiches for lunch on 9 March reported that her infant had been sick with watery diarrhea since just before the outbreak. A stool sample from the infant was positive for NLV by RT-PCR, and the sequence of the amplified product was identical to that of amplified product from deli ham and students' stool specimens. This is the first time RT-PCR and sequence analysis have successfully confirmed viral contamination of a food item likely to have been contaminated by a food handler.

Daniels N.A. et al. Vibrio parahaemolyticus infections in the United States, 1973-1998. J Infect Dis. 2000; 181(5): 1661-6p. Abstract: Vibrio parahaemolyticus infections are associated with consumption of raw or undercooked shellfish, contaminated food, and exposure of wounds to warm seawater. Foodborne outbreaks and sporadic infections from Vibrio species in 4 Gulf Coast states are reported routinely to the Centers for Disease Control and Prevention (CDC). Between 1988 and 1997, 345 sporadic V. parahaemolyticus infections were reported: 59% were gastroenteritis, 34% were wound infections, 5% were septicemia, and 2% were from other exposures. Forty-five percent of patients suffering from these conditions were hospitalized for their infections, and 88% of patients with acute gastroenteritis reported having eaten raw oysters during the week before their illness occurred. Between 1973 and 1998, 40 outbreaks of V. parahaemolyticus infections were reported to the CDC, and these outbreaks included >1000 illnesses. Most of these outbreaks occurred during the warmer months and were attributed to seafood, particularly shellfish. The median attack rate among persons who consumed the implicated seafood was 56%. To prevent V. parahaemolyticus infections, persons should avoid consumption of raw or undercooked shellfish and exposure of wounds to seawater.

Daniels N.A. et al. Traveler's diarrhea at sea: three outbreaks of waterborne enterotoxigenic Escherichia coli on cruise ships. J Infect Dis. 2000; 181(4): 1491-5p. Abstract: Enterotoxigenic Escherichia coli (ETEC) has become the leading bacterial cause of gastroenteritis outbreaks on cruise ships. Investigation of recent outbreaks of ETEC gastroenteritis on 3 cruise ships indicated that all were associated with consuming beverages with ice cubes on board the ship (relative risk [RR], 1.4, 95% confidence interval [CI], 1.0-1.9, P = .02; RR, 1.9, 95% CI, 1.3-2.9, P < .001; and RR, 1.3, 95% CI, 1.0-1.6, P < .01), and 2 were associated with drinking unbottled water (RR, 2.7, 95% CI, 1.8-4.1, P < .001; RR, 1.7, 95% CI, 1.3-2.3, P < .001). Multiple ETEC serotypes were detected in patients' stool specimens in each of the 3 outbreaks, and 12 (38%) of 32 isolates were resistant to > or =3 antimicrobial agents. ETEC appears to be emerging as a waterborne pathogen on cruise ships. Water bunkered in overseas ports was the likely source of ETEC infection in these outbreaks. To ensure passenger safety, cruise ships that take on water in foreign ports must ensure that water treatment and monitoring systems function properly.

Daniels N.A. et al. First do no harm: making oral rehydration solution safer in a cholera epidemic. Am J Trop Med Hyg. 1999; 60(6): 1051-5p. Abstract: Oral rehydration solution (ORS) is lifesaving therapy for cholera and pediatric diarrhea. During a cholera epidemic in Guinea-Bissau, we evaluated the microbiologic quality of ORS prepared at a hospital and tested a simple intervention using special vessels for disinfecting tap water with bleach and for preparing, storing, and dispensing ORS. Few coliform bacteria and Escherichia coli were recovered from tap water; however, pre-intervention ORS contained numerous bacteria including E. coli and toxigenic Vibrio cholerae O1. In contrast, ORS samples from intervention vessels had few or no coliform bacteria, no E. coli, and no V. cholerae. Mean pre-intervention counts of coliform bacteria (3.4 x 10(7) colony-forming units [cfu]/100 ml) and E. coli (6.2 x 10(3) cfu) decreased significantly during the intervention period to 3.6 x 10(2) cfu and 0 cfu, respectively (P < .001). This simple system using bleach disinfectant and special storage vessels prevents bacterial contamination of ORS and reduces the risk of nosocomial transmission of cholera and other enteric pathogens.

Davies E.A. et al. The use of the bacteriocin, nisin, as a preservative in ricotta-type cheeses to control the food-borne pathogen Listeria monocytogenes. Lett Appl Microbiol. 1997; 24(5): 343-6p. Abstract: The efficacy of nisin to control the food-borne pathogen Listeria monocytogenes in ricotta-type cheeses over long storage (70 d) at 6-8 degrees C was determined. Cheeses were prepared from unpasteurized milk by direct acidification with acetic acid (final pH 5.9) and/or calcium chloride addition during heat treatment. Nisin was added in the commercial form of Nisaplin pre-production to the milk. Each batch of cheese was inoculated with 10(2)-10(3) cfu g-1 of a five-strain cocktail of L. monocytogenes before storage. Shelf-life analysis demonstrated that incorporation of nisin at a level of 2.5 mg I-L could effectively inhibit the growth of L. monocytogenes for a
period of 8 weeks or more (dependent on cheese type). Cheese made without the addition of nisin contained unsafe levels of the organism within 1-2 weeks of incubation. Measurement of initial and residual nisin indicated a high level of retention over the 10-week incubation period at 6-8 degrees C, with only 10-32% nisin loss.

Davis L.E. Botulinum toxin. From poison to medicine. West J Med. 1993; 158(1): 25-9p. Abstract: Although thousands of people in the world each year continue to be poisoned with botulinum toxin-food-borne, infantile, or wound botulism-the neurotoxin is now sufficiently understood to allow it to be used as a medicinal agent to paralyze specific muscles, giving temporary symptomatic relief from a variety of dystonic neurologic disorders. I review some of the epidemiologic, clinical, and pathophysiologic aspects of botulinum toxin and how the neurotoxin may act as a poison or a medicine.

de Castro J.J. Sustainable tick and tickborne disease control in livestock improvement in developing countries. Vet Parasitol. 1997; 71(2-3): 77-97p. Abstract: Tick and tickborne disease (TTBD) control is a major component of animal health programmes protecting livestock, thereby enhancing global food security. The present methods for TTBD control are reviewed and an integrated use of the tools is recommended with a broader view of how to link TTBD control to the control of other parasitic diseases. The work of FAO in this field is presented and it is advocated that, although there are still areas that need further investigation, a stage has been reached where robust integrated TTBD control schemes, based on ecological and epidemiological knowledge of ticks and their associated diseases, can be promoted and implemented. Major challenges are the implementation of these policies in the field through the continuation of the present on-going programme in Africa and support to Latin America and Asia. The importance of involving all parties, governments, international and private organisations and the agrochemical industry in developing sustainable, cost-efficient control programmes is stressed and a global strategy is proposed. The main thrust should now be to convince policy makers on the adoption of the strategies and veterinarians and farmers on their implementation.

Deardorff T.L. Epidemiology of marine fish-borne parasitic zoonoses. Southeast Asian J Trop Med Public Health. 1991; 22 Suppl 146-9p. Abstract: Most parasites of marine animals are of little public health concern; however, some helminths are capable of infecting humans. Marine zoonotic infections in humans result from consumption of contaminated edible tissues or products of seafood or, to a lesser extent, from physical contact with contaminated seafood. Worldwide, over 50 species of helminth parasites from fishes, crab, crayfishes, snails and bivalves are known to produce human infections. Most helminth zoonoses are rare and invoke only slight to moderate injury; however, some are more prevalent and pose serious potential health hazards. Worldwide, the majority of seafood zoonoses occur along coastal regions where seafood products are commonly consumed. Continuing improvements in transportation, technology, and food handling, however, allow fresh seafood to be shipped throughout the world; thus, the potential for acquisition of parasitic infections from marine products is not limited to coastal populations. Although the number of documented cases continue to increase, the overall risk of human infection is slight. The increasing exploitation of the marine environment by humans, changing dietary habits incorporating “natural” seafood dishes (eg, sushi and sashimi), and tendency to reduce cooking times when preparing seafood products, all increase the chances of becoming infected with these parasites.

Delakowitz B. et al. Decommissioning of a nuclear power plant: determination of site-specific sorption coefficients for Co-60 and Cs-137. Isotopes Environ Health Stud. 1998; 34(4): 371-80p. Abstract: Assessment of radiological risks in strategies for decommissioning of nuclear installations have to consider not only technical concepts such as cutting and decontamination techniques but, even more important, requirements for input of reliable information on the hydrological situation and retardation capabilities of relevant radionuclides specific to the respective decommissioning operation. In this paper we describe appropriate methods for obtaining site-specific sorption data and present results achieved from a case study performed as a commercial contractual work preliminary to the planned decommissioning of a nuclear power plant. A detailed mineralogical study of the sediment used in our sorption experiment highlights the necessity of a thorough sample homogenization and characterization. Batch experiments using radiotracer techniques for the determination of site-specific sorption coefficients show significant retardation for Co-60 and Cs-137 after only 2 h of equilibrium between the preconditioned groundwater and sediment. Sorption is more effective in the groundwater of a deeper aquifer containing a higher amount of colloidal clay (illite particles < 0.63 micron. The Co-60 radiotracer is more completely sorbed than the Cs-137 radiotracer. Equilibration of radionuclide distribution is slow, particularly for Co-60. Presence of EDTA reduces sorption of Co-60 efficiently while Cs-137 sorption remains unaffected.

Deneen V.C. et al. The impact of foodborne calicivirus disease: the Minnesota experience. J Infect Dis. 2000; 181 Suppl 2 S281-3p. Abstract: The first outbreaks of Norwalk virus gastroenteritis in Minnesota were confirmed in 1982. Since then, Norwalk-like caliciviruses have been recognized to be the most common cause of foodborne disease outbreaks, accounting for 41% of all confirmed foodborne outbreaks in Minnesota from 1981-1998. Although laboratory confirmation of caliciviruses in stool samples was not attempted in most of these outbreaks, all conformed to epidemiologic criteria for defining outbreaks of Norwalk virus. Since 1996, the availability of polymerase chain reaction testing at the Minnesota Department of Health has allowed for the confirmation of calicivirus infection among patients involved in epidemiologically defined outbreaks of viral gastroenteritis. Results have confirmed the usefulness of characterizing foodborne disease outbreaks by epidemiologic criteria and also confirmed the importance of human caliciviruses as the leading cause of foodborne disease outbreaks in Minnesota.

Dentinger C.M. et al. An outbreak of hepatitis A associated with green onions. J Infect Dis. 2001; 183(8): 1273-6p. Abstract: Forty-three cases of serologically confirmed hepatitis A occurred among individuals who ate at restaurant A in Ohio in 1998. Serum samples from all restaurant A employees who worked during the exposure period were negative for IgM antibodies to hepatitis A virus (HAV). A matched case-control study determined that foods containing green onions, which were eaten by 38 (95%) of 40 case patients compared with 30 (50%) of 60 control subjects, were
associated with illness (matched odds ratio, 12.7; 95% confidence interval, 2.6-60.8). Genetic sequences of viral isolates from 14 case patients were identical to each other and to those of viral isolates from 3 patients with cases of hepatitis A acquired in Mexico. Although the implicated green onions, which could have come from one of 2 Mexican farms or from a Californian farm, were widely distributed, no additional green onion-associated cases were detected. More sensitive methods are needed to detect foodborne hepatitis A. A better understanding of how HAV might contaminate raw produce would aid in developing prevention strategies.

DeRosa C.T. et al. Strategic elements of ATSDR's Great Lakes Human Health Effects Research Program. *Toxicol Ind Health.* 1996; 12(3-4): 315-25p. Abstract: The goal of the Agency for Toxic Substances and Disease Registry's (ATSDR) Great Lakes Human Health Effects Research Program is to identify at-risk populations and to prevent potential human health effects associated with exposure to chemical contaminants in the Great Lakes basin. While this research effort is mandated by the Great Lakes Critical Programs Act of 1990, it also represents a significant opportunity to define a broader model or strategy for other regional or systems-level studies of potential health effects in at-risk populations. This article describes the strategy developed by ATSDR for this purpose in the Great Lakes Basin, as well as the program's specific research objectives and current status. It also outlines the projected implications of this research effort for greater comprehension of the potential health effects of exposure to contaminants in the Great Lakes Basin.

Desenclos J.A. et al. The protective effect of alcohol on the occurrence of epidemic oyster-borne hepatitis A. *Epidemiology.* 1992; 3(4): 371-4p. Abstract: Limited data indicate that drinking alcoholic beverages along with eating food contaminated with Shigella or Salmonella decreases the risk and/or the severity of illness. No such study has been reported following exposure to a viral pathogen. During an oyster-borne outbreak of hepatitis A, we studied the effect of ingestion of alcoholic beverages concomitant with consumption of contaminated oysters. The analysis was restricted to 51 cases and 33 controls who had consumed the implicated raw oysters. After controlling for potential confounders, we found a protective effect for beverages that have an alcohol concentration of greater than 0.02-0.9), but not for beverages with an alcohol concentration or equal to 10% (odds ratio = 0.1, 95% confidence interval = 2.6-60.8). Genetic sequences of viral isolates from 14 case patients were identical to each other and 10% (odds ratio = 0.1, 95% confidence interval = 0.2-2.9).

Desenclos J.C. [Epidemiology of toxic and infectious risk related to shellfish consumption]. *Rev Epidemiol Sante Publique.* 1996; 44(5): 437-54p. Abstract: For feeding purposes shellfish filter large amounts of water but also concentrate infectious agents and toxins that are present in the marine environment either naturally or because of pollution. Thus, the consumption of raw or undercooked shellfish is a substantial source of foodborne poisoning, mostly epidemic and sometimes sporadic. Most of shellfish-borne infectious diseases are linked to fecal contamination of the marine environment; they include: typhoid fever, salmonellosis, shigellosis, campylobacteriosis, cholera, Norwalk or Norwalk-like gastroenteritis and hepatitis A. In warm climates, shellfish contains naturally occurring halophilic Vibrios and may cause severe sporadic infections (septicemias) among very susceptible consumers (immunocompromised). Shellfish also causes outbreaks of paralytic shellfish poisoning (PSP) and diarrheic shellfish poisoning (DSP) when they are contaminated by toxins produced when Dinophysis, a marine plankton, proliferates. Chemical compounds (heavy metals and organic toxins) that are dumped in the environment (soil, air, and water) also reach shellfish harvesting waters where they are coentrated. Although acute or chronic effects of the chemical contamination of shellfish have not been clearly documented, the cadmium pollution of some shellfish harvesting waters raises a serious problem. Since it is impossible to prevent completely the contamination of coastal waters by any of the agents cited above, the prevention of shellfish-borne diseases requires monitoring of the marine environment and shellfish flesh (coliform count, Dinophysis toxins, heavy metals...). This surveillance allows the classification of growing areas as suitable or not for harvesting and distribution of shellfish. However, this surveillance is not always sensitive enough. Indicators of fecal pollution are particularly not reliable for shellfish viral contamination. A better knowledge of marine biology, the limitation of coastal waters pollution, improved surveillance, the development of more sensitive indicators, the responsabilisation of the industry and the information of the public on the health hazards associated with shellfish consumption are the key issues for the improvement of shellfish-borne disease prevention.

Deutch B. et al. High blood levels of persistent organic pollutants are statistically correlated with smoking. *Int J Circumpolar Health.* 1999; 58(3): 214-9p. Abstract: Persistent Organic Pollutants (11 pesticides and 14 PCB-congeners), and heavy metals (Cd, Cu, Hg, Pb, Se, and Zn) were determined in 175 pregnant women and 160 newborn infants (umbilical cord blood) from Disko Bay, Greenland, 1994-96. Among these, 135 women filled out questionnaires about drinking, smoking and intake of traditional Inuit food. Multiple linear regression analyses showed highly significant positive associations between the mothers' smoking status (never, previous, present) and plasma concentrations of all the studied organic pollutants both in maternal blood and umbilical cord blood. Traditional food and not the tobacco is known to be the source of the contaminants. But smoking may influence the enzymatic turnover of toxic substances.

Devine M.J. et al. Follow-up of sporadic cases of food-borne infection: comparison of a postal questionnaire with a personal visit. *J R Soc Health.* 1998; 118(3): 176-81p. Abstract: The aim of the study was to evaluate the follow-up of sporadic cases of suspected food-borne illness by either a postal questionnaire or a personal visit by environmental health staff. This was achieved by comparing the practice in two authority areas within the West Pennine Health Authority in the north west of England. We included all identified cases of suspected food poisoning, campylobacteriosis, cryptosporidiosis, salmonellosis and dysentery occurring in the district between 1 July and 30 September 1996. The main outcome measures were: (1) the proportion of all cases which were successfully followed-up by each method; (2) the timeliness of follow-ups; (3) qualitative estimation by environmental health staff of the data obtained. Visiting by environmental health staff was successful in obtaining information from 76.3% (106/139) of cases, while the postal questionnaires elicited a 52% (50/96) response rate. We found that 70.5% of visits occurred within one week of notification. Although 69.8% (67/96) of questionnaires were
issue within one week of notification, only 16% of replies to the questionnaire were received within this period. The information provided on the returned questionnaires was found by environmental health staff to be generally as useful as that obtained by visiting.

Dewailly E. et al. Weighing contaminant risks and nutrient benefits of country food in Nunavik. *Arctic Med Res.* 1996; 55 Suppl 1 13-9p. Abstract: In view of the levels of human exposure to priority contaminants assessed in previous surveys in Nunavik, a series of risk reduction scenarios were produced to modelize the effects of different potential health advisories on limiting exposure of women of reproductive age to these contaminants, as well as on maximizing nutritional benefits derived from the consumption of country food. This paper presents part of the results, in particular as regards effects of reducing PCB intake by 46%, 65% and 86%.

Dieckmann H. et al. [Investigation of foodborne outbreak due to Salmonella infantis using epidemiological and microbiological methods]. *Gesundheitswesen.* 1999; 61(5) : 241-7p. Abstract: In foodborne outbreaks, direct microbiological diagnosis is often not possible due to lack of remaining food samples. Therefore, in this investigation of an outbreak of Salmonella infantis at a fair, we chose an epidemiological approach in addition to microbiological testing. In a case control study, fair participants with symptoms of acute gastroenteritis as well as participants showing no signs of disease were interviewed by telephone. Questions concerning what food had been eaten at the fair and the course of disease had priority. Data analysis showed a significantly elevated odds ratio of 144 (p < 0.00001) for the consumption of potato salad. Salmonella infantis was cultured in faeces of symptomatic individuals as well as from left-over potato salad in high concentration. In conclusion, our data show that the cause of a foodborne outbreak can be detected through the application of epidemiological methods with a high degree of certainty. In order to eliminate memory bias, a structured interview should be carried out as soon as possible after the initial outbreak.

Dietz V. et al. Active, multisite, laboratory-based surveillance for Cryptosporidium parvum. *Am J Trop Med Hyg.* 2000; 62(3) : 368-72p. Abstract: Cryptosporidium parvum leaped to the attention of the United States following the 1993 outbreak in Milwaukee, Wisconsin, which sickened 400,000 people. Other outbreaks in the United States have been associated with drinking and recreational water, consumption of contaminated foods, contact with animals, and childcare attendance. Despite its public health importance, the number of people who become infected each year is not known. In 1997, active surveillance for C. parvum was added to the Foodborne Diseases Active Surveillance Network (FoodNet), a collaborative effort among the Centers for Disease Control and Prevention, selected state health departments, the U.S. Departments of Agriculture and Food and Drug Administration. During the first 2 years of surveillance, 1,023 laboratory-confirmed cases of cryptosporidiosis were detected in FoodNet (Connecticut, Minnesota, Oregon, and selected counties in California, Georgia, Maryland, and New York). The annual rate per 100,000 persons was 2.3. Sixteen percent of case-patients were hospitalized. A seasonal increase in case detection was noted in late summer among persons less than 15 years of age. These data represent the first active multistate ascertainment of laboratory-confirmed cryptosporidiosis cases and provide useful information on the burden of disease in the United States.

Dixon B.R. et al. Fish- and shellfish–borne trematode infections in Canada. *Southeast Asian J Trop Med Public Health.* 1997; 28 Suppl 1 58-64p. Abstract: Food-borne trematode infections are endemic in various parts of the world, particularly Southeast Asia. Despite the high prevalence, morbidity and total costs of these infections, they remain poorly recognized by public health authorities and consumers. Factors such as poor sanitation and traditional methods of food preparation hasten the spread of food-borne trematode infections in endemic regions and must be carefully examined in order to develop effective control strategies. There is also a growing risk to consumers in non-endemic countries as a result of international trade. A considerable quantity of freshwater fish and shellfish is imported into Canada from endemic countries in Southeast Asia. Some of these products are imported fresh or processed in such a way that the infective metacercariae may not be destroyed. Further, current inspection procedures in Canada may not detect the presence of all parasites in imported fish products. Therefore, there may be a risk of infection if the fish or shellfish is consumed raw or lightly cooked. Many of the cases of infection in Canada involve recent immigrants from endemic regions who have become infected either before arriving or through the consumption of traditional or ethnic dishes prepared from imported products. International travel and the increasing availability and interest in ethnic foods also contribute to the risk of infection in all Canadians. In addition to these imported trematodes, a number of species are found in freshwater fishes and shellfish in North America and have also caused illness in humans. Although the prevalence of infection remains relatively low in Canada, the need for an increased general awareness of food-borne trematode infections and their causes is indicated.

Dixon L.B. et al. Choose a diet that is low in saturated fat and cholesterol and moderate in total fat; subtle changes to a familiar message. *J Nutr.* 2001; 131(2S-1) : 510S-526Sp. Abstract: "Choose a diet that is low in saturated fat and cholesterol and moderate in total fat," issued in Nutrition and Your Health: Dietary Guidelines for Americans in the year 2000, has an interesting and lengthy history. The first guideline, for which there was extensive scientific data to show that dietary excess increased chronic disease risk, prompted much scientific discussion and debate when implemented as dietary guidance. Three major changes in the guideline are noted since it was issued in 1980, i.e., numerical goals for dietary fats; the applicability of recommended fat intakes for all individuals > or =2 y old; and rewording to emphasize reducing saturated fat and cholesterol intakes. The shift in emphasis includes the terminology moderate fat, which replaces the phrasing low fat. National data about the food supply, the population's dietary intake, knowledge, attitudes and behaviors, and nutritional status indicators (e.g., serum cholesterol levels) related to dietary fats help to monitor nutrition and health in the population. Experts consider that national data, although not without limitations, are sufficient to conclude that U.S. intakes of fats, as a proportion of energy, have decreased. The lower intakes of saturated fat and cholesterol are consistent with decreases in blood cholesterol levels and lower rates of coronary mortality over the past 30 years. Strategies are needed and some are suggested, to further encourage the population to achieve a dietary pattern that is low in saturated

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fat and cholesterol and moderate in total fat. Other suggestions are offered to improve national nutrition monitoring and surveillance related to the guideline.

**Doan C.H. et al.** Microbiology of potatoes and potato products: a review. *J Food Prot.* 2000; 63(5) : 668-83p. **Abstract:** Many types of spoilage and pathogenic microorganisms exist on fresh, minimally processed, and fully processed potato products. Potatoes are processed into many products including frozen, dried, ready-to-eat, and minimally processed. The microbiological quality of finished potato products is influenced by the natural microflora, processing, handling, and human contact. The natural microflora of potatoes are influenced by soil and airborne inocula, agricultural practices, harvesting methods, and storage conditions. The microflora of processed products are influenced by all of the factors and conditions affecting the natural microflora as well as the processes applied to the product. Increased consumer demand for new and existing potato products highlights the importance of ensuring their microbiological safety. This review considers the sources of microorganisms, microflora, foodborne disease pathogens, and outbreaks associated with, and selected microbiological research involving, potatoes and potato products.

**Doing K.M. et al.** False-positive results obtained with the Alexon ProSpecT Cryptosporidium enzyme immunoassay. *J Clin Microbiol.* 1999; 37(5) : 1582-3p. **Abstract:** Cryptosporidium is known to cause diarrhea in immunocompromised patients and is also associated with outbreaks of disease due to food- borne and waterborne parasites. Traditional procedures, involving iodine staining of wet mounts of stool sediments and trichrome staining, lack the sensitivity to detect Cryptosporidium. Special staining procedures, such as the modified acid-fast and safranin stains, are generally employed. Less labor-intensive antigen detection assays have simplified detection; however, careful attention to local epidemiology is important because false-positive tests occur. Here, we report two incidents involving 62 false-positive results obtained with the Alexon ProSpecT Cryptosporidium enzyme immunoassay, which were deemed false-positive based on negative results obtained from extensive microscopic examinations.

**Domingo J.L. et al.** Health risk assessment of PCDD/PCDF exposure for the population living in the vicinity of a municipal waste incinerator. *Arch Environ Contam Toxicol.* 2002; 43(4) : 461-5p. **Abstract:** Emissions of polychlorinated dibenzo-p-dioxins (PCDDs) and dibenzofurans (PCDFs) by municipal solid waste (MSW) incinerators cause concern to the populations living in the vicinity of these facilities. In this study, the health risks of PCDD/F exposure were assessed for adults and children living 500 and 1,000 m from the MSW incinerator. A comparative analysis was performed before (1998) and after (2000) pronounced decreases in PCDD/F air emissions from the stack were noted as a consequence of technical improvements in the facility. At 500 m, total environmental exposure to PCDD/Fs diminished from 5.102 x 10(-5) to 1.271 x 10(-5) ng I-TEQ/kg/day for adults, and from 8.131 x 10(-5) to 2.656 x 10(-5) ng I-TEQ/kg/day for children, which means a reduction of 75.1% for adults and 67.3% for children between 1998 and 2000. At 1,000 m, total environmental PCDD/F exposure diminished from 4.087 x 10(-5) ng I-TEQ/kg/day in 1998 to 0.995 x 10(-5) ng I-TEQ/kg/day in 2000 and from 6.294 x 10(-5) ng I-TEQ/kg/day in 1998 to 1.983 x 10(-5) ng I-TEQ/kg/day in 2000 for adults and children, respectively. However, these reductions are almost imperceptible compared with the contribution of dietary intake of PCDD/F to total exposure to these contaminants. The present results corroborate that for MSW incinerators with modern technologies, human PCDD/F exposure is mainly due to background contamination.

**Donnelly C.W.** Listeria monocytogenes: a continuing challenge. *Nutr Rev.* 2001; 59(6) : 183-94p. **Abstract:** As a leading cause of death from a foodborne pathogen, Listeria monocytogenes continues to cause sporadic cases and outbreaks of illness. The most recent of these outbreaks in the United States involved consumption of hot dogs, with 101 cases of illness and 21 deaths reported to the Centers for Disease Control and Prevention for the years 1998-1999. Epidemiologic analysis determined that contamination levels in hot dogs were remarkably low (0.3 CFU [colony-forming units] L monocytogenes serotype 4b/g). That same year, manufacturers of hot dogs and luncheon meats collectively recalled more than 500,000 pounds of product owing to possible Listeria contamination. This article, through focus on issues such as reexamination of zero-tolerance policies, improvements in detection and enumeration procedures, the impact of epidemiologic innovations, and measures needed to further reduce the incidence of listeriosis will highlight why L monocytogenes remains a continuing challenge for the food industry.

**Dorn C.R. et al.** Plasmid analysis of Salmonella enteritidis isolated from human gastroenteritis cases and from epidemiologically associated poultry flocks. *Epidemiol Infect.* 1993; 111(2) : 239-43p. **Abstract:** Plasmid analysis of Salmonella enteritidis isolates from human gastroenteritis cases and from two commercial egg-producing poultry flocks was performed to determine if the poultry flocks were the source of the human infections. The plasmid profile and restriction fragment pattern (fingerprint) of five S. enteritidis isolates from human cases matched those of nine isolates from internal organs of egg-laying hens in one flock which was the source of eggs consumed by the cases. Another commercial flock was epidemiologically associated as the source of eggs consumed by affected persons in four separate gastroenteritis outbreaks from which S. enteritidis isolates were available. Five S. enteritidis isolates from human cases in these four outbreaks had the same profile and fingerprint, and they all matched those of the 24 isolates from hens in this flock. These results provide further documentation of egg-borne transmission of S. enteritidis to humans.

**Dorronsoro I. et al.** [Epidemiology of gastroenteritis by Salmonella (1983-1994)]. *Enferm Infecc Microbiol Clin.* 1996; 14(10) : 604-7p. **Abstract:** BACKGROUND: The incidence of Salmonella enteritidis infection has been studied in order to determine their epidemic spread from 1983 to 1994, and the impact of the measures introduced to attempt its control. METHOD: Review of the stool cultures positives for enteric pathogens obtained in the Hospital de Navarra from 1983-1994. RESULTS: Looking at the isolation rates of the different enteric pathogens from 1983 to 1994, a sharp increase of S. enteritidis was recorded on 1985 as a consequence of several outbreaks associated with the consumption of mayonnaise elaborated with row eggs. From 409 strains of Salmonella isolated that year, 302 were serotype enteritidis, this means a 7.5 fold rise since the
Emergence of domestically acquired infections to vertical transmission from breeding flocks to mayonnaise. The measures introduced by local Public Health authorities to attempt control of non pasteurized mayonnaise were insufficient. Evidence from other places links human infections to vertical transmission from breeding flocks to layers. And makes of S. enteritidis infection an international challenge. The severity of the lived experience demands a time-temperature control of eggs in the interval from purchaser to consumer and a more generalized use of pasteurized egg products, no only in the industry but also in the household.

**Dourson M.L. et al.** Fish consumption advisories: toward a unified, scientifically credible approach. *Regul Toxicol Pharmacol.* 1990; 12(2): 161-78p. **Abstract:** A model is proposed for fish consumption advisories based on consensus-derived risk assessment values for common contaminants in fish and the latest risk assessment methods. The model accounts in part for the expected toxicity to mixtures of chemicals, the underlying uncertainties in the health and exposure data, and the amount of contaminated fish consumed. Application of the model to a larger number of chemicals is possible. Noncancer toxicity is used as an example, but this model is applicable for risks from cancer as well. A second related model is proposed that is useful for comparing potential risks among sites (e.g., rivers and lakes).


**Dubey J.P.** Toxoplasmosis—an overview. *Southeast Asian J Trop Med Public Health.* 1991; 22 Suppl 88-92p. **Abstract:** Increasing concern over food safety has focussed attention on food-borne parasitic diseases, particularly toxoplasmosis. Infection by the protozoan parasite Toxoplasma gondii is widely prevalent in humans and in food animals. Cats are the main reservoirs of infection because they are only hosts that excrete environmentally resistant oocysts. Toxoplasma gondii infection is transmitted by ingesting undercooked infected meat, congenitally, and via feces of infected cats. The most severe clinical infections occur in congenitally infected children. Toxoplasmosis is a major cause of abortion and neonatal mortality in sheep, goats, and pigs. Strategies to control toxoplasmosis are outlined.

**Dunne E.F. et al.** Emergence of domestically acquired ceftriaxone-resistant Salmonella infections associated with AmpC beta-lactamase. *JAMA.* 2000; 284(24): 3151-6p. **Abstract:** CONTEXT: Ceftriaxone, an expanded-spectrum cephalosporin, is an antimicrobial agent commonly used to treat severe Salmonella infections, especially in children. Ceftriaxone-resistant Salmonella infections have recently been reported in the United States, but the extent of the problem is unknown. OBJECTIVES: To summarize national surveillance data for ceftriaxone-resistant Salmonella infections in the United States and to describe mechanisms of resistance. DESIGN AND SETTING: Case series and laboratory evaluation of human isolates submitted to the Centers for Disease Control and Prevention from 17 state and community health departments participating in the National Antimicrobial Resistance Monitoring System (NARMS) for enteric bacteria between 1996 and 1998. PATIENTS: Patients with ceftriaxone-resistant Salmonella infections between 1996 and 1998 were interviewed and isolates with decreased ceftriaxone susceptibility were further characterized. MAIN OUTCOME MEASURES: Exposures and illness outcomes, mechanisms of resistance. RESULTS: The prevalence of ceftriaxone-resistant Salmonella was 0.1% (1 of 1326) in 1996, 0.4% (5 of 1301) in 1997, and 0.5% (7 of 1466) in 1998. Ten (77%) of the 13 patients with ceftriaxone-resistant infections were aged 18 years or younger. The patients lived in 8 states (California, Colorado, Kansas, Massachusetts, Maryland, Minnesota, New York, and Oregon). Nine (82%) of 11 patients interviewed did not take antimicrobial agents and 10 (91%) did not travel outside the United States before illness onset. Twelve of the 15 Salmonella isolates with ceftriaxone minimum inhibitory concentrations of 16 microg/mL or higher were serotype Typhimurium but these isolates had different pulsed-field gel electrophoresis patterns. Thirteen of these 15 isolates collected between 1996 and 1998 were positive for a 631-base pair polymerase chain reaction product obtained by using primers specific for the ampC gene of Citrobacter freundii. CONCLUSIONS: Domestically acquired ceftriaxone-resistant Salmonella has emerged in the United States. Most ceftriaxone-resistant Salmonella isolates had similar AmpC plasmid-mediated resistance.

**Echeverria P. et al.** Bacterial Enteric Pathogens in Uncooked Foods in Thai Markets. *J Travel Med.* 1994; 1(2): 63-67p. **Abstract:** In developing countries, the morbidity and mortality rates of gastrointestinal tract infections from food borne bacteria have been difficult to establish. Most studies have only been able to gather data prospectively from isolated geographic sources, rather than from large point-source epidemics. This study investigates the types of bacterial enteric pathogens found in food that was collected in a community in Western Thailand, where sporadic cases of hemolytic uremia syndrome and cholera have been reported. Samples of six different uncooked foods were collected from markets in two villages and in the hills in an area near Bangkok and were tested at a district hospital laboratory within 2 hours of collection. From the 820 food samples collected, enteric pathogens were isolated from approximately 12%. These included nontyphoidal salmonella; Vibrio parahemolyticus; attaching and effacing Escherichia coli of nonenteropathogenic E. coli serogroups; Campylobacter jejuni; enterotoxigenic E. coli; Shigella; and V. cholerae. Travelers in developing countries should be made aware by diarrheal disease programs that food obtained in markets may contain bacterial enteric pathogens and, therefore, the hygienic preparation of such foods is important in the prevention of gastrointestinal disease.
Eckert J. Workshop summary: food safety: meat- and fish-borne zoonoses. Vet Parasitol. 1996; 64(1-2) : 143-7p. Abstract: In this workshop, J.P. Dubey (USA), Th. Hiepe (Germany), and P. Deplazes (Switzerland), were invited speakers. The main areas covered were toxoplasmosis, microsporidiosis, trematode infections, taeniosis/cysticercosis and trichinellosis. The public health and economic impact of meat- and fish-borne parasitic zoonoses is considerable in terms of morbidity and even mortality in humans as well as in losses due to reduced productivity in animals and condemnation of parasitised meat and fish. In this context, the increasing demands of consumers for meat and fish free of pathogens and chemical residues has to be considered. Among the parasitic zoonoses some are widespread and frequent, for example toxoplasmosis. About 30-50% of women of child-bearing age are at risk of acquiring the infection during pregnancy with the potential of prenatal infection and severe disease of the fetus. In addition, toxoplasmosis plays an increasing role as an AIDS-associated infection. There are some recent indications that Toxoplasma infections acquired by adults by ingestion of sporulated oocysts may be more pathogenic than cyst-induced infections. In such cases, eye lesions are quite frequent and were previously thought to be predominantly acquired by prenatal infection (J.P. Dubey, USA). Fish- or crustacean-borne trematodes (species of Clonorchis, Opisthorchis, Paragonimus, intestinal flukes) infect about 39 million people, and about 550 millions are at risk (WHO, 1995). Other zoonotic infections are less frequent but may cause severe and lethal diseases, for example Taenia solium cysticercosis.

Eckert J., Eckstein M., et al. Out-of-hospital and emergency department management of epidemic scombroid poisoning. Acad Emerg Med. 1999; 6(9) : 916-20p. Abstract: OBJECTIVE: To report two epidemic outbreaks of scombroid food poisoning and their emergency medical services (EMS) response and emergency department (ED) treatment, analyzing the impact of early physician involvement and on-line medical control. METHODS: Retrospective case series of two multiple-casualty incidents (MCIs) involving scombroid food poisoning. RESULTS: A total 57 patients were treated from two separate incidents, with 30 patients transported to area hospitals. One patient required treatment with a cardiac medication in the field and another patient eventually required hospital admission. On-scene medical control (incident 1) and early identification of the index case (incident 2) were instrumental to out-of-hospital care interventions and conservation of resources. Patient triage, field treatment, and hospital transport were expedited, with some patients treated and released from the scene. CONCLUSIONS: Immediate diagnosis of a food-borne illness in the out-of-hospital setting allows rapid treatment at the scene and allows for the efficient transport of multiple patients to a single receiving facility. EMS medical directors should be able to immediately respond to such incidents to make presumptive diagnoses and accurately direct patient care. When this is not possible, early identification of the index case facilitates early diagnosis and treatment.

Eduardo S.L. Food-borne parasitic zoonoses in the Philippines. Southeast Asian J Trop Med Public Health. 1991; 22 Suppl 16-22p. Abstract: A number of food-borne parasitic zoonoses have been recorded in the Philippines and include echinostomiasis, artyfechinostomiasis, fascioliasis, heterophydiasis, carneocephalosis, clonorchiasis, paragonimiasis, taeniasis, echinococcosis/hydatoisis, diphyllobothriosis/spirometrosis and sparganosis, intestinal capillarialis, gnathostomiasis, angiostrongylosis, toxoplasmosis and sarcopsporidiosis. Some are now rarely observed while others continue to be public health problems. Many are endemic in certain areas of the Philippines because of the habit of consuming raw or partly cooked fish, snails, crustaceans, and meat. Artyfechinostomiasis caused by Artyfechinostomum malayanum is a recently recognized problem in the Philippines and is reported in man and pigs. Human infection results from ingesting raw or partly cooked freshwater snail, Bullastra cumingiana which serves as second intermediate host. More information on the epidemiology, transmission including the animal hosts involved locally are still needed for some of these problems. Human infection with many of these diseases can be prevented by changing the food habits, but this requires aggressive health education campaigns.

Edwards B.H. Salmonella and Shigella species. Clin Lab Med. 1999; 19(3) : 469-87, vp. Abstract: Salmonella and Shigella are the second and third most common causes of bacterial food-borne disease in the United States and are a major global health problem. The prevention and treatment of disease caused by these organisms are complicated by the increase in multidrug-resistant strains and the lack of an effective vaccine. This article discusses the epidemiology, clinical features, and diagnostic techniques for both enteric pathogens.

Egan C. Points of view: Inuit women's perceptions of pollution. Int J Circumpolar Health. 1998; 57 Suppl 1 550-4p. Abstract: Inuit women's perceptions of health risks from potential contamination in the arctic food chain were investigated in 1995 through in-depth interviews with 47 women in a Canadian arctic community. This number represents 34% of the eligible participants in the population of the research community. Many of these Inuit women suggest that pollution can appear in a variety of forms, from drug and alcohol consumption to visible air and water.
Eicher S.D. et al. Dietary modulation of Kupffer cell and splenocyte function during a Salmonella typhimurium challenge in mice. *J Leukoc Biol.* 1995; 58(1): 32-39p. **Abstract:** Oils from cold-water fish are rich in (n-3) polyunsaturated fatty acids, in particular eicosapentaenoic acid (20:5) and docosahexaenoic acid (22:6). Although these fatty acids are beneficial in the prevention of cardiac disease and have anti-inflammatory properties, they can also decrease survival rates of mice during challenges with food-borne pathogens. This study was designed to determine dietary fat effects on Kupffer cells and splenocytes during a Salmonella typhimurium challenge. Mice were fed a low corn oil diet (3%, control), high corn oil diet (20%, HCO), or a menhaden fish oil diet (17% + 3% corn oil, FO) for 28 days and then orally given 3.1 x 10(8) colony-forming units of *S.* typhimurium. Kupffer cells and splenocytes were separated immediately prior to and on days 6, 10, and 14 postchallenge. Fish oil decreased Kupffer cell phagocytosis and oxidative burst early in the infection and adhesion molecule (CD18) expression at the end of the infection. In splenocytes, fish oil affected Ia expression prior to and late in the infection and depressed CD18 expression late in the infection. These data suggest that the diet affected Kupffer cells most early in the infection but affected splenocytes primarily later in the infection. Therefore, because the greatest death rate during an *S.* typhimurium infection occurs early, the reduced function of the Kupffer cells is probably a major factor.

Eiguer T. et al. [Significance of Salmonella enteritidis in outbreaks of diseases transmitted by foods in Argentina, 1986-1988]. *Rev Argent Microbiol.* 1990; 22(1): 31-6p. **Abstract:** This paper reports on the outbreaks of food-borne-diseases due to Salmonella Enteritidis which occurred in Argentina between 1986 and 1988. In 39 registered episodes 210 strains were isolated from human feces (28 outbreaks) and 59 from food (23 outbreaks). More than 2,500 people in different provinces were affected, the chief characteristics of the infection to humans and other animals. Apart from being a source of Salmonella food poisoning for humans, Salmonella-contaminated food animal carcasses are also a concern because they are a source of antibiotic-resistant Salmonella.

Ekperigin H.E. et al. Microbial food borne pathogens. *Salmonella.* * Vet Clin North Am Food Anim Pract.* 1998; 14(1): 17-29p. **Abstract:** All food animals are susceptible to infection with Salmonella, a genus of gram negative, nonspore-forming, usually motile, facultative anaerobic bacilli belonging to the family Enterobacteriaceae. Salmonella are differentiated into over 2200 serologically distinct types (serotypes) based on differences in somatic, flagellar, and capsular antigens. Infection with Salmonella may or may not lead to a sometimes fatal salmonellosis, a disease that can remain localized in the gastrointestinal tract as gastro-enteritis, or become generalized as a septicemia and affect several organ systems. Infected food animals that do not develop salmonellosis, and those that recover from the disease, become carriers of Salmonella and serve as sources of infection to humans and other animals. Apart from being a source of Salmonella food poisoning for humans, Salmonella-contaminated food animal carcasses are also a concern because they are a source of antibiotic-resistant Salmonella.

el-Sahni F. Dietary patterns and nutritional assessment of working children at Abou El-Dardar industrial area in Alexandria City. *J Egypt Public Health Assoc.* 1992; 67(1-2): 119-45p. **Abstract:** The present study was undertaken in order to evaluate the nutritional status of young working children aged 8 to 18 years, working in workshops at Abou-El-Dardar industrial area in Alexandria Governorate. A total sample of 154 of young male workers were recruited from workshops. The nutritional status was assessed using anthropometric, dietary and biochemical criteria. The results of the study revealed that 45% of the working children were considered malnourished: 16% were wasted, 23% were stunted and 3% were both wasted and stunted and 3% were overweight. Analysis of nutrient intake revealed that the intakes were less than the recommended for energy, calcium, vitamin A, vitamin C and niacin, while the intake of protein, iron, thiamin and riboflavin were more than sufficient. About 77% of the young workers were found to have haemoglobin levels below the cut-off levels issued by WHO. A high prevalence of parasitic infection (food-borne) (72%) was found among young workers. The results also revealed that stunting, wasting and stunting together and overweight were more common in young workers who were both anaemic and had evidence of parasitic infection than those who were anaemic only or had parasitic infection only.
were markedly enhanced by the addition of sodium chloride on the bactericidal activity was observed. Their activities suggested that the treatment with vinegar solution containing vegetables were examined. Vinegar solution (1-2% acidity) was further examined. When vinegar was used in combination with sodium chloride, predominant synergism on the bactericidal activity was observed. Their activities were markedly enhanced by the addition of sodium chloride in proportion to the concentration. In addition to this, at higher temperatures spirit vinegar killed bacteria much more rapidly. It should be noted that the bactericidal activity of spirit vinegar was extremely enhanced by the combined use of the addition of sodium chloride and the rise of temperature. For example, in 2.5% acidity vinegar, the time required for 3 log decrease in viable cell numbers at 20 degrees C was shortened to 1/140-fold by the addition of 5% sodium chloride, shortened to 1/51-fold by the rise of the reaction temperature at 40 degrees C, and shortened to 1/830-fold; 0.89 minutes by both the addition of 5% sodium chloride and the rise of temperature at 40 degrees C. In order to propose the methods to prevent food poisoning by bacterial infection, bactericidal activities of vinegar solution containing sodium chloride on cooking tools and raw vegetables were examined. Vinegar solution (1-2% acidity, 3-7% NaCl) produced more than 3 log decrease in viable cell numbers of E. coli O157:H7 on the surface of cutting board, and cabbage and cucumber at 20-50 degrees C. These results suggested that the treatment with vinegar solution containing sodium chloride may be one of the useful methods to prevent food poisoning.

Epstein S.S. Evaluation of the national cancer program and proposed reforms. Am J Ind Med. 1993; 24(1): 109-3p. Abstract: A statement by some 68 prominent national experts in industrial medicine, carcinogenesis, epidemiology, and public health, released at a February 4, 1992 press conference in Washington, D.C., charged that the National Cancer Institute (NCI) has confused the public by repeated claims of winning the war against cancer. In fact, age standardized incidence rates have increased sharply over recent decades, while ability to treat and cure most cancers has not materially improved. Furthermore, the NCI has minimized evidence for increasing cancer rates which are largely attributed to smoking and to diet. In so doing, NCI trivializes the importance of occupational carcinogens as non-smoking-attributable causes of lung and other cancers, and ignores the tenuous and inconsistent evidence for the causal role of diet per se and also the important role of carcinogenic dietary contaminants. Reflecting this near exclusionary blame-the-victim theory of cancer causation, with support from the American Cancer Society and industry, the NCI discounts the role of avoidable involuntary exposures to industrial carcinogens in air, water, food, the home, and the workplace. The NCI has also failed to provide scientific guidance to Congress and regulatory agencies on fundamental principles of carcinogenesis and epidemiology, and on the critical need to reduce avoidable exposures to environmental and occupational carcinogens. Contrary to NCI, analysis of their $2 billion budget reveals very limited allocations for research on primary cancer prevention, and for occupational cancer which receives only $19 million annually, 1% of NCI's total budget. Problems of professional mindsets in NCI leadership-fixation on diagnosis, treatment, and basic research (much of questionable relevance) and the neglect of cancer prevention-are exemplified by the composition of the Executive President's Cancer Panel and the National Cancer Advisory Board. Contrary to the explicit mandate of the National Cancer Act, the Board is virtually devoid of recognized authorities in occupational and environmental carcinogenesis. These problems are further compounded by institutionalized conflicts of interest reflected in the composition of past Cancer Panels, and of the current Board of Overseers of the Memorial Sloan Kettering Cancer Center, NCI's prototype comprehensive cancer center, with their closely interlocking financial interests with the cancer drug and other industries. Comprehensive reforms of NCI policies and priorities are overdue. Implementation of such reforms is, however, unlikely in the absence of further support from industrial medicine professionals, which is here solicited, besides action by Congress and concerned citizen groups.

Ericsson H. et al. An outbreak of listeriosis suspected to have been caused by rainbow trout. J Clin Microbiol. 1997; 35(11): 2904-7p. Abstract: An outbreak of listeriosis in Sweden, consisting of nine cases, was investigated by means of molecular typing of strains from patients and strains isolated from suspected foodstuffs, together with interviews of the patients. Listeria monocytogenes was isolated from six of the patients, and all isolates were of the same clonal type. This clonal type was also isolated from a "gravad" rainbow trout, made by producer Y, found in the refrigerator of one of the patients. Unopened packages obtained from producer Y were also found to contain the same clonal type of L. monocytogenes. Based on the interview results and the bacteriological typing, we suspect that at least six of the nine cases were caused by gravid or cold-smoked rainbow trout made by producer Y. To our knowledge, this is the first rainbow trout-borne outbreak of listeriosis ever reported.

Estes M.K. et al. Norwalk virus vaccines: challenges and progress. J Infect Dis. 2000; 181 Suppl 2 S367-73p. Abstract: Human calcivirus (HuCVs) are the major cause of outbreaks of acute nonbacterial gastroenteritis throughout the world. An increasing recognition of the clinical significance of these viruses as human pathogens causing foodborne and waterborne disease indicates that an effective vaccine would be useful. This article reviews the current challenges that exist for the development of a vaccine for the HuCVs as well as the status of development of a candidate vaccine. HuCVs are viruses that exhibit a restricted tropism for infection of the gastrointestinal tract of humans, and a volunteer model of infection and disease is available. As pathogens with a restricted host range, the HuCVs are excellent models for understanding the mechanisms that mediate and regulate viral infection of the gastrointestinal tract and mucosal immunity in humans.

Evans M.R. et al. A milk-borne campylobacter outbreak following an educational farm visit. Epidemiol Infect. 1996; 117(3): 457-62p. Abstract: After a nursery school trip to a dairy farm, 20 (53%) of 38 children and 3 (23%) of 13 adult helps developed gastrointestinal infection. Campylobacter jejuni was isolated from 15 primary cases and from 3 of 9
Farber J.M. et al. Listeria monocytogenes, a food-borne pathogen. Microbiol Rev. 1991; 55(3) : 476-511p. Abstract: The gram-positive bacterium Listeria monocytogenes is an ubiquitous, intracellular pathogen which has been implicated within the past decade as the causative organism in several outbreaks of foodborne disease. Listeriosis, with a mortality rate of about 24%, is found mainly among pregnant women, their fetuses, and immunocompromised persons, with symptoms of abortion, neonatal death, sepsis, and meningitis. Epidemiological investigations may make use of strain-typing procedures such as DNA restriction enzyme analysis or electrophoretic enzyme typing. The organism has a multifactorial virulence system, with the thiol-activated hemolysin, listeriolysin O, being identified as playing a crucial role in the organism's ability to multiply within host phagocytic cells and to spread from cell to cell. The organism occurs widely in food, with the highest incidences being found in meat, poultry, and seafood products. Improved methods for detecting and enumerating the organism in foodstuffs are now available, including those based on the use of monoclonal antibodies, DNA probes, or the polymerase chain reaction. As knowledge of the molecular and applied biology of L. monocytogenes increases, progress can be made in the prevention and control of human infection.

Farber J.M. et al. A small outbreak of listeriosis potentially linked to the consumption of imitation crab meat. Lett Appl Microbiol. 2000; 31(2) : 100-4p. Abstract: A small outbreak of listeriosis involving two previously healthy adults occurred in Ontario. Food samples obtained from the refrigerator of the patients included imitation crab meat, canned black olives, macaroni and vegetable salad, spaghetti sauce with meatballs, mayonnaise and water. All of the samples except the water contained Listeria monocytogenes. The three most heavily contaminated samples were the imitation crab meat, the olives and the salad which contained 2.1 x 109, 1.1 x 107 and 1.3 x 106 cfu g-1, respectively. L. monocytogenes serotype 1/2b was isolated from the patients, as well as from the opened and unopened imitation crab meat. Molecular typing of the isolates by both randomly amplified polymorphic DNA (RAPD) and pulsed-field gel electrophoresis (PFGE) typing demonstrated the imitation crab meat and clinical strains to be indistinguishable. Challenge studies performed with a pool of L. monocytogenes strains showed that imitation crab meat, but not olives, supported growth of the organism. In this study we have shown for the first time the potential involvement of imitation crab meat in a small outbreak of listeriosis. In terms of disease prevention, temperature control is critical to prevent or reduce the growth of this foodborne pathogen. In addition, with refrigerated products having a long (> 30 d) shelf life, additional safety factors must be used to prevent the growth of foodborne pathogens such as L. monocytogenes.

Evans S.J. Introduction and spread of thermophilic campylobacters in broiler flocks. Vet Rec. 1992; 131(25-26) : 574-6p. Abstract: Campylobacteriosis is the most commonly reported infectious cause of human gastroenteritis in developed countries and broiler chickens are considered to be the major food-borne source of the infection. The control of the infection in man depends upon its control in broiler flocks but the epidemiology in poultry is poorly understood. Up to 50 per cent of broiler flocks may be infected and most of the birds in an infected flock carry the organisms until slaughter. Vertical transmission through the egg appears unlikely but there are many other potential sources of the infection for the chicks; direct contact with infected animals or birds has been proposed and there is also evidence for indirect transmission through drinking water or insect vectors. It is suggested that the cross-sectional studies discussed in this review should be followed by well designed case-control studies to test the aetiological hypotheses put forward.

Fent K. Ecotoxicological problems associated with contaminated sites. Toxicol Lett. 2003; 140-141 353-65p. Abstract: Contamination sites pose significant environmental hazards...
Contaminants present at polluted sites occur as high lipophilicity resulting in bioaccumulation in food webs. Ecotoxicological effects occur at all levels of the biological organization, from the molecular to the ecosystem level. Not only certain organisms may be affected, but the ecosystems as a whole in its function and structure. Contaminants at large contaminated sites often share critical properties such as toxicity, high environmental persistence, often high mobility prone to contamination of groundwater, and high lipophilicity resulting in bioaccumulation in food webs. Contaminants present at polluted sites occur as mixtures; therefore, interactions between individual compounds may be of importance. The bioavailability is a key factor responsible for ecotoxicological effects of contaminants: only the bioavailable fraction induces ecotoxicological effects, as shown for organotin compounds. Organotins belong to the most toxic pollutants known so far for aquatic life. Widespread contamination of harbor sediments occurs globally due to the ongoing use of organotins in antifouling paints on large ships. In lake sediments, tributyl- and triphenyltin are very persistent and bioavailable to biota even after a long time. The bioavailability of organotins is dependent on the pH and the content of organic matter. Organotins accumulate in sediments, but remobilization occurs during disturbance and dredging. A key question in dealing with contaminated sites is whether, and to what extent ecotoxicity occurs. Usually, established OECD tests and whole effluent toxicity tests are performed for an ecotoxicological evaluation and for risk assessment. However, these assays are often expensive, laborious and sometimes not sensitive enough. As a consequence, we have used rapid and inexpensive in vitro systems such as fish cell lines for the evaluation of sediments and landfill leachates, which were contaminated by polycyclic aromatic hydrocarbons (PAHs). The determination of cytotoxicity as a measure for acute toxicity, and the induction of cytochrome P4501A (CYP1A) as a biomarker of exposure and effects were found to be important measures, which can be used for hazard and risk assessment. We have developed a concept for the ecotoxicological evaluation of PAH contamination based on induction equivalents, which can be applied for aquatic and terrestrial ecosystems. One of the key question and present gaps, however, includes the long-term chronic ecotoxicological effects of single compounds and mixtures on soil and aquatic biota at contaminated sites. This should be addressed in the future.

Feron V.J. et al. Polyethylene terephthalate bottles (PRBs): a health and safety assessment. Food Addit Contam. 1994; 11(5): 571-94p. Abstract: As part of a multi-client project, the potential public health risks of the reuse of polyethylene terephthalate (PET) refillable bottles (PRBs) following possible misuse has been investigated. Participants in the project provided data and information from previous studies conducted independently at contract laboratories. These studies were sponsored by the clients in order to provide further research data on PET containers and their safety. In this report, the results of five of these studies along with the results of a recent study carried out at TNO are compiled and reported. PET refillable bottles were exposed to 62 contaminants, including pesticides, that a consumer could potentially store in bottles. After storage with a contaminant under well defined conditions, the bottles were washed, filled with a simulated beverage, and stored for various lengths of time. The beverage and in some cases the bottle wall were then analysed for the presence of the contaminants. Toxicological evaluation of the analytical results from these tests on contaminant residue remigration showed that even under exaggerated exposure conditions, there was no public health concern. Only one compound, parathion, remigrated to a level that required a more in-depth risk evaluation, and under the most conservative assumptions, it too presented no real health hazard. Additionally, current detection systems employed to ensure product quality detect a wide variety of contaminants, including commercial formulations of parathion. Data developed in this paper are consistent with the finding that PRBs can be safely reused. For preventing negative effects on product quality (e.g. taste), however, good manufacturing procedures including visual and electronic inspection systems are required to eliminate abused bottles.

Ferrari C.K. et al. [Viral contamination of food products: a poorly understood public health problem]. Rev Panam Salud Publica. 1998; 3(6): 359-66p. Abstract: Throughout the world there have been several epidemics of food-borne diseases (FBD) about which there is lack of sufficient information for public health institutions to take appropriate measures. This study was conducted for the purpose of contributing to the dissemination of information on these diseases and their etiologic agents, epidemiology, and control. The study was based on data from 61 sources, including review articles, reports of outbreaks, and databases. Results reveal considerable underregistration and lack of data on FBD throughout the various countries, with viruses being the second most important cause of FBD in the United States of America. Two agents, Norwalk virus and hepatitis A virus, were the fifth and sixth most frequent causes, respectively, although the former was the single most frequent cause of FBD in 1982 and the second most frequent cause of water-borne diseases during the period from 1986 to 1988. Despite the scarcity of information on the problem, rotavirus, poliovirus, hepatitis E virus, astrovirus, and small gastroenteric viruses are also important causes of FBD. We also discuss the importance of viral zoonoses, especially hemorrhagic fevers transmitted by contact with rodent feces and tick-borne viral encephalitides (Lassa fever). There is discussion of the controversial mad cow disease and its potential transmission through food products, as well as dietary aspects of the management of AIDS and other viral infections. Finally, measures for the prevention and control of FBD are described.

Fiala Z. et al. [Chemical load in the population and its evaluation]. Acta Medica (Hradec Kralove) Suppl. 1998; 41(1): 39-47p. Abstract: Human health is determined by the interplay between heredity and the environment. Air, water, food and soil contain chemical, physical and biological agents some of which are known to be harmful to health. Chemical substances that pose the risk to human health and safety and to the environment are subject to governmental regulation. The regulatory decision-making process and regulatory actions are based on two distinct elements: risk assessment and risk management. Air pollution (outdoor, indoor) is a world problem afflicting densely populated urban centers and heavily industrialised areas. Industrialization and the widespread use of chemicals coupled with modern intensive agricultural practices have raised a global concern about the contamination of soil and water. Three categories of environmental chemical contaminants generally occur in food–natural and synthetic organic compounds and traces of
toxic metals. Human health protection against chemical exposure can be realised in three ways. Environmental monitoring assesses exposure to a chemical agent by measuring the chemical, its concentration in the environment (i.e., air, soil, food, water). Biological monitoring assesses internal exposure to a chemical agent by measuring the chemical, its metabolites or non-adverse biological response in body fluids, tissues, expired air or excreta. Health surveillance entails the periodic medical examinations of exposed humans with the purpose of protecting health and preventing disease.

**Fisher I.S. et al.** International surveillance networks and principles of collaboration. *Euro Surveill.* 2001; 6(2): 17-21p. Abstract: In the face of the multiplication and the development of international surveillance networks for communicable diseases, many questions on the transmission of personal data and information arise. The confidential nature of shared data and their disclosure internationally within and outside the network are therefore potential sources for conflicts. To resolve these problems, Enter-net developed its 'Collaboration Principles' intended to apply to all the participants of the network and to all others potentially involved. These principles propose solutions to questions related to the access to databases created within the framework of the network, to the quality and confidentiality of circulating data, to the individual responsibility in the identification of an incriminated product in case of an outbreak, and even to the transmission of information outside the network. These principles, which are to be regularly reviewed, are primarily aimed at optimising early detection and management of foodborne outbreaks, and at taking the necessary measures for public health. Considering the nature of the problems, however, some of these principles are also of relevance to other surveillance networks.

**Fleet G.H. et al.** Foodborne viral illness–status in Australia. *Int J Food Microbiol.* 2000; 59(1-2): 127-36p. Abstract: Norwalk-like virus contamination of oysters and orange juice, and hepatitis A virus contamination of oysters have been responsible for large outbreaks of foodborne viral disease in Australia. Rotavirus, adenovirus, astrovirus, parvovirus and other enteroviruses also contribute to the incidence of gastroenteritis in this country but the role of foods and waters in transmitting these viruses is unclear. Protocols for the investigation, surveillance and reporting of foodborne viral illness require further development to enable a more accurate description of the problem. Few laboratories have the capability to analyse foods for viruses and specific training in this technology is needed. Management of food safety in Australia largely relies on the implementation of HACCP principles, but these need to be adapted to address the specific risks from viruses.

**Foegeding P.M.** Driving predictive modelling on a risk assessment path for enhanced food safety. *Int J Food Microbiol.* 1997; 36(2-3): 87-95p. Abstract: How do we best protect our citizens to allow the highest quality of life? Where do we put our food safety resources so that we gain the greatest positive impact? Risk assessment provides the critical scientific basis for these types of important risk management decisions. Increasingly, risk assessment is used to guide legislated and voluntary changes intended to improve safety, yet its formal application for enhanced food safety is in its infancy. Risk assessment includes disease characterization, dose-response assessment, exposure assessment, and risk characterization. Quantitative data is critical for risk assessment to realize its full value, yet much of our knowledge about the incidence of pathogens or toxins in foods, dose-response knowledge, incidence of acute foodborne illness, incidence of chronic sequelae, and cost of foodborne illness is qualitative or estimates are controversial. Predictive modelling should help to improve estimates and thereby allow quantification of food safety risks. Predictive modelling will also find application for assessing prevention strategies in risk management.

**Fone D.L. et al.** Investigation of an outbreak of gastroenteritis at a hospital for patients with learning difficulties. *Commun Dis Public Health.* 1999; 2(1): 35-8p. Abstract: Eighty of the 460 patients and staff (attack rate 22%) in a long-stay hospital for patients with learning difficulties became ill during a general outbreak of gastrointestinal infection that followed a buffet style party on one ward. Illness in the cohort of 47 resident patients, relations, and staff who attended that party was associated with having eaten ham, coleslaw, bread rolls, and cheese and pineapple on sticks. Food from the hospital kitchen was supplemented by food brought in and prepared on the ward by staff and patients. The investigation suggested that food items were contaminated either during preparation by staff and patients or during the party when people served themselves. Microbiological and virological investigations were negative, but small round structured virus was thought to be responsible. Hospitals could do more to prevent outbreaks of foodborne infection by undertaking risk
assessment as required by the Food Safety Act (General Food Hygiene) Regulations 1995. Purchasers of hospital infection control should ensure compliance with this legislation.

**Fossi M.C. et al.** Nondestructive biomarkers of exposure to endocrine disrupting chemicals in endangered species of wildlife. *Chemosphere.* 1999; 39(8) : 1273-85p. **Abstract:** This paper explores the problem of endocrine disrupting chemicals (EDCs) from the ecotoxicological point of view, focusing on nondestructive biomarkers of exposure to EDCs for risk assessment of endangered species of wildlife. Several EDCs, such as polyhalogenated aromatic hydrocarbons and toxic metals, tend to be biomagnified in the terrestrial and particularly the marine food chains. Top predators tend to accumulate high concentrations of these contaminants which places them in a situation of high toxicological risk. Hence, there is a need to develop nondestructive techniques, such as nondestructive biomarkers, for hazard assessment, protection, and conservation of endangered species exposed to EDCs. The biological materials proposed for this approach (for example blood, faeces, fur, skin biopsy specimens) are easily obtained with minimal stress for individuals and populations. Some validation data are reported on porphyrins in sea bird excreta (Larus dominicanus, Phalacrocorax olivaceus, Pelicans occidentalis thagus), as nondestructive biomarkers of exposure to organochlorines, and on benzopyrene monoxygenase activities in marine mammal skin biopsy specimens (Stenella coerulea, Balaenoptera physalus), as early indicators of exposure to p,p’-DDE and other endocrine disrupting organochlorines.

**Francis A.J. et al.** Investigation of milk-borne Streptococcus zooepidemicus infection associated with glomerulonephritis in Australia. *J Infect.* 1993; 27(3) : 317-23p. **Abstract:** An outbreak of infection due to Streptococcus zooepidemicus is reported. The index case was a patient who suffered an episode of septicemia complicated by glomerulonephritis. Two other persons in his family were found to be asymptomatic throat carriers. The source of the outbreak was unpasteurised milk from a house cow on the farm where the family lived. Molecular studies confirmed that the strains isolated from the index case, the other family members and the cow’s milk were identical. Although a renal biopsy was not performed, the diagnostic criteria for poststreptococcal glomerulonephritis were satisfied. The organism is an uncommon human pathogen that sometimes causes outbreaks of severe infection which may be associated with glomerulonephritis.

**Franz C.M. et al.** Enterococci at the crossroads of food safety? *Int J Food Microbiol.* 1999; 47(1-2) : 1-24p. **Abstract:** Enterococci are gram-positive bacteria and fit within the general definition of lactic acid bacteria. Modern classification techniques resulted in the transfer of some members of the genus Streptococcus, notably some of the Lancefield’s group D streptococci, to the new genus Enterococcus. Enterococci can be used as indicators of faecal contamination. They have been implicated in outbreaks of foodborne illness, and they have been ascribed a beneficial or detrimental role in foods. In processed meats, enterococci may survive heat processing and cause spoilage, though in certain cheeses the growth of enterococci contributes to ripening and development of product flavour. Some enterococci of food origin produce bacteriocins that exert anti-Listeria activity. Enterococci are used as probiotics to improve the microbial balance of the intestine, or as a treatment for gastroenteritis in humans and animals. On the other hand, enterococci have become recognised as serious nosocomial pathogens causing bacteraemia, endocarditis, urinary tract and other infections. This is in part explained by the resistance of some of these bacteria to most antibiotics that are currently in use. Resistance is acquired by gene transfer systems, such as conjugative or nonconjugative plasmids or transposons. Virulence of enterococci is not well understood but adhesins, haemolysins, hyaluronidase, aggregation substance and gelatinase are putative virulence factors. It appears that foods could be a source of vancomycin-resistant enterococci. This review addresses the issue of the health risk of foods containing enterococci.

**Frost J.A. et al.** Public health implications of campylobacter outbreaks in England and Wales, 1995-9: epidemiological and microbiological investigations. *Epidemiol Infect.* 2002; 128(2) : 111-8p. **Abstract:** Although campylobacter has been the most commonly recognized bacterial cause of gastrointestinal infection in England and Wales since 1981, there are few reported campylobacter outbreaks. Of the 2374 general outbreaks of infectious intestinal disease reported to CDSC between 1995 and 1999, for which an aetiological agent was identified, campylobacter accounted for only 50 (2%). Foodborne transmission was identified in 35 outbreaks and the majority took place in commercial catering establishments; waterborne transmission was responsible for a further four outbreaks. Isolates of Campylobacter jejuni were referred for typing from 25 outbreaks. In 13 outbreaks all isolates were the same subtype, as defined by serotype and phage type, while in the remainder more than one campylobacter subtype was involved.

**Gajadhar A.A. et al.** Historical perspectives and current global challenges of Trichinella and trichinellosis. *Vet Parasitol.* 2000; 93(3-4) : 183-9p. **Abstract:** Trichinella spiralis and related species of Trichinella have had a long history of causing human disease, and as a foodborne pathogen have had a major impact on international commerce of pork and other meat animal species which are known to transmit the parasite. Our knowledge of Trichinella has increased substantially over the past few years particularly in the areas of phylogeny, host diversity, epidemiology and control. In this paper, we provide a brief overview of our understanding of Trichinella from its discovery to present time. Past and current challenges of the control of Trichinella and trichinellosis are summarized. As editors of this special issue of Veterinary Parasitology, we introduce a series of invited review articles prepared by experts from around the world, summarizing recent knowledge in Trichinella and trichinellosis.

**Galay A. et al.** How many foodborne outbreaks of Salmonella infection occurred in France in 1995? Application of the capture-recapture method to three surveillance systems. *Am J Epidemiol.* 2000; 152(2) : 171-7p. **Abstract:** Despite control measures, foodborne outbreaks of non-typhi Salmonella infection continue to occur in developed countries. The authors aimed to assess the number of foodborne Salmonella outbreaks that occurred in France in 1995 using a capture-recapture approach. Data from three sources—the National Public Health Network (NPHN), the
Ministry of Agriculture (MA), which receives mandatory notification, and the National Salmonella and Shigella Reference Center (NRC)—were collected. Matching algorithms permitted identification of matched outbreaks. The total number of outbreaks was estimated by log-linear modeling taking into account source dependencies and the variable catchability. The final estimate was adjusted for the positive predictive value (66%) of the NRC case definition. The dependency between the NPHN and the MA was also evaluated by means of a qualitative survey. A total of 716 foodborne Salmonella outbreaks were reported to the three sources, and 108 matches were identified. The best-fitting model, taking into account a positive dependence between the NPHN and MA sources, gave an estimate of 757 outbreaks. The sensitivity was 15% for the NPHN, 10% for the MA, and 50% for the NRC. In France, routine mandatory reporting of foodborne Salmonella outbreaks is very incomplete, and it is not representative of the serotype and the type of outbreak.

Gallo G. et al. An outbreak of group A food-borne streptococcal pharyngitis. *Eur J Epidemiol.* 1992; 8(2) : 292-7p. **Abstract:** A food-borne outbreak of pharyngitis from group A streptococcus developed in people attending wedding banquets in the same restaurant on July 5-8, 1986. Of the 300 people interviewed, 179 reported illness; pharyngeal swabs were taken from 115 ill people; from 63 (53%) of them group A streptococci, belonging to serotype T28, M28, were isolated. Statistical analysis performed using chi-square and Cochran's test showed that a prawn hors-d'oeuvre served on July 7 could have been a possible source of infection. Six people on the staff, 5 of whom belonged to the family of the restaurant manager, and the manager's three young daughters were colonized by the same group A serotype. A possible previous diffusion of the strain among the staff followed by contamination of the food was suspected.

Gallo J. et al. Susceptibility of some pea cultivars to pea seed-borne mosaic virus infection and virus transmission by seeds. *Acta Virol.* 1995; 39(5-6) : 283-6p. **Abstract:** The susceptibility of 19 pea cultivars to pea seed-borne mosaic virus (PShbMV) by mechanical inoculation and the virus transmission by seeds were determined. All tested cultivars were highly susceptible to the virus. The virus transmission by seeds was found in 1.9% - 32.7%. A correlation between mechanical and vector-mediated infections of pea and virus transmission by seeds is discussed.

Gast R.K. et al. Applying tests for specific yolk antibodies to predict contamination by Salmonella enteritidis in eggs from experimentally infected laying hens. *Avian Dis.* 1997; 41(1) : 195-202p. **Abstract:** Detecting Salmonella enteritidis contamination in hens has become the cornerstone of many programs for reducing egg-borne disease transmission, but egg culturing is time consuming and laborious. Preliminary screening tests are thus generally applied to minimize the number of flocks from which eggs must be cultured. The usefulness of such tests is directly proportional to both their detection sensitivity and their ability to predict the likelihood of egg contamination. In the present study, samples were collected for 24 days after groups of laying hens were orally inoculated with S. enteritidis. Eggs from each hen were cultured for S. enteritidis in the contents and samples of egg yolk were diluted and tested for specific antibodies to S. enteritidis flagella using both experimental and commercially available enzyme-linked immunosorbent assay (ELISA) methods. Samples of voided feces were also collected regularly from each bird and cultured for S. enteritidis. Although fecal shedding and egg yolk antibody production followed opposite patterns over time (fecal shedding was decreasing as egg yolk antibody titers were increasing), tests for both parameters were effective in predicting whether particular hens would lay contaminated eggs. Among hens that laid at least one egg contaminated by S. enteritidis, 82% were detected as infected by fecal culturing and 96% by the experimental egg yolk ELISA test. Using easily collected samples, egg yolk antibody testing offers a rapid and effective screening method for identifying S. enteritidis-infected laying flocks that might lay contaminated eggs.

Gaylor D.W. et al. Health risk assessment practices in the U.S. Food and Drug Administration. *Regul Toxicol Pharmacol.* 1997; 26(3) : 307-21p. **Abstract:** The U.S. Food and Drug Administration (FDA) regulates a wide variety of consumer products. Safety issues involve chemical and microbial contaminants in food, biologies, and medical devices; side effects from prescription and nonprescription drugs; residues of animal drugs in food; and radiation from electronic devices. Because of this wide diversity, the legal standards, rules, and policies governing the regulation of these products differ considerably. Hence, risk assessment and risk management practices within the FDA are of necessity quite diverse. This paper presents a summary of risk assessment practices at each of the product centers of the FDA (Center for Food Safety and Applied Nutrition, Center for Drug Evaluation and Research, Center for Biologics Evaluation and Research, Center for Devices and Radiological Health, and Center for Veterinary Medicine) and of the development of risk assessment procedures at the National Center for Toxicological Research.

Gaylor D.W. et al. U.S. Food and Drug Administration perspective of the inclusion of effects of low-level exposures in safety and risk assessment. *Environ Health Perspect.* 1998; 106 Suppl 1 391-4p. **Abstract:** A brief overview is provided of some of the general safety and risk assessment procedures used by the different centers of the U.S. Food and Drug Administration (U.S. FDA) to evaluate low-level exposures. The U.S. FDA protects public health by regulating a wide variety of consumer products including foods, human and animal drugs, biologies, and medical devices under the federal Food, Drug, and Cosmetic Act. The diverse legal and regulatory standards in the act allow for the consideration of benefits for some products (e.g., drugs) but preclude them from others (e.g., food additives). When not precluded by statutory mandates (e.g., Delaney prohibition), the U.S. FDA considers both physiologic adaptive responses and beneficial effects. For the basic safety assessment paradigm as presently used, for example in the premarket approval of food additives, the emphasis is on the identification of adverse effects and no observed adverse effect level(s) (NOAEL). Generally, the NOAEL is divided by safety factors to establish an acceptable exposure level. This safety assessment paradigm does not preclude the consideration of effects whether they are biologically adaptive or beneficial at lower dose levels. The flexibility to consider issues such as mechanisms of action and adaptive and beneficial responses depends on the product under consideration. For carcinogenic contaminants and radiation from medical devices, the U.S. FDA considers the potential cancer risk at low exposure.
levels. This generally involves downward extrapolation from the observed dose-response range. The consideration of adverse effects of other toxicologic end points (e.g., reproductive, immunologic, neurologic, developmental) associated with low exposure levels is also becoming more of a reality (e.g., endocrine disrupters). The evaluation of the biologic effects of low-level exposures to toxic substances must include whether the effect is adverse or a normal physiologic adaptive response and also determine the resiliency of a physiologic system. The public health mandate of the U.S. FDA includes an active research program at the National Center for Toxicological Research and the other U.S. FDA centers to support the regulatory mission of the U.S. FDA. This includes the development of knowledge bases, predictive strategies, and toxicologic studies to investigate effects at the lower end of the dose-response range. Because of the wide diversity of legal and regulatory standards for various products regulated by the U.S. FDA agency-wide safety and risk assessment procedures and policies generally do not exist.

Geiss H.K. et al. [Food borne outbreak of a Salmonella enteritidis epidemic in a large pharmaceutical industry]. Gesundheitswesen. 1993; 55(3) : 130-5p. Abstract: In summer 1991 an outbreak of a Salmonella enteritidis epidemic involving about 600 cases of gastroenteritis occurred at one of the leading pharmaceutical companies in southwestern Germany. The main source was a cold fruit soup, in addition Salmonella were isolated from meat strips and a curd cheese which were used for a salad dressing. A total of 2300 contaminated food portions were served resulting in an attack rate of about 25%. The possible origin could have been an asymptomatic Salmonella-positive member of the kitchen personnel who was the only one who was involved with the preparation of all the incriminated foods. A further spread of the epidemic and especially the possible contamination of pharmaceuticals was avoided by the timely and adequate reaction of the company's occupational medical service. This case exemplifies how classical crisis management, "increased initiative on one's own for prevention of infections in all areas of food processing" (Steuer) and finally the cooperation of the company with different institutions of the public health authorities contribute to the control of such a catastrophic scenario.

Gellert G.A. et al. Scombroid fish poisoning. Underreporting and prevention among noncommercial recreational fishers. West J Med. 1992; 157(6) : 645-7p. Abstract: Food-borne diseases, including those caused by seafood products, are common and greatly underreported sources of morbidity. In this article we review the epidemiology of scombroid fish poisoning and its possible relationship to the noncommercial and recreational catch and sale of fish. More than 20% of all fish sold in the United States is caught by sport fishers, and outbreaks of scombroid fish poisoning have involved improperly handled fish from private catches. We report an outbreak of scombroid fish poisoning among recreational fishers in California. The unregulated sale of recreationally caught fish for consumption and the prevention of scombrototoxicity are discussed from the perspectives of public health agencies, clinicians, and the fishing public. Scientific and policy issues that require further attention are highlighted.

Gerstenberger S.L. et al. PCBs, mercury, and organochlorine concentrations in lake trout, walleye, and whitefish from selected tribal fisheries in the Upper Great Lakes region. Environ Toxicol. 2002; 17(6) : 513-9p. Abstract: The purpose of this study was to determine the concentrations of environmental contaminants in the edible portion of fish tissue consumed by Ojibwa residing in the Upper Great Lakes region. Lake trout, whitefish, and walleye were collected from Lake Superior, Lake Huron, Lake Michigan, and selected inland lakes. These fish were harvested by either commercial fishing or spearfishing techniques and analyzed for environmental contaminants. Samples were pooled by species and location of collection and were analyzed as composites. The concentrations of congener-specific polychlorinated biphenyl (PCB), total mercury, and 17 other organochlorine compounds of the pooled samples were determined using gas chromatographic and atomic absorption techniques. Differences were noted in both the concentration and composition of contaminants depending on the geographic location of collection and the species examined. Lake trout and whitefish contained higher concentrations of organochlorine compounds than did walleye; and samples from Lakes Michigan and Huron had much higher concentrations than did Lake Superior fish. Conversely, mercury was much higher in walleye (580 ppb) when compared with lake trout (117 ppb) and whitefish (10 ppb). Several PCB congeners were commonly found in all fish samples; these included PCBs 138 + 163, 153, 66 + 95, 118, 77 + 110, 180, and 101. Lake trout accumulated the highly chlorinated PCB congeners, whereas walleye and whitefish accumulated certain lower tri- and tetrachlorobiphenyl congeners. In conclusion, the fish harvested and consumed by Ojibwa tribal members contained both mercury and organochlorine compounds. The concentrations of contaminants found in fish tissue differed among species and sampling sites. Consequently, it is imperative to sample fish that best represent those being consumed by tribal members and to continue long-term monitoring of fish from ceded waters. Therefore, risk assessment and risk management strategies need to take into account geographic location of the fish and unique preparation methods and to be directed at the contaminant(s) of concern for given locations.

Giboda M. et al. Current status of food-borne parasitic zoonoses in Laos. Southeast Asian J Trop Med Public Health. 1991; 22 Suppl 56-61p. Abstract: Stool samples from a total of 1,008 persons were examined for intestinal parasites during a comprehensive study on the epidemiology of small fluke infections in Laos. The prevalence of small fluke eggs in the stool was seen to peak at age 20 years, particularly in men from villages (90.4%). Three quarters of infections belong to the category of light infections and only 0.6% to the category of very heavy according to eggs per gram of feces (EPG). The highest EPG was in the 11-15 year age group. In addition, the following parasites were diagnosed: Sarcocystis hominis (prevalence more than 10% in the group over 20 years of age), Taenia sp. (12.4% for the village people over 20 years), Fasciolopsis buski (3.8% for the same group). The habit of Laos people to eat raw fish, beef and pork flesh, is reflected in significant epidemiological consequences. Cercariae of Opisthorchis viverrini occurred in 0.5% of Bithynia siamensis goniophalus examined, Haplorchis sp. cercariae were found in 0.9% of Tarebia granifera snails. Metacercariae of O. viverrini were found in flesh of 7 species of cyprinid fish. Haplorchis taichui in 4 species of these fish, and H. pumilio of two cyprinid species. Hampala
Giesy J.P. et al. Contaminants of fishes from Great Lakes-influenced sections and above dams of three Michigan rivers: III. Implications for health of bald eagles. *Arch Environ Contam Toxicol.* 1995; 29(3) : 309-21p. Abstract: Recently, there have been discussions of the relative merits of passage of fishes around hydroelectric dams on three rivers (Au Sable, Manistee, and Muskegon) in Michigan. A hazard assessment was conducted to determine the potential for adverse effects on bald eagles that could consume such fishes from above and below dams on the three primary rivers. The hazard assessments were verified by comparing the reproductive productivities of eagles nesting in areas where they ate primarily fish from either above or below dams on the three primary rivers, as well as on two additional rivers in Michigan, the Menominee and Thunder Bay. Concentrations of organochlorine insecticides (OCI), polychlorinated biphenyls (total PCBs), 2,3,7,8-tetrachlorodibenzo-p-dioxin equivalents (TCDD-EQ), and total mercury (Hg) were measured in composite samples of fishes from above and below hydroelectric dams on the Manistee and Muskegon Rivers, which flow into Lake Michigan, and the Au Sable River, which flows into Lake Huron. Mean concentrations of OCI, total PCBs, and TCDD-EQ were all greater in fishes from below the dams than in those from above. The hazard assessment indicated that current concentrations of Hg and OCI other than DDT (DDT+DDE+DDD) in fish from neither above nor below dams would present a significant hazard to bald eagles (Haliaeetus leucocephalus). Both total PCBs and TCDD-EQ in fishes from below the dams currently present a significant hazard to bald eagles, since their mean hazard quotients (HQ) were all greater than one.

Giesy J.P. et al. Cell bioassays for detection of aryl hydrocarbon (AhR) and estrogen receptor (ER) mediated activity in environmental samples. *Mar Pollut Bull.* 2002; 45(1-12) : 3-16p. Abstract: In vitro cell bioassays are useful techniques for the determination of receptor-mediated activities in environmental samples containing complex mixtures of contaminants. The cell bioassays determine contamination by pollutants that act through specific modes of action. This article presents strategies for the evaluation of aryl hydrocarbon receptor (hereafter referred as dioxin-like) or estrogen receptor mediated activities of potential endocrine disrupting compounds in complex environmental mixtures. Extracts from various types of environmental or food matrices can be tested by this technique to evaluate their 2,3,7,8-tetrachlorodibenzo-p-dioxin equivalents or estrogenic equivalents and to identify contaminated samples that need further investigation using resource-intensive instrumental analyses. Fractionation of sample extracts exhibiting significant activities, and subsequent reanalysis with the bioassays can identify important classes of contaminants that are responsible for the observed activity. Effect-directed chemical analysis is performed only for the active fractions to determine the responsible compounds. Potency-balance estimates of all major compounds contributing to the observed effects can be calculated to determine if all of the activity has been identified, and to assess the potential for interactions such as synergism or antagonism among contaminants present in the complex mixtures. The bioassay approach is an efficient (fast and cost effective) screening system to identify the samples of interest and to provide basic information for further analysis and risk evaluation.

Gillespie I.A. et al. General outbreaks of infectious intestinal disease associated with fish and shellfish, England and Wales, 1992-1999. *Commun Dis Public Health.* 2001; 4(2) : 117-23p. Abstract: Between 1992 and 1999 1425 foodborne general outbreaks of Infectious Intestinal Disease (IID) were reported to the PHLS Communicable Disease Surveillance Centre. Of these, 148 (10%) were associated with the consumption of fish and shellfish. Three main aetiologies were identified. Outbreaks associated with fish (47%) occurred more frequently in the summer months, and were linked with Scombrotoxic fish poisoning caused by the consumption of tuna that was improperly stored. Outbreaks associated with molluscs (36%) were associated with the consumption of oysters contaminated with viral pathogens, particularly in February. Outbreaks associated with the consumption of crustaceans (11%) often involved eating prawns that contained either salmonellas or viral pathogens. The maintenance of microbial quality from prior to capture/harvesting until the moment of consumption, based on a Hazard Analysis and Critical Control Point style approach, is essential if gastrointestinal illness associated with such produce is to be avoided.

Gilling S.J. et al. Successful hazard analysis critical control point implementation in the United Kingdom: understanding the barriers through the use of a behavioral adherence model. *J Food Prot.* 2001; 64(5) : 710-5p. Abstract: Hazard analysis critical control point (HACCP), a system of risk management designed to control food safety, has emerged over the last decade as the primary approach to securing the safety of the food supply. It is thus an important tool in combatting the worldwide escalation of foodborne disease. Yet despite wide dissemination and scientific support of its principles, successful HACCP implementation has been limited. This report takes a psychological approach to this problem by examining processes and factors that could impede adherence to the internationally accepted HACCP Guidelines and subsequent successful implementation of HACCP. Utilizing knowledge of medical clinical guideline adherence models and practical experience of HACCP implementation problems, the potential advantages of applying a behavioral model to food safety management are highlighted. The models' applicability was investigated using telephone interviews from over 200 businesses in the United Kingdom. Eleven key barriers to HACCP guideline adherence were identified. In-depth narrative interviews with food business proprietors then confirmed these findings and demonstrated the subsequent negative effect(s) on HACCP implementation. A resultant HACCP awareness to adherence model is proposed that demonstrates the complex range of potential knowledge, attitude, and behavior-related barriers involved in failures of HACCP guideline adherence. The model's specificity and detail provide a tool whereby problems can be identified and located and in this way.
facilitate tailored and constructive intervention. It is suggested that further investigation into the barriers involved and how to overcome them would be of substantial benefit to successful HACCP implementation and thereby contribute to an overall improvement in public health.

**Gillis D. et al.** A new Streptococcus group A M-29 variant isolated during a suspected common-source epidemic. *Mil Med.* 1992; 157(6) : 282-3p. **Abstract:** In the summer of 1988, a large epidemic of acute pharyngitis occurred in an Israeli military base. The clinical features were those of acute pharyngitis. The epidemic curve was characteristic of a common-source outbreak, possibly food-borne. Throat swabs from a sample of cases were positive for group A streptococci. Nine isolates from the epidemic were further evaluated at the local reference laboratory and serotyping showed that all were of the same strain with a distinct M protein that is a hitherto undescribed variant of M-29. We discuss the significance of unusual strains of beta-hemolytic Streptococcus appearing in food-borne outbreaks.

**Goffi-Laroche L. et al.** [Description of drinking water intake in French communities (E.M.I.R.A. study)]. *Rev Epidemiol Sante Publique.* 2001; 49(5) : 411-22p. **Abstract:** BACKGROUND: Assessment of risks associated with waterborne pollutants requires a good characterization of the exposure of individuals and populations. This characterization implies knowledge of pollutants' levels in water and their time variability, and also estimation of drinking water consumption. Several studies were conducted, mostly in North America, on levels of chemical contaminants or prevalence of pathogens. Few studies were conducted on drinking water intake of the general population. METHODS: This work, included within the E.M.I.R.A study which was set up to assess waterborne infectious risks, describes in details daily drinking water consumption of 544 French volunteers. Data were collected by self-questionnaires. Results: Results differ according to the season. Tap water usage for food follows a normal distribution (arithmetic mean in winter=1.55 l/j, 95% CI [0.20-2.90]; arithmetic mean in spring=1.78 l/j, [0.13-3.43]). Total drinking water intake follows a log-normal distribution (geometric mean in winter=1.60 l/j, standard deviation=1.73 l/j; geometric mean in spring=1.92 l/j, standard deviation=1.70 l/j). Tap water intake amounts to more than 80% of total drinking water consumption, and pure tap water (i.e. not added, modified nor boiled) amounts to 42% of total drinking water. Results are also displayed by age, and compared to other data available in the literature. CONCLUSIONS: This work provides data that can be used to develop risk assessment and epidemiological studies in the field of chemical or infectious risks in the context of France.

**Goldman L.R. et al.** Pesticide food poisoning from contaminated watermelons in California, 1985. *Arch Environ Health.* 1990; 45(4) : 229-36p. **Abstract:** Aldicarb, a carbamate pesticide, is the most potent pesticide in the market and has a LD50 of 1 mg/kg. In the United States it is illegal to use aldicarb on certain crops, e.g., watermelons, because it is incorporated into the flesh of the fruit. Once an accidental or illegal use of such a potent pesticide occurs, there is no easy way for the agricultural or public health system to protect the populace. This paper describes the impact of one such event upon the health of individuals and the institutions of California. On July 4, 1985, California and other western states experienced the largest known outbreak of food-borne pesticide illness ever to occur in North America. This was attributed to watermelons contaminated through the illegal or accidental use of aldicarb by a few farmers in one part of the state. Within California, a total of 1,376 illnesses resulting from consumption of watermelons was reported to the California Department of Health Services (CDHS). Of the 1,376 illnesses, 77% were classified as being probable or possible carbamate illnesses. Many of the case reports involved multiple illnesses associated with the same melon among unrelated individuals. Seventeen individuals required hospitalization. There were 47 reports of illness involving pregnant women, two of whom reported having subsequent stillbirths. Thirty-five of the remaining pregnant women were followed-up 9 mo after the epidemic; no additional stillbirths were found. **(ABSTRACT TRUNCATED AT 250 WORDS).**

**Golovkina T.V. et al.** Generation of a tumorigenic milk-borne mouse mammary tumor virus by recombination between endogenous and exogenous viruses. *J Virol.* 1997; 71(5) : 3895-903p. **Abstract:** Two novel exogenous mouse mammary tumor viruses (MMTV), BALB2 and BALB14, that encode superantigens (Sags) with Vbeta2+ and Vbeta14+ specificities, respectively, were found in the BALB/cT mouse strain. BALB/cT females were crossed with AKR/J males to generate F1 females. Foster nursing of BALB/cT mice on (BALB/cT x AKR/J)F1 females resulted in the generation of a new mouse strain, BALB/cLA, that had acquired a new exogenous MMTV (hereafter called LA) with a Vbeta6+/Vbeta8.1+- T-cell-specific Sag. Sequence analysis of the long terminal repeats of the BALB2, BALB14, and LA viruses indicated that LA virus resulted from recombination between BALB14 and the endogenous Mtv-7 provirus. Mtv-7 is expressed only in lymphoid tissues but not the mammary glands of Mtv-7-containing mouse strains such as AKR. In contrast, LA virus was highly expressed in the mammary gland, although it had the sag-specific region from Mtv-7. The LA virus, as well as different recombinant viruses expressed in the mammary glands of (BALB/cT x AKR/J)F1 mice, acquired a specific DNA sequence from BALB14 virus that is required for the mammary-gland-specific expression of MMTV. Since the Sag encoded by LA virus strongly stimulated cognate T cells in vivo, selection for recombinant virus with the Mtv-7 Sag most likely occurred because the increased T-cell proliferation resulted in greater lymphoid and mammary gland cell infection. As a result of the higher virus titer, 80% of BALB/cLA females developed mammary gland tumors, although the incidence was only 40% in BALB/cT mice.

**Gonzalez-Hewia M.A. et al.** Usefulness of molecular genetic markers in the typing of Salmonella enterica serovar Enteritidis causing a food-borne outbreak. *Int J Food Microbiol.* 1994; 22(2-3) : 97-103p. **Abstract:** A combination of serotyping-phagetyping and three molecular genetic markers (plasmid analysis, chromosomal DNA restriction pattern and ribosomal RNA gene restriction pattern or ribotyping) was used in the typing of Salmonella enterica causing a food-borne outbreak. The isolates analysed, 29 from stools and eight from foods, belonging to serovar Enteritidis-phagetypetype A, carried a 36-MDa plasmid, showed a similar DNA restriction pattern and the same ribopattern. These data indicate that only one strain was involved. The DNA pattern and ribopattern of this strain were indistinguishable from the patterns of a serovar Enteritidis-phagetypetype A strain which has caused salmonellosis in Asturias, Spain, since, at least, 1984.
Goormachtig S. et al. Differentiation of strains from a food-borne outbreak of Salmonella enterica by phenotypic and genetic typing methods. *Eur J Epidemiol.* 1995; 11(4): 479-82p. Abstract: A combination of typing methods was used to identify the strains and the infection source in a food-borne outbreak of Salmonella enterica occurring in a summer camp and affecting 25 children. All isolates tested were found to be serovar Enteritidis, with an identical biotype API 20E and ribotype. However, they differed in their plasmid profiles and/or antibiograms, and were grouped into three strains. One strain was found in human stools, another in a hen's egg, and the third in both stools and another egg pointing to large Spanish omelettes to be the contaminated food source.

Goodman L. et al. Infectious diarrhea. *Dis Mon.* 1999; 45(7): 268-99p. Abstract: Infectious diarrhea is an extremely common illness that affects millions of Americans annually. For most patients, the illness is a self-limited one. Its major risk is dehydration. However, for some patients, diarrhea can lead to severe dehydration or be associated with bacteremia and metastatic infection. Patients with these conditions require prompt treatment. A large number of organisms have been associated with diarrhea in humans, and most laboratories routinely screen for Salmonella, Shigella, and Campylobacter. Other bacteria, parasites, and viruses account for a significant percentage of diarrhea cases and frequently go undetected. This article summarizes many of these pathogens and describes the settings in which they can be acquired. Food distribution networks have made the delivery of previously rare foods to remote areas a commonplace occurrence; this has also led to new challenges in the diagnosis and prevention of food-borne illnesses. Outbreaks of diarrhea now frequently extend across many states. The identification of a rare strain of a bacterial pathogen or changes in the isolation rate of common pathogens may be early clues to the cause of such an ongoing outbreak. Most enteric pathogens cause disease by either stimulating the secretion of fluids at the level of the small bowel or by irritating and invading the colon. Organisms that cause disease by the latter mechanism have the potential to invade the blood stream and spread to other parts of the body, irritating and invading the colon. Organisms that cause disease by the latter mechanism have the potential to invade the blood stream and spread to other parts of the body, including the bones and the central nervous system. Several organisms have been associated with specific postinfectious syndromes that are responsible for additional morbidity and mortality. The antibiotic resistance of bacterial pathogens has been increasing, and this has a limiting effect on the empiric treatment choices available for suspected bacterial diarrhea. Careful attention to local sensitivity patterns and appropriate testing of the patient's isolate are among the important factors that lead to successful treatment decisions.

Goormachtig S. et al. Srchi13, a novel early nodulin from Sesbania rostrata, is related to acidic class III chitinases. *Plant Cell.* 1998; 10(6): 905-15p. Abstract: On the tropical legume Sesbania rostrata, stem-borne nodules develop after inoculation of adventitious root primordia with the microsymbiont Azorhizobium caulinodans. A cDNA clone, Srchi13, with homology to acidic class III chitinase genes, corresponds to an early nodulin gene with transiently induced expression during nodule ontogeny. Srchi13 transcripts accumulated strongly 2 days after inoculation, decreased from day 7 onward, and disappeared in mature nodules. Induction was dependent on Nod factor-producing bacteria. Srchi13 was expressed around infection pockets, in infection center, around the developing nodule and its vascular bundles, and in uninfected cells of the central tissue. The specific and transient transcript accumulation together with the lipochitooligosaccharide degradation activity of the recombinant protein hint at a role of Srchi13 in normal nodule ontogeny by limiting the action of Nod factors.

Gotz H. et al. Clinical spectrum and transmission characteristics of infection with Norwalk-like virus: findings from a large community outbreak in Sweden. *Clin Infect Dis.* 2001; 33(5): 622-8p. Abstract: A large foodborne outbreak caused by Norwalk-like virus (NLV) among children and staff at 30 day care centers provided an opportunity to study symptomatology and attack rates among patients in different age groups, as well as secondary transmission rates in centers and households. A retrospective cohort study of 775 subjects from 13 randomly chosen centers was performed. Diarrhea was more common in adults than in children (P<.001), whereas the reverse was noted with regard to vomiting (P=.003). The primary attack rate was 27% (142 of 524 subjects): 54% of adults versus 19% of children (P<.001). The mean incubation time for foodborne cases of infection was 34 hours. The secondary attack rate was 17%. Risk factors for spread into households were the primary case being a child (relative risk [RR], 3.8; 95% confidence interval [CI], 1.9-7.6) and vomiting (RR, 2.4; 95% CI, 1.0-5.5). The incubation time for person-to-person transmission was approximated by a mean serial interval of 52 hours. This is the first reported outbreak of NLV infection in which secondary transmission into households by individuals has been studied.

Graceyk T.K. et al. Echinostomiasis: a common but forgotten food-borne disease. *Am J Trop Med Hyg.* 1998; 58(4): 501-4p. Abstract: Human echinostomiasis, endemic to southeast Asia and the Far East, is a food-borne, intestinal, zoonotic parasitosis attributed to at least 16 species of digenean trematodes transmitted by snails. Two separate life cycles of echinostomes, human and sylvatic, efficiently operate in endemic areas. Clinical symptoms of echinostomiasis include abdominal pain, violent watery diarrhea, and anorexia. The disease occurs focally and transmission is linked to fresh or brackish water habitats. Infections are associated with common sociocultural practices of eating raw or insufficienly cooked mollusks, fish, crustaceans, and amphibians, promiscuous defecation, and the use of night soil (human excrement collected from latrines) for fertilization of fish ponds. The prevalence of infection ranges from 44% in the Philippines to 5% in mainland China, and from 50% in northern Thailand to 9% in Korea. Although the patterns of other food-borne trematodiases have changed in Asia following changes in habits, cultural practices, health education, industrialization, and environmental alteration, human echinostomiasis remains a health problem. The disease is most prevalent in remote rural places among low-wage earners and in women of child bearing age. Echinostomiasis is aggravated by socioeconomic factors such as poverty, malnutrition, an explosively growing free-food market, a lack of supervised food inspection, poor or insufficient sanitation, other helminthiases, and declining economic conditions. Furthermore, World Health Organization control programs implemented for other food-borne helminthiases and sustained in endemic areas are not fully successful for echinostomiasis because these parasites display extremely broad specificity for the second intermediate host and are capable of completing the life cycle without involvement of the human host.
Gray S.F. et al. Dose-response in an outbreak of non-bacterial food poisoning traced to a mixed seafood cocktail. *Epidemiol Infect.* 1993; 110(3) : 583-90p. Abstract: An outbreak of non-bacterial food poisoning presumed due to small round, structured viruses (SRSV) occurred at a national conference. A detailed postal survey of all conference attenders was carried out to ascertain the cause of the outbreak and 355 questionnaires were returned. Univariate analysis showed that mussels in the seafood cocktail were the likely vehicle of infection. A dose-response relationship between the amount of seafood cocktail consumed and the risk of illness was demonstrated. Dose-response has not previously been documented in a food-borne outbreak due to small round structured virus. Detailed quantitative food histories can be useful in eliciting dose-response relationships and may be crucial in establishing the vehicle of infection when investigating food poisoning following consumption of a set-menu meal. Their use should be considered in other outbreak situations.

Grotto I. et al. [Epidemiological characteristics of outbreaks of diarrhea and food poisoning in the Israel Defense Forces in the years 1978-1995]. *Harefuah.* 1997; 133(7-8) : 255-64, 336p. Abstract: Acute infectious diseases of the gastrointestinal tract and food poisoning are problems of great importance in the Israel Defense Forces (IDF). They involve individual and epidemic morbidity, with impairment of health of individual soldiers and in the activities of units. Outbreaks of gastrointestinal infectious diseases must be reported to the IDF army health branch, which conducts epidemiological investigation. This study is based on data from yearly epidemiological reports for 1978-1989, and from a computerized database for the years 1990-1995. The incidence of outbreaks is characterized by an unstable trend. It was highest at the end of the 80's (68.3 per 100,000 soldiers on active duty) and lowest for the last 2 years (1994-1995, 36.3 per 100,000). The incidence of soldiers involved in food-borne outbreaks has been more stable, constantly declining during the course of the years. There was marked seasonality with a peak in the summer months. Sporadic morbidity was constant in 1990-1995, with a yearly attack rate of 60% in soldiers on active duty. Shigella strains were the leading cause of outbreaks until 1993, while in 1994-1995 their proportion decreased, with an increase in the proportion of Salmonella strains. As to Staphylococcus aureus, its role in causing food poisoning has been characterized by marked changes. Shigella sonnei replaced Shigella flexneri as the leading strain. 73.3% of outbreaks were small, with fewer than 40 soldiers involved, while 5.4% of outbreaks affected more than 100 soldiers. Outbreaks in which a bacterial agent was identified or which occurred in new-recruit bases were larger than those in which a bacterial agent was not identified, or which occurred in active field unit bases. In conclusion, the rates of infectious disease of the gastrointestinal tract are still high, although there has been a marked decrease since 1994. The incidence of outbreaks has also decreased, as well as the role of Shigella as a leading causative agent.

Gunnarsson H. et al. The usefulness of Diffusion-In-Gel-ELISA in clinical practice as illustrated by a Campylobacter jejuni outbreak. *J Immunol Methods.* 1998; 215(1-2) : 135-44p. Abstract: In this study, the DIG-ELISA (Diffusion-In-Gel Enzyme Linked Immunosorbent Assay) is presented as a tool for the determination of antibodies with improved quantitation over other solid phase assays. The method combines the diffusion of antibodies in agar with the EIA concept in Petri dishes. Diffusion of native, undiluted sera results in (1) a concentration gradient in the effort to reach equilibrium, i.e., an end point titration; (2) a separation of serum components of different sizes; (3) unlimited possibilities for migrating antibodies to bind antigenic epitopes because of the constant antigen excess. Low affinity antibodies can bind divalently and are more readily detected; and (4) elimination of dilution errors. The combination of undiluted sera and Petri dishes as solid phase also permits a large number of samples to be tested with less effort and simplifies the practical handling of EIAs, including easy coating and washing procedures, reuse of antigen and quantitation by zone areas without instrumentation. Plates can be stored for months and are available for re-examination, demonstration and transport. The whole procedure can be conducted in a closed system, i.e., when testing highly contaminated samples. The usefulness of the procedure is demonstrated by a food-borne outbreak of Campylobacter jejuni. The outbreak involved 86 persons of whom 20% were culture positive in contrast to a seropositivity of 74% with DIG-ELISA. A diffusion time of 24 h was used for diagnostic purposes. Extended diffusion times of 48 h and 72 h were utilized when consecutive series of sera showed identical values after 24 h, indicating high antibody content that resulted in a peak serum (end point). For infectious diseases with a rapid course, this assay could be used as an acute test. With the diffusion step prepared in advance, DIG-ELISA is a ready-to-use test. When frequent sampling of sera is performed in the very early phase of the disease, DIG-ELISA reveals that all Ig-classes can be present at high titer and the diagnostic potential of the immune response is better utilized. The DIG-ELISA has the methodological flexibility and the physical qualities to be an effective, inexpensive technique for quantitation of antibodies at any laboratory.

Hadidi A. et al. Scar skin and dapple apple viroids are seed-borne and persistent in infected apple trees. *Res Virol.* 1991; 142(4) : 289-96p. Abstract: The closely related apple scar skin viroid (ASSV) and dapple apple viroid (DAV) were identified in whole seeds from infected pome fruits by hybridization of extracted nucleic acids with a 32P-labelled ASSV cRNA probe. Viroid amounts were greater in seed coats and subcoats than in seed cotyledons and embryos. ASSV or DAV was also detected in nucleic acid extracts from infected seeds, cotyledons and embryos by reverse transcription/polymerase chain reaction with viroid-cDNA-specific primers followed by Southern blot hybridization analysis of the amplified products with an ASSV cRNA probe. These results indicate that ASSV and DAV are seed-borne. ASSV and DAV were also found in the anthers, petals, receptacles, leaves, bark and roots of infected trees. The results suggest that viroid-infected trees constitute potential sources of the viroid in field spread. ASSV and DAV infections have been observed sporadically in commercial orchards in the United States and Canada and the infected trees have been eliminated. The use of viroid-free sources of seeds, seedlings, rootstocks and budwood should greatly reduce the risk of the future spread of the viroid.

Hainaut P. et al. Mouse mammary tumor virus (MMTV) infection in SWISS and RIII mice. Correlation between
Hall J.A. et al. Epidemiologic profiling: evaluating foodborne outbreaks for which no pathogen was isolated by routine laboratory testing: United States, 1982-9. *Epidemiol Infect.* 2001; 127(3): 381-7p. Abstract: The objective was to evaluate foodborne outbreaks of undetermined aetiology by comparing them to pathogen-specific epidemiologic profiles of laboratory-confirmed foodborne outbreaks. National foodborne outbreak data reported to CDC during 1982-9 were categorized by clinico-epidemiologic profiles based on incubation, duration, percent vomiting, fever and vomiting to fever ratio. From the pathogen-specific profiles, five syndromes were developed: a vomiting-toxin syndrome resembling Bacillus cereus and Staphylococcus aureus; a diarrhoea-toxin syndrome characteristic of Clostridium perfringens, a diarrhoeagenic Escherichia coli syndrome, a Norwalk-like virus syndrome, and a salmonella-like syndrome. Of 712 outbreaks, 624 (87.6%) matched one of five syndromes; 340 (47.8%) matched the Norwalk-like syndrome and 83 (11.7%) matched the salmonella-like syndrome. After combining information on known pathogens and epidemiologic profiles, only 88 (12.4%) outbreaks remained unclassified. Norwalk-like virus outbreaks appear as common as salmonella-like outbreaks. We conclude that profiling can help classify outbreaks, guide investigations and direct laboratory testing to help detect new and emerging pathogens.

Hancock D. et al. The control of VTEC in the animal reservoir. *Int J Food Microbiol.* 2001; 66(1-2): 71-8p. Abstract: A great diversity of VTECs exist but only in the case of *Escherichia coli* O157:H7, a common human foodborne pathogen, has sufficient research been done to allow generalizations about the ecology. The key features are as follows: lack of host specificity such that indistinguishable isolates can be found in a variety of species; near-ubiquitous distribution in cattle (and perhaps other ruminant) farms; transient residence in the gastrointestinal flora of individual animals that is not associated with clinical disease; temporal clustering at the population level such that most fecal shedding is confined to sharp bursts in a high percentage of animals separated by much longer periods of very low prevalence; a higher prevalence in young animals in comparison to older ones: a higher prevalence in animals with floral disturbance such as that caused by transit, feed changes or antimicrobial dosing; and a markedly higher prevalence during warm months. Molecular epidemiological studies of *E. coli* O157:H7 have demonstrated that subtypes of the organism can persist on cattle farms for years, thus supporting a conclusion that cattle farms represent a reservoir. Yet on such farms, common subtypes are often found in environmental niches and in other species of animals; thus, it is not completely clear that cattle themselves are the reservoir. New subtypes are periodically observed on particular farms, and indistinguishable subtypes can be found on farms that are separated by hundreds of kilometers even in the absence of any obvious animal movements between them. The number of subtypes found on a farm does not appear to be qualitatively correlated with cattle movements (e.g., purchases) into the farm. Commercial feeds are sometimes contaminated with *E. coli* O157:H7, and it seems likely that feeds represent an important route of dissemination for this agent and other VTEC. Mixed feeds collected from feeding troughs are commonly positive for *E. coli* O157:H7, as are cattle watering troughs, and feed and water likely represent the most common means of infection. Environmental replication in feeds and in sediments of watering troughs appears to be feasible for VTECs. Nevertheless, certain farm management practices—especially those related to maintenance and multiplication of the agent in feed and water—may provide practical means to substantially reduce the prevalence of these agents in cattle on farms and in those arriving at slaughter plants.

Hansen J.C. Environmental contaminants and human health in the Arctic. *Toxicol Lett.* 2000; 112-113 119-25p. Abstract: Monitoring of human exposure to persistent organic pollutants POPs and heavy metals have taken place since 1994 in a circumpolar study conducted under the Arctic monitoring and assessment programme (AMAP). The study has confirmed that Arctic populations relying on marine food (Inuit) have an exposure level of POPs and methyl mercury related to the amount of traditional food eaten and in some areas at a level where health effects cannot be excluded. Weighing the benefits of traditional food against the risks, AMAP have so far recommended that consumption of
traditional food continues. There is a need for dietary advice to Arctic peoples so they can make informed choices concerning the food they eat.

Hardy M.E. Norwalk and "Norwalk-like viruses" in epidemic gastroenteritis. *Clin Lab Med.* 1999; 19(3) : 675-90p. **Abstract:** Despite the lack of a cell culture or animal model system, the past decade has seen tremendous advances in our understanding of NLV. Prior to 1990, the only nucleotide sequence information for caliciviruses was from viruses isolated from animals. There are now sequences available for more than 100 NLV isolates and more are rapidly accumulating. Such information is being used for development of new and more sensitive diagnostic assays. The CDC, under the National Food Safety Initiative and in cooperation with state and local governments, is working toward implementing routine surveillance and outbreak responses to limit or prevent widespread illness from the same identified source. Such increased surveillance and continued epidemiologic studies are necessary and critical to assess the risks and contain food-borne and water-borne outbreaks caused by the NLVs.

Harris J.E. et al. Crohn's disease and *Mycobacterium avium* subsp. *paratuberculosis*: current issues. *J Food Prot.* 2001; 64(12) : 2103-10p. **Abstract:** Crohn's disease is a chronic debilitating inflammatory bowel disease of unknown etiology. Proposed causes include bacterial or viral infection, diet or exposure to tobacco smoke, genetic abnormality, and immune dysfunction. The bacterium *Mycobacterium avium* subsp. *paratuberculosis* (Map) has received much research attention as a potential cause of the disease. Map causes Johne's disease in ruminants. The pathology of Johne's disease superficially resembles that of Crohn's disease in humans. Some researchers have shown evidence of Map in intestinal tissues of Crohn's disease patients. Studies are in progress to investigate the possibility that Map exists in milk from infected cows and survives pasteurization. This is a controversial subject with the potential for media attention and public outcry. We examined the current literature and concluded that insufficient evidence exists at this time to implicate any one factor, including Map in milk, as the definitive cause of Crohn's disease. The high degree of uncertainty in this issue requires regulators to recognize the need for effective risk communication as ongoing research provides additional information about the disease.

Harrison N. et al. Time trends in human dietary exposure to PCDDs, PCDFs and PCBs in the UK. *Chemosphere.* 1998; 37(9-12) : 1657-70p. **Abstract:** Total Diet Study samples collected in 1982 and 1992 were analysed. Estimated dietary intakes of PCDDs, PCDFs and PCBs by UK consumers were found to have fallen substantially during this period and are now considerably below the Tolerable Daily Intake (TDI). Composite samples of human milk were also analysed for PCDDs, PCDFs and PCBs. Estimated combined dietary intakes of PCDDs, PCDFs and PCBs by breast fed infants in 1993-94 via breast milk fell from 170 pg TEQ/kg bodyweight/day at 2 months to 39 pg TEQ/kg bodyweight/day at 10 months.

Hart A. et al. Application of uncertainty analysis in assessing dietary exposure. *Toxicol Lett.* 2003; 140-141 437-42p. **Abstract:** Conventional approaches for assessing dietary exposure to contaminants and additives in food are deterministic, using point estimates for consumption and contamination. In reality, both consumption and contamination are variable. Furthermore our knowledge of them is uncertain, e.g. due to measurement uncertainty. Conventional approaches attempt to allow for this by using worst-case assumptions or safety factors, but these are often subjective and may result either in overestimation or underestimation of the true range of exposures. Probabilistic approaches take account of variability and uncertainty by using distributions rather than point estimates for consumption and contamination. The outputs are distributions for exposure, which provide a more complete and balanced description of risk for the decision-maker. These approaches also facilitate the use of sensitivity analysis to identify those factors that impact most on exposure, and to identify areas of uncertainty where additional data will improve exposure estimates. This paper reviews examples of the application of these methods to the assessment of dietary exposure to food contaminants, including dioxins in seafood, where it was found that the greatest uncertainties relate to toxicity rather than exposure. Further work required to implement probabilistic approaches for dietary exposure assessment is discussed.

Headrick M.L. et al. Food borne disease summary by food commodity. *Vet Clin North Am Food Anim Pract.* 1998; 14(1) : 91-100p. **Abstract:** Microbial pathogens may be transmitted to humans via food animals and food animal products. A quick reference table is presented to provide easy access to food safety information related to the major food animal product areas. Included in the table are the pathogens, mode of transmission, public health impact, and control and prevention strategies for poultry, beef, dairy products, and pork.


Hedberg C.W. et al. Outbreaks of food-borne and waterborne viral gastroenteritis. *Clin Microbiol Rev.* 1993; 6(3) : 199-210p. **Abstract:** Norwalk virus infection is the epidemiologic prototype for outbreaks of food-borne and waterborne gastroenteritis. Around the world, Norwalk virus and Norwalk-like viruses appear to be major causes of food-borne and waterborne illness. Assessment of the overall significance of viral agents to the epidemiology of food-borne and waterborne illness is hampered by the lack of surveillance throughout much of the world. In areas where food-borne and waterborne illness surveillance is conducted, outbreaks of viral gastroenteritis are underreported because of the lack of availability of routine laboratory services to confirm the viral etiology. Routine use of epidemiologic criteria as an alternative to laboratory confirmation will allow better assessments of the importance of viral gastroenteritis until effective laboratory methods can be widely implemented. Outbreaks of viral gastroenteritis have been propagated by contamination of water supplies, raw foods, and ill food handlers. Controlling an outbreak depends on identifying and removing the source of contamination. The demonstrated occurrence of person-to-person transmission and the likely occurrence of transmission of Norwalk-like viruses by aerosol make it necessary to evaluate the potential for transmission by food handlers and servers in every outbreak, regardless of primary source.
Hedlund K.O. et al. Epidemiology of calicivirus infections in Sweden, 1994-1998. *J Infect Dis.* 2000; 181 Suppl 2 S275-S80p. **Abstract:** Outbreaks of acute gastroenteritis are frequently caused by caliciviruses. Electron microscopy was used to search for these viruses in fecal samples from patients with acute gastroenteritis. Of 5800 samples collected and analyzed from November 1994 to June 1998, 3700 were associated with outbreaks. A total of 67% outbreaks were analyzed, and viruses were found in 67%. Caliciviruses, usually Norwalk-like viruses (NLVs), were found in 407 (89%) of 455 outbreaks, while Sapporo-like viruses were identified in nine outbreaks, including six that were suspected to include foodborne transmission. Sixty percent of the 1041 patients with calicivirus infections were between 70 and 90 years of age. Food- and waterborne infections were associated with 66 calicivirus outbreaks. Virus-positive outbreaks were documented mainly during winter and spring. The longitudinal survey showed that caliciviruses, and especially the NLVs, cause most nosocomial and community-associated outbreaks in Sweden.

Hendriks A.J. et al. The power of size. 1. Rate constants and equilibrium ratios for accumulation of organic substances related to octanol-water partition ratio and species weight. *Environ Toxicol Chem.* 2001; 20(7) : 1399-420p. **Abstract:** Most of the thousands of substances and species that risk assessment has to deal with are not investigated empirically because of financial, practical, and ethical constraints. To facilitate extrapolation, we have developed a model for accumulation kinetics of organic substances as a function of the octanol-water partition ratio (Kow) of the chemical and the weight, lipid content, and trophic level of the species. The ecological parameters were obtained from a previous review on allometric regressions. The chemical parameters, that is, resistances that substances encounter in water and lipid layers of organisms, were calibrated on 1,939 rate constants for absorption from water for assimilation from food and for elimination. Their ratio was validated on 37 laboratory bioconcentration and biomagnification regressions and on 2,700 field bioaccumulation data. The rate constant for absorption increased with the hydrophobicity of the substances with a Kow up to about 1,000 and then leveled off, decreasing with the weight of the species. About 39% of the variation was explained by the model, while deviations of more than a factor of 5 were noted for labile, large, and less stress-sensitive signaling pathways. The concept that nutrition can modify or ameliorate the toxicity of Superfund chemicals is provocative and warrants further study as the implications for human health are significant. The information from such studies could be used to develop dietary recommendations and nutritional interventions for populations at high risk for exposure to PCBs, including communities living near Superfund sites and those exposed via occupation or diet.

Henry K.S. et al. Concentrations and hazard assessment of organochlorine contaminants and mercury in smallmouth bass from a remote lake in the Upper Peninsula of Michigan. *Arch Environ Contam Toxicol.* 1998; 34(1) : 81-6p. **Abstract:** Concentrations of PCBs, DDTs, toxaphene, chlordane, dieldrin, and mercury were determined in smallmouth bass (Micropterus dolomieu) collected from Fumee Lake, a remote lake in the Upper Peninsula of Michigan. An ecological hazard assessment was conducted to determine potential impacts of contaminants on bald eagles and mink eating fish from this lake. Concentrations of organochlorines, except toxaphene, and mercury in smallmouth bass were similar to those found in fish from Lake Superior, where atmospheric inputs are the primary sources. Bioaccumulation was indicated by a positive correlation between fish weight and contaminant solids and organism-food concentrations ratios could be largely explained by ecological variables only. The model is believed to facilitate various types of scientific interpretation as well as environmental risk assessment.

Hennig B. et al. PCB-induced oxidative stress in endothelial cells: modulation by nutrients. *Int J Hyg Environ Health.* 2002; 205(1-2) : 95-102p. **Abstract:** There is an increasing body of evidence suggesting that exposure to Superfund chemicals may have adverse consequences on many organ systems, as well as carcinogenic and atherogenic effects. This is particularly true for polyhalogenated aromatic hydrocarbons such as the polychlorinated biphenyls (PCBs). The vascular endothelium, which is constantly exposed to blood components including environmental contaminants, is extremely vulnerable to chemical insult as well as necrotic and apoptotic injury. Our recent studies suggest that certain PCBs, especially coplanar PCBs, can compromise normal functions of vascular endothelial cells by activating oxidative stress-sensitive signaling pathways and subsequent proinflammatory events critical in the pathology of atherosclerosis and cardiovascular disease. Our findings suggest that an increase in the level of cellular oxidative stress is a significant event in PCB-mediated endothelial cell dysfunction and that nutrients can modulate PCB-induced oxidative stress and endothelial toxicity. We have demonstrated that the dietary fat linoleic acid, the parent unsaturated fatty acid of the omega-6 family, can increase endothelial dysfunction induced by selected PCBs, probably by contributing to oxidative stress and as the result of the production of toxic metabolites called leukotoxins. The subsequent imbalance in the overall cellular oxidant/antioxidant status can activate oxidative stress- or redoxsensitive transcription factors, which in turn promote gene expression for inflammatory cytokines and adhesion molecules, intensifying the inflammatory response and endothelial cell dysfunction. Our data also suggest that antioxidant nutrients such as vitamin E can protect against endothelial cell damage mediated by PCBs or polyunsaturated dietary fats by interfering with oxidative stress-sensitive and proinflammatory signaling pathways. The concept that nutrition can modify or ameliorate the toxicity of Superfund chemicals is provocative and warrants further study as the implications for human health are significant. The information from such studies could be used to develop dietary recommendations and nutritional interventions for populations at high risk for exposure to PCBs, including communities living near Superfund sites and those exposed via occupation or diet.
concentrations for organochlorines, while mercury concentrations did not appear to correspond predictably to body weight. Concentrations of mercury and PCBs in smallmouth bass were sufficiently great to be of concern regarding their consumption by eagles or mink.

Henson S. Estimating the incidence of food-borne Salmonella and the effectiveness of alternative control measures using the Delphi method. *Int J Food Microbiol.* 1997; 35(3): 195-204p. **Abstract:** The paper describes the use of the Delphi method to estimate the incidence of food-borne Salmonella in the UK and the effectiveness of alternative control measures. A panel of experts of food-borne Salmonella participated in the Delphi survey, which involved five rounds of questioning taking place in the period July 1993 to January 1994. Participants were asked to give initial estimates for a number of parameters and invited to revise these estimates through progressive rounds of the survey at which the group responses were reported back. This process resulted in a reduction in the variation between the estimates given by individual experts. The final estimated annual incidence of food-borne Salmonella in the UK was 537,000, although significant variation remained between individual estimates. The foods judged to be the most important modes of transmission were poultry and poultry products (50% of cases) and eggs and egg products (26% of cases). The panel was also requested to estimate the effectiveness of strategies available to reduce the incidence of food-borne Salmonella from all sources. The most effective methods were judged to be food irradiation and mandatory application of HACCP, although there were significant differences in the judged effectiveness of these technologies for individual respondents. The paper demonstrates the efficacy of the Delphi method as a mechanism for reconciling differences between expert judgements of the incidence of food-borne disease and the effectiveness of alternative control strategies.

Herrman J.L. et al. Background to the ADI/TDI/PTWI. *Regul Toxicol Pharmacol.* 1999; 30(2 Pt 2) : S109-13p. **Abstract:** International scientific committees such as the Joint FAO/WHO Expert Committee on Food Additives (JECFA) and the Joint FAO/WHO Meeting on Pesticide Residues (JMPR), regional scientific committees such as those of the European Union, and national regulatory agencies generally use the safety factor approach for establishing acceptable or tolerable intakes of substances that exhibit thresholds of toxicity. The acceptable daily intake (ADI) is used widely to describe "safe" levels of intake; other terms that are used are the reference dose (RfD) and tolerable intakes that are expressed on either a daily (TDI or tolerable daily intake) or weekly basis. JECFA uses the term PTWI, or provisional tolerable daily intake, for contaminants that may accumulate in the body. The weekly designation is used to stress the importance of limiting intake over a period of time for such substances. When using this approach no-observed-effect levels (NOELs) or no-observed-adverse-effect levels (NOAELs) are identified in the critical studies, to which appropriate safety or uncertainty factors are applied. Although the value of safety factors varies depending upon a number of factors, 100 is most often used, which is designed to account for interspecies and intraspecies variations. Within the framework of the IPCS project on harmonization of approaches to the assessment of risk from exposure to chemicals, issues relating to uncertainty and variability are being addressed with the aim of relying, whenever appropriate, on data-derived safety/uncertainty factors. The ILSI Europe ADI Task Force has, for the past few years, been considering the scientific basis for the safety factor, which will be discussed by other speakers in the workshop. The value of the NOAEL is dependent on the design of the study. Because of the expense and time required conduct many studies, doses are usually spread over wide intervals. Thus, the no-observed-adverse-effect level may be considerably less than a marginally effective dose. In addition, use traditionally has not been made of the dose-response relationship when establishing ADIs. Newer approaches such as the benchmark dose may provide ways of making use of dose-response information. It is unlikely that consumption at the level of the ADI will result in significant risk to the consumer because of the conservatisms that are built into it. It usually is based on long-term studies that are intended to mimic consumption over the lifetime of humans. The ADI is applied to "discretionary" chemicals (food additives, veterinary drugs, and pesticides) by JECFA and JMPR, which are relatively easy to control if safety problems are identified. On the other hand, when tolerable intakes are derived for contaminants that are present in the environment at high levels, the use of standard safety factors could result in discarding large portions of the food supply. Thus, it is very important that the basis for the tolerable intake is fully described so that informed judgments can be made about the health consequences of exceeding it.

Herwaldt B.L.. Cyclospora cayetanensis: a review, focusing on the outbreaks of cyclosporiasis in the 1990s. *Clin Infect Dis.* 2000; 31(4) : 1040-57p. **Abstract:** Cyclospora cayetanensis, a coccidian parasite that causes protracted, relapsing gastroenteritis, has a short recorded history. In retrospect, the first 3 documented human cases of Cyclospora infection were diagnosed in 1977 and 1978. However, not much was published about the organism until the 1990s. One of the surprises has been the fact that a parasite that likely requires days to weeks outside the host to become infectious has repeatedly caused foodborne outbreaks, including large multistate outbreaks in the United States and Canada. In this review, I discuss what has been learned about this enigmatic parasite since its discovery and what some of the remaining questions are. My focus is the foodborne and waterborne outbreaks of cyclosporiasis that were documented from 1990 through 1999. The occurrence of the outbreaks highlights the need for health care personnel to consider that seemingly isolated cases of infection could be part of widespread outbreaks and should be reported to public health officials. Health care personnel should also be aware that stool specimens examined for ova and parasites usually are not examined for Cyclospora unless such testing is specifically requested and that Cyclospora infection is treatable with trimethoprim-sulfamethoxazole.

Herwaldt B.L. et al. Characterization of a variant strain of Norwalk virus from a food-borne outbreak of gastroenteritis on a cruise ship in Hawaii. *J Clin Microbiol.* 1994; 32(4) : 861-6p. **Abstract:** A gastroenteritis outbreak affecting at least 217 (41%) of 527 passengers on a cruise ship was caused by a variant strain of Norwalk virus (NV) that is related to but distinct from the prototype NV strain. Consumption of fresh-cut fruit served at two buffets was significantly associated with illness (P < or = 0.01), and a significant dose-response relationship was evident between illness and the number of various fresh-cut fruit items eaten. Seven (58%) of 12 paired serum specimens from ill persons demonstrated at least fourfold rises in antibody response to
recombinant NV capsid antigen. A 32-nm small round-structured virus was visualized by electron microscopy in 4 (29%) of 14 fecal specimens, but none of the 8 specimens that were examined by an enzyme immunoassay for NV antigen demonstrated antigen. Four (40%) of 10 fecal specimens were positive by reverse transcriptase-PCR by using primer pairs selected from the polymerase region of NV. In a 145-bp region, the PCR product shared only 72% nucleotide sequence identity with the reference NV strain and 77% nucleotide sequence identity with Southampton virus but shared 95% nucleotide sequence identity with UK2 virus, a United Kingdom reference virus strain. In addition, the outbreak virus was serotyped as UK2 virus by solid-phase immune electron microscopy. The genetic and antigenic divergence of the outbreak strain from the reference NV strain highlights the need for more broadly reactive diagnostic assays and for improved understanding of the relatedness of the NV group of agents.


Heuer C. et al. Variation of serum inorganic phosphorus and association with haemoglobinuria and osteomalacia in female water buffaloes in Pakistan. Prev Vet Med. 1998; 33(1-4): 69-81p. Abstract: Data from an animal health service in the Punjab of Pakistan showed that 39 adult female buffaloes with haemoglobinuria were 21 times more likely to have serum inorganic phosphorus (serum P) levels < 0.97 mmol/l than 24 controls sampled during the period of case occurrence (December 1984-March 1985). Age > 7 years or early lactation (1-60 days post partum) were unrelated to the disease. Similarly, symptoms of osteomalacia in 19 multiparous buffaloes were associated with low P (OR = 14.3) but not with age. Subsequently, a serum survey was carried out from February 1985 to July 1987 to investigate serum P variations with season and host factors. Data from 139 farms (426 adult female buffaloes, 468 lactations) indicated strong farm and seasonal effects on serum P. Serum P declined during the study period and was lowest during December-March 1985/1986 and again 1986/1987. Calving season, parity > 1, high pregnancy > 6 months, or daily milk production were not related to serum P in the final model. Seasonal effects were interpreted as soil borne and related to feed changes from maize to berseem in December.

Hicks H.E. et al. Harmonizing human health studies in the Great Lakes basin. Toxicol Ind Health. 1996; 12(3-4): 467-76p. Abstract: Epidemiological studies of exposed human populations can provide valuable evidence of human health effects. Information has been sparse on human health effects associated with consumption of contaminated Great Lakes fish. As part of its Great Lakes Human Health Effects Research Program, the Agency for Toxic Substances and Disease Registry (ATSDR) has funded ten projects. Of these studies, eight are epidemiologic investigations of human exposure and potential health effects from consumption of contaminated fish. To strengthen and to enhance the findings and comparability across the health studies, ATSDR has initiated several activities. These activities include harmonizing questionnaires, analytical protocols, human health end points, and contaminants tested. Also included is the establishment of a quality assurance and quality control (QA/QC) program and tissue bank. These activities will allow ATSDR to enhance exposure assessment in the Great Lakes basin. In addition, these research activities allow ATSDR to evaluate and to interpret data across all the projects, including a basin-wide health risk analysis on exposure, levels of contaminants or body burden, and the potential for human health effects from exposure to Great Lakes contaminants.

Hilbig A. et al. Measured consumption of tap water in German infants and young children as background for potential health risk assessments: data of the DONALD Study. Food Addit Contam. 2002; 19(9): 829-36p. Abstract: Contaminated tap water can become a health risk, e.g. by metals or environmental pollution particularly for sensitive population groups such as infants and young children. There is a lack of data on exactly measured water intake. In the DONALD Study, individual food and fluid intakes were measured by use of 3-day weighed diet records. Here we report on the distribution of individual intakes of tap water in 504 healthy normally nourished subjects aged 3-36 months (1962 diet records) between 1990 and 1998. We calculate scenarios for potential tap water contamination. Tap water intake per kg body weight was significantly higher in formula-fed (FF) infants than in breast-fed (BF) infants. The estimated median intake of lead and nitrate per kg body weight from tap water was higher in FF infants than in BF infants or mixed fed (MF) young children. The scenarios based on intakes at the median, P95 or maximums show that higher risks for exceeding the presently existing maximums could be expected in FF infants. Our data could also be used for estimations of potential risks from other contaminants of tap water.

Hild C.M. Cultural concerns regarding contaminants in Alaskan local foods. Int J Circumpolar Health. 1998; 57 Suppl 1: 561-6p. Abstract: Indigenous people of Alaska, who depend in many ways on foods which they obtain locally by hunting, fishing, and gathering, have raised concerns about the changing quality of their foods in light of confirmation of the long-range transport of global pollutants. A review of a variety of parallel research efforts has shown little consistency in practice, no clear evaluation of exposure levels through dietary surveys on a broad scale, and no comprehensive educational effort to inform the general public of the changing levels of pollutants in local foods. Nor has there been adequate communication regarding the source of the contamination, whether natural contaminants or anthropogenic pollution. Alaska Native cultural issues that contribute to the risk perception of a health problem inherent in eating a traditional diet that is showing signs of increasing levels of pollution, no matter how small, must be considered in any recommendations regarding locally obtained foods and in public health efforts. Recommended cross-cultural communication methods should be employed in dealing with topics of high community concern.

Himebloom B.H. Primer on food-borne pathogens for subsistence food handlers. Int J Circumpolar Health. 1998; 57 Suppl 1: 228-34p. Abstract: Subsistence food preparations may lead to human illnesses caused by pathogenic bacteria and viruses. Little is known about the incidence of food-borne illnesses other than botulism in circumpolar indigenous populations. Lack of documentation for other pathogens may be related to the sparsely populated communities involved, limited laboratory analysis, and non-lethality to healthy individuals. This overview covers the major food-borne pathogens, their sources, transmission, growth parameters, and prevention. Examples of indigenous
peoples’ food preparations that may be susceptible to pathogenic bacterial growth and toxin formation are described.

Hinnebusch B.J. Bubonic plague: a molecular genetic case history of the emergence of an infectious disease. \textit{J Mol Med.} 1997; 75(9) : 645-52p. \textbf{Abstract}: Yersinia pestis, the bacterial agent of bubonic plague, is transmitted primarily by fleas and has been responsible for devastating epidemics throughout history. Y. pseudotuberculosis is a food- and water-borne pathogen that causes a much more benign enteric disease in humans. Despite these profoundly different pathogenesis strategies, the two bacteria are very closely related phylogenetically. Thus, identifying the specific genetic differences between them should provide an instructive case study in the evolution of microbial pathogenicity. Some key pathogenesis-related genes of Y. pestis and Y. pseudotuberculosis that have been described to date are compared in this review. Factors that potentiate plague transmission as well as disease are discussed, since dependence on the blood-sucking flea for transmission likely fueled the selection of virulent Y. pestis strains able to produce a high-density bacteremia. Retracing the evolutionary steps between these two Yersinia species may ultimately furnish a historical model for the sudden emergence of new human disease agents.

Hino S. et al. Association between maternal antibodies to the external envelope glycoprotein and vertical transmission of human T-lymphotropic virus type I. Maternal anti-env antibodies correlate with protection in non-breast-fed children. \textit{J Clin Invest.} 1995; 95(6) : 2920-5p. \textbf{Abstract}: Vertical transmission of human T-lymphotropic virus type I (HTLV-I) depends primarily on breast-feeding; substitution of bottle-feeding has reduced the transmission rate from 20% in breast-fed children to 3% among bottle-fed. To determine the correlates of transmission for long breast-feeding (> or = 6 mo), short breast-feeding (< 6 mo), and bottle-feeding mothers, the antibody titers of transmitter (T) mothers and non-transmitter (nT) mothers were analyzed by using synthetic and recombinant epitopes representing the immunodominant epitopes of gag (Gag1a, r24), env (Env1/5, MTA1, RE3), and tax (Tax8/22-24) proteins. Seroreactivity to gag and tax epitopes was not significantly different except for anti-r24 antibody titer, which was significantly higher among T-mothers (geometric mean 134) when compared with nT-mothers (62) in the long-feeding group (P < 0.001). Profiles of antibody titers against env epitopes were different. Within the long-feeding group, Env1/5, MTA1, and RE3 titers were significantly higher among T-mothers (258, 1,476, and 738, respectively) when compared with nT-mothers (106, 279, and 320, respectively) (P < 0.01 for all three epitopes). In contrast, within the bottle-feeding group, antibody titers to Env1/5 (269) and RE3 (418) among nT-mothers were significantly higher than those among T-mothers (80 and 113, respectively) (P < 0.01). These data confirm that high-titered anti-HTLV-I antibodies in the long-feeding group correlate with milk-borne transmission of HTLV-I and, more importantly, imply that maternal anti-env antibodies may reduce the risk of non-milkborne infection.

Hoogenboom L.A. et al. Bioassays for the detection of growth-promoting agents, veterinary drugs and environmental contaminants in food. \textit{Analyt.} 1999; 124(1) : 79-85p. \textbf{Abstract}: Residues of growth-promoting agents, veterinary drugs and environmental contaminants in food products are routinely analyzed with chemical-analytical methods, using physical and spectrometric properties of a compound. Since residue limits are in general based on biological properties of compounds, bioassays offer in theory a good alternative. As a consequence, these assays are much more suitable for the detection of mixtures of compounds with common biological properties, including possibly unknown agonists. Using modern molecular biological techniques, a new generation of bioassays has been developed, showing in general a higher sensitivity and specificity for the target compounds. The CALUX (chemical activated luciferase expression) assay was developed for the detection of polyhalogenated compounds, based on their affinity for the ahr hydrocarbon (Ah) receptor. This paper focuses on the specificity of the assay. The benzimidazole compounds oxfendazole, fenbendazole, febantel, thiabendazole, mebendazole, omeprazole, lansoprazole and benomyl were shown to give a positive response in the assay. Similar results were obtained with dexamethasone, corticosterone and cortisol, which in addition were able to enhance the response obtained with TCDD. Similarly to the flavonoids alpha- and beta-naphthoflavone, the reported Ah receptor antagonist 4-amino-3methoxyflavone showed a strong positive response at a concentration of 400 microM, but failed to inhibit the response obtained with TCDD. It is concluded that the chances of false-negative results appear to be minimal and can be recognized. False-positive or, better, unwanted results are in theory more likely to occur. Possible solutions to avoid or detect these type of results are discussed. In general, these kinds of assays offer great possibilities for screening of food samples. In addition to the further optimization of these assays, future work should be focused on the development of rapid, sample and selective extraction procedures.

Hook D. et al. Clostridium perfringens food-borne outbreak: an epidemiological investigation. \textit{Aust N Z J Public Health.} 1996; 20(2) : 119-22p. \textbf{Abstract}: On 3 April 1994, the Western Sector Public Health Unit was notified of an outbreak of gastroenteritis at a Christian youth camp. Attending the camp were 820 people; 241 (42 per cent) of 574 camp participants who completed a questionnaire reported illness. Of these, 230 met the case definition. Main symptoms reported were stomach cramps (78 per cent), diarrhoea (67 per cent) and nausea (46 per cent). Bacterial analysis of leftover chicken grew 2.3 x 10^7 and 3.3 x 10^7 colonies/g of Clostridium perfringens, and we identified Type A enterotoxin of C. perfringens in four of seven stool samples collected from ill people. Camp participants who consumed chicken at lunch on the second day of the camp were nearly four times as likely to be ill than those who did not (relative risk 3.81, 95 per cent confidence interval 3.07 to 4.72). There were deficiencies in hygiene and food preparation. We highlight the importance of time and temperature controls in food preparation and storage to prevent contamination and subsequent poisoning by C. perfringens or other food pathogens. This investigation demonstrates the importance of a multidisciplinary team when investigating disease outbreaks.

Hoornstra E. et al. Quantitative microbiological risk assessment. \textit{Int J Food Microbiol.} 2001; 66(1-2) : 21-9p. \textbf{Abstract}: The production of safe food is being increasingly based on the use of risk analysis, and this process is now in use to establish national and international food safety objectives. It is also being used more frequently to guarantee that safety objectives are met and that such guarantees are achieved in a...
cost-effective manner. One part of the overall risk analysis procedure-risk assessment is the scientific process in which the hazards and risk factors are identified, and the risk estimate or risk profile is determined. Risk assessment is an especially important tool for governments when food safety objectives have to be developed in the case of 'new' contaminants in known products or known contaminants causing trouble in 'new' products. Risk assessment is also an important approach for food companies (i) during product development, (ii) during (hygiene) process optimization, and (iii) as an extension (validation) of the more qualitative HACCP-plan. This paper discusses these two different types of risk assessment, and uses probability distribution functions to assess the risks posed by Escherichia coli O157:H7 in each case. Such approaches are essential elements of risk management, as they draw on all available information to derive accurate and realistic estimations of the risk posed. The paper also discusses the potential of scenario-analysis in simulating the impact of different or modified risk factors during the consideration of new or improved control measures.

**Hoover S.M.** Exposure to persistent organochlorines in Canadian breast milk: a probabilistic assessment. *Risk Anal.* 1999; 19(4) : 527-45p. Abstract: Exposure to persistent organochlorines in breast milk was estimated probabilistically for Canadian infants. Noncancer health effects were evaluated by comparing the predicted exposure distributions to published guidance values. For chemicals identified as potential human carcinogens, cancer risks were evaluated using standard methodology typically applied in Canada, as well as an alternative method developed under the Canadian Environmental Protection Act. Potential health risks associated with exposure to persistent organochlorines were quantitatively and qualitatively weighed against the benefits of breast-feeding. Current levels of the majority of contaminants identified in Canadian breast milk do not pose unacceptable risks to infants. Benefits of breast-feeding are well documented and qualitatively appear to outweigh potential health concerns associated with organochlorine exposure. Furthermore, the risks of mortality from non breast-feeding estimated by Rogan and colleagues exceed the theoretical cancer risks estimated for infant exposure to potential carcinogens in Canadian breast milk. Although levels of persistent compounds have been declining in Canadian breast milk, potentially significant risks were estimated for exposure to polychlorinated biphenyls, dibenzo-p-dioxins, and dibenzo furans. Follow-up work is suggested that would involve the use of a physiologically based toxicokinetic model with probabilistic inputs to predict dioxin exposure to the infant. A more detailed risk analysis could be carried out by coupling the exposure estimates with a dose-response analysis that accounts for uncertainty.

**Hope B.K.** A spatially and bioenergetically explicit terrestrial ecological exposure model. *Toxicol Ind Health.* 2001; 17(5-10) : 322-32p. Abstract: In typical exposure models, dose is a function of ingestion rate, which is a function of field metabolic rate and food energy availability. It is implicitly assumed that neither food energy nor ingestion rate is limited. This is unlikely to be true in the field. Poor habitat quality (expressed as limited or lacking food energy) or a physiologically limited maximum ingestion rate may collectively limit energy intake. A receptor may thus be as much at risk from lack of energy as from toxicant effects. To explore this possibility, an existing spatially explicit exposure model (SE3M) was enhanced to: 1) express 'habitat quality' in terms of gross energy available from a suite of habitat-specific food types, 2) track fulfillment of a receptor's daily energy needs as it traverses habitat patches with varying gross energy levels, 3) link intake of contaminants to food consumed to meet daily energy needs, and 4) track contaminant doses and resulting tissue residue levels as a receptor moves through habitat patches with differing levels of contamination. A feedback term through which chemical stressors affect a receptor's ability to intake and process energy was not considered at this time. The now spatially and energetically explicit exposure model, SE(4)M, provides a platform for exploring spatial and bioenergetic factors that may influence a receptor's acquisition of energy and contaminant tissue residues as it moves through space and time. An application of this model would be to provide predictions of tissue residue levels that are accessible to calibration or validation with empirical field data.

**Hubert B. et al.** [Case control studies in investigation of foodborne infection outbreaks. Study of their utilization in France]. *Rev Epidemiol Sante Publique.* 1992; 40(3) : 156-63p. Abstract: Among the 251 foodborne outbreaks investigated by public health officers in France in 1989, 62 (25%) used a case-control study to identify the responsible food. This survey aims to analyse the results of these 62 investigations. Thirty eight (61%) investigations found the responsible food(s); 10 investigations (16%) lacked power because of the small size of the population studied, but allowed to suspect the food with the highest odds ratio; 13 investigations (21%) gave results inconsistent with bacteriological studies or with hypothesis generated by the descriptive study: in 5 of it, food origin is questionable and in 8 investigations, methodological errors are likely. We could not conclude for one study. Among the surveys with case-control studies, 74% identified the food responsible with bacteriological or epidemiological confirmation, as opposed to 17% of other surveys which had only bacteriological confirmation. This study allowed us to give recommendations on the management of investigation and the interpretation of results to improve the efficiency of this practice.


**Hughes K.A. et al.** Biofilm susceptibility to bacteriophage attack: the role of phage-borne polysaccharide depolymerase. *Microbiology.* 1998; 144 ( Pt 11) 3039-47p. Abstract: Biofilm bacteria Enterobacter agglomerans 53b and Serratia marcescens Serr were isolated from a food processing factory. A bacteriophage (SF153b), which could infect and lyse strain 53b, was isolated from sewage. This has been shown to possess a polysaccharide depolymerase enzyme specific for the exopolysaccharide (EPS) of strain 53b. Using batch culture and chemostat-linked modified Robbins Device systems it was observed that SF153b could degrade the EPS of a mono-species biofilm (strain 53b) and infect the cells. The disruption of the biofilm by phage was a combination of EPS degradation by the depolymerase and infection and subsequent cell lysis by the phage. Strain Serr biofilms were not susceptible to the phage and the biofilm EPS was not degraded by the phage glycans, with the result that the biofilm was unaffected by the addition of SF153b phage. Scanning electron microscopy confirmed that specific phage could extensively degrade susceptible biofilms and continue...
Hung C.F. et al. Evidence that cowpea aphid-borne mosaic and blackeye cowpea mosaic viruses are two different potyviruses. *J Gen Virol.* 1993; 74 (Pt 3): 335-40p. **Abstract:** The immunoreactivity of a panel of polyclonal antibodies and monoclonal antibodies (MAbs) raised against African isolates of potyviruses from cowpea and African yam bean was examined in ELISAs. A serological study including reference isolates followed by further characterization in differential hosts resulted in separation of the potyviruses into two distinct serogroups, one containing blackeye cowpea mosaic virus (BICMV) and the other containing cowpea aphid-borne mosaic virus (CAMV). Using biotin-labelled MAbs, the BICMV isolates were further subdivided into two serotypes and the CAMV isolates into five serotypes. Because both BICMV and CAMV induce a very similar mosaic disease in cowpea, different ELISA procedures using mixed MAbs were evaluated and a single protocol was developed which allowed reliable diagnosis of both viruses.

Hung C.F. et al. Arylamine N-acetyltransferase: a possible promoter in Helicobacter pylori-related gastric carcinogenesis. *Chung Hua I Hsueh Tsai Chih (Taipei).* 1999; 62(4): 203-8p. **Abstract:** BACKGROUND: The hypothesis of an association between peptic ulcer and infection by Helicobacter pylori in the gastroduodenal tract was suggested by Marshall and Warren in 1984. H pylori infection of the stomach is the most frequent infection in the world and exhibits an age-dependent increase. However, only a very small percentage of those infected develop gastric carcinoma, suggesting that H pylori acts as a cofactor in the pathogenesis of gastric carcinoma. N-Acetyltransferase (NAT) is expressed in uroepithelial cells and colon cytosol, while cytosolic acetyltransferase plays a critical role in susceptibility to arylamine-induced bladder and colon cancer. The presence of NAT activity in H pylori has yet to be determined. METHODS: NAT activity in H pylori from patients with peptic ulcer was studied using an acetyl coenzyme A (AcCoA) recycling assay and high-pressure liquid chromatography with p-aminobenzoic acid and coenzyme A (AcCoA) recycling assay and high-pressure liquid chromatography with p-aminobenzoic acid and aminofluorene substrates. RESULTS: The NAT activities from a number of H pylori samples were found to be 0.68 +/- 0.10 nmol/min/10(10) colony-forming units (CFUs) (intact bacteria); and 0.90 +/- 0.22 nmol/min/mg protein (cytosol) for the acetylation of 2-aminofluorene, and 0.63 +/- 0.06 nmol/min/10(10) CFUs (intact bacteria) and 0.72 +/- 0.24 nmol/min/mg protein (cytosol) for the acetylation of p-aminobenzoic acid. CONCLUSIONS: These studies show that H pylori has NAT activity, from which we speculate that the bioactivation of food-borne heterocyclic aromatic amines into genotoxic and carcinogenic products in the stomach is a possible promoter in the pathogenesis of gastric cancer.

Hurley B.P. et al. Shiga toxins 1 and 2 translocate differently across polarized intestinal epithelial cells. *Infect Immun.* 1999; 67(12): 6670-7p. **Abstract:** Shiga toxin-producing Escherichia coli (STEC) is an important food-borne pathogen that causes hemolytic-uremic syndrome. Following ingestion, STEC cells colonize the intestine and produce Shiga toxins (Stx), which appear to translocate across the intestinal epithelium and subsequently reach sensitive endothelial cell beds. STEC cells produce one or both of the major toxins, Stx1 and Stx2. Stx2-producing STEC is more often associated with disease for reasons as yet undetermined. In this study, we used polarized intestinal epithelial cells grown on permeable filters as a model to compare Stx1 and Stx2 movement across the intestinal epithelium. We have previously shown that biologically active Stx1 is able to translocate across cell monolayers in an energy-dependent, saturable manner. This study demonstrates that biologically active Stx2 is also capable of movement across the epithelium without affecting barrier function, but significantly less Stx2 crossed monolayers than Stx1. Chilling the monolayers to 4 degrees C reduced the amount of Stx1 and Stx2 movement by 200-fold and 20-fold respectively. Stx1 movement was clearly directional, favoring an apical- to-basolateral translocation, whereas Stx2 movement was not. Colchicine reduced Stx1, but not Stx2, translocation. Monensin reduced the translocation of both toxins, but the effect was more pronounced with Stx1. Brefeldin A had no effect on either toxin. Excess unlabeled Stx1 blocks the movement of (125)I-Stx1. Excess Stx2 failed to have any effect on Stx1 movement. Our data suggests that, despite the many common physical and biochemical properties of the two toxins, they appear to be crossing the epithelial cell barrier by different pathways.

Hutin Y.J. et al. A multistate, foodborne outbreak of hepatitis A. National Hepatitis A Investigation Team. *N Engl J Med.* 1999; 340(8): 595-602p. **Abstract:** BACKGROUND: We investigated a large, foodborne outbreak of hepatitis A that occurred in February and March 1997 in Michigan and then extended the investigation to determine whether it was related to sporadic cases reported in other states among persons who had consumed frozen strawberries, the food suspected of causing the outbreak. METHODS: The cases of hepatitis A were serologically confirmed. Epidemiologic studies were conducted in the two states with sufficient numbers of cases, Michigan and Maine. Hepatitis A virus RNA detected in clinical specimens was sequenced to determine the relatedness of the virus from outbreak-related cases and other cases. RESULTS: A total of 213 cases of hepatitis A were reported from 23 schools in Michigan and 29 cases from 13 schools in Maine, with the median rate of attack ranging from 0.2 to 14 percent. Hepatitis A was associated with the consumption of frozen strawberries in a case-control study (odds ratio for the disease, 8.3; 95 percent confidence interval, 2.1 to 33) and a cohort study (relative risk of infection, 7.5; 95 percent confidence interval, 1.1 to 53) in Michigan and in a case-control study in Maine (odds ratio for infection, 3.4; 95 percent confidence interval, 1.0 to 14). The genetic sequences of viruses from 126 patients in Michigan and Maine were identical to one another and to those in 5 patients in Wisconsin and 7 patients in Arizona, all of whom attended schools where frozen strawberries from the same processor had been served, and to those in 2 patients from Louisiana, both of whom had consumed commercially prepared products containing frozen strawberries from the same processor. CONCLUSIONS: We describe a large outbreak of hepatitis A in Michigan that was associated with the consumption of frozen strawberries. We found apparently sporadic cases in other states that could be linked to the same source by viral genetic analysis.

including employees, relatives and guests of the Psychiatry Department of Changhua Christian Hospital (CCH). Among the 114 attendees interviewed, 96 (84.2%) reported developing symptoms within 120 h after the dinner on February 4, 1999. The time of onset ranged from 2 h to 101 h after the dinner with an average of 20 +/- 16 h. The median and mode incubation periods were 17 h and 16 h, respectively. Salmonella C1 and C2 serogroups were isolated from the stool samples of 45 attendees. Based on the results of interview questionnaire, the most likely contaminated food was eel kabayaki (OR = 4.8, 95% CI:1.6-14.9, p < 0.01) followed by baked mussels (OR = 4.04, 95% CI:1.3-12.1, p = 0.01). However, this result could not be confirmed by food sample investigation due to the lack of leftover food. Possible techniques for the prevention of food-borne disease transmission, enhancement of communication about foodborne disease outbreaks within the health reporting system, and the reduction of response time during an outbreak of infection are required.

**Inami G.B. et al.** Detection and isolation of Salmonella from naturally contaminated alfalfa seeds following an outbreak investigation. *J Food Prot.* 1999; 62(6) : 662-4p. Abstract: Naturally contaminated alfalfa seeds, epidemiologically linked to foodborne disease outbreaks in Oregon and British Columbia, were tested for the presence of Salmonella. Ten sample units from the suspected lot were sprouted and grown for 4 days. After enrichment of the grown sprouts, an enzyme immunoassay (EIA) and culture method (modified procedure of the Food and Drug Administration Bacteriological Analytical Manual) were used for the detection and isolation of Salmonella. Four of the 10 sample units were positive with the EIA; however, 5 of the 10 sample units were culture positive (four were positive for Salmonella serotype Newport and a fifth was positive for Salmonella serotype Albany and serotype Schwarzengrund). The positive alfalfa seed sample units were further tested after shredding, soaking, and washing before culturing. Results suggest that sprouting and shredding methods may yield greater detection and recovery rates of Salmonella, but more research with a larger sample size is warranted.

**Inouye S. et al.** Surveillance of viral gastroenteritis in Japan: pediatric cases and outbreak incidents. *J Infect Dis.* 2000; 181 Suppl 2 S270-4p. Abstract: Surveillance results from pediatric cases and outbreaks of viral gastroenteritis in Japan are presented. In winter, both small round structured virus (SRSV, or Norwalk-like viruses) and rotavirus were detected from infants with gastroenteritis; however, in recent years, the prevailing time of SRSV infection has preceded that of rotavirus infection. Most nonbacterial gastroenteritis outbreaks were related to SRSV infection, and >60% of the outbreaks were caused by contaminated food. In small-sized outbreaks, raw oysters were the primary source of transmission. In large-sized outbreaks, school lunches and catered meals that were served at schools, banquet halls, and hospitals were most often implicated in the transmission of foodborne gastroenteritis.

**Jacobs R.J. et al.** Cost effectiveness of vaccinating food service workers against hepatitis A infection. *J Food Prot.* 2000; 63(6) : 768-74p. Abstract: Foodborne transmission is an important means of hepatitis A infection that may be reduced through vaccination of food service workers (FSWs). Several states are considering actions to encourage or mandate FSW vaccination, but the cost effectiveness of such policies has not been assessed. We estimated the clinical and economic consequences of vaccinating FSWs from the 10 states with the highest reported rates of hepatitis A. A decision analytic model was used to predict the effects of vaccinating FSWs at age 20 years. It was assumed all FSWs would receive one dose of inactivated hepatitis A vaccine, and 50% would receive the second recommended dose. Parameter estimates were obtained from published reports and Centers for Disease Control and Prevention databases. The primary endpoint was cost per year of life saved (YOLS). Secondary endpoints were symptomatic infections, days of illness, deaths, and costs of hepatitis A treatment, public health intervention, and work loss. Each endpoint was considered separately for FSWs and patrons. We estimate vaccination of 100,000 FSWs would cost $8.1 million but reduce the costs of hepatitis A treatment, public health intervention, and work loss by $3.0 million, $2.3 million, and $3.1 million, respectively. Vaccination would prevent approximately 2,500 symptomatic infections, 93,000 days of illness, and 8 deaths. A vaccination policy would reduce societal costs while costing the health system $13,969 per YOLS, a ratio that exceeds generally accepted standards of cost effectiveness.

**Janda J.M. et al.** Unusual food-borne pathogens. Listeria monocytogenes, Aeromonas, Plesiomonas, and Edwardsiella species. *Clin Lab Med.* 1999; 19(3) : 553-82p. Abstract: Although these four groups of organisms are perceived as infrequent food-borne pathogens or of dubious significance, increasing epidemiologic data indicate that L. monocytogenes is an emerging cause of infections, particularly gastroenteritis. Furthermore, if data are ever generated that prove that most fecal isolates of Aeromonas are involved in bacterial diarrhea, then aeromonads will become recognized as important food-borne pathogens. For Plesiomonas and Edwardsiella, recognition of possible involvement in food-borne disease requires detailed medical histories, including foreign travel, contact with pets or animals, and food consumption histories.

**Jelesic Z. et al.** [Analysis of the plasmid profile of various Salmonella serotypes]. *Med Pregl.* 2000; 53(11-12) : 564-7p. Abstract: INTRODUCTION: Every year foodborne infections cause millions of illnesses but many of them go undiagnosed and unreported. The epidemiology of these illnesses is changing, new pathogens have emerged (Escherichia coli 0157:H7, Cyclospora cayetanensis, Vibrio vulnificus). Salmonella spp. is the most common bacterial cause of acute enterocolitis with us. All over the world, as well as in our country the most often isolated serotype is Salmonella Enteritidis. A great problem in many countries is the multiresistant Salmonella Typhimurium, as well as other serotypes resistant to a great number of antimicrobial drugs (S. Hadar, S. Typhi). Clinical microbiologists are often asked to determine the relatedness of bacterial isolates. Recently, traditional methods of strain typing such as bacteriophage typing, resistotyping and serotyping, have been supplemented or replaced in many laboratories with newer molecular methods such as plasmid fingerprinting, ribotyping. PCR-based methods, etc. The goal of strain typing is to provide evidence that epidemiologically related isolates collected
Jespersen N.B. et al. [Food-borne streptococcal epidemics]. *Ugeskr Laeger*. 1997; 159(36) : 5368-71p. Abstract: Approximately two days after a high school final year farewell party a striking number of pupils and teachers became ill with pharyngitis. The regional public health medical office carried out a questionnaire study with a control group of younger pupils. The regional food control unit studied the preparation and handling at food. Some bacterial cultures received from general practitioners were identified by the regional clinical-microbiological laboratory. Seventy-six percent of the 216 exposed pupils who answered (94% response rate) against 15% of 238 answering in the control group (83% response rate) became ill. The peak incidence was two days after the party. The infectious agent was beta- haemolytic streptococci group-A, T-type 25. A salad made of pasta and vegetables that were not cooked and handled properly must have been the vehicle of infection although no salad was left for cultivation. Salads made of pasta must be prepared with great care and effectively cooled. When suspecting a food-borne epidemic, clinicians should immediately inform the regional public health medical office, and the municipal food control unit must take part in the investigations. It is important that bacterial cultures are identified by the regional clinical- microbiological laboratory. It should be considered to make it mandatory that the involved personnel accepts clinical examination and microbiological sampling in cases of suspected food-borne infection.

Jimenez A. et al. Restriction endonuclease analysis, DNA relatedness and phenotypic characterization of Campylobacter jejuni and Camp. coli isolates involved in food-borne disease. *J Appl Microbiol*. 1997; 82(6) : 713-21p. Abstract: Seven cases of Campylobacter infection, each of them involving two isolates, were analysed. Study of their biochemical profiles and susceptibility patterns allowed the identification of Camp. jejuni and Camp. coli isolates and the effective typing of Camp. jejuni strains into biotypes. Genotyping was carried out by comparing chromosomal DNA restriction patterns obtained by cleavage with Bg/II and EcoRV and by Southern hybridization experiments. These studies revealed clonal homogeneity between both isolates in five of the seven cases studied, indicating that in these cases Campylobacter infection was caused by a single strain. Infection with two different strains was characterized in only two of the seven cases studied, two different species belonging to Camp. coli and Camp. jejuni spp. jejuni biotype 1 being identified. Genetic analysis proved to be the most reliable technique to achieve precise identification of strains and to elucidate clonal heterogeneity among Campylobacter isolates obtained from a single patient.

Johansson T.M. et al. The first Salmonella enteritidis phage type 1 infection of a commercial layer flock in Finland. *Acta Vet Scand*. 1996; 37(4) : 471-9p. Abstract: The first Salmonella Enteritidis phage type (PT) 1 infection in a commercial layer flock of 2700 birds in Finland occurred in 1995. All the birds were ordered to be killed, the eggs to be destroyed and access to the layer house was denied in order to prevent spread of the infection. Ninety one commercial layers, 61 replacement pullets and 1062 eggs were collected for the analyses. The total infection level of the flock was 8%, concentrated on the 2 older age groups. S. Enteritidis PT1 was isolated from layers (5%), ovariens (2%) and from caeca (3%), of which 2 positive samples were detected with pre- enrichment and 3 without pre-enrichment by cultivation Rambach agar. Eight % of 105 pooled egg samples were positive, of which 2 were detected only from contents and 3 only from shells indicating both oviductal and faecal contamination routes of eggs. The results support the use of the extended sampling procedure in poultry flocks suspected of human food-borne Salmonella outbreaks of invasive serotypes, including not only faecal but also environmental, organ, blood and/or egg samples.

Johnson B.L. et al. Key environmental human health issues in the Great Lakes and St. Lawrence River basins. *Environ Res*. 1999; 80(2 Pt 2) : S2-S12p. Abstract: In May 1997, Health Conference '97-Great Lakes/St. Lawrence, an international conference on the effects of the environment on human health in the Great Lakes and St. Lawrence River basins, was held in Montreal, Quebec, Canada. This was the third international conference on this topic sponsored by agencies in the United States and Canada. More than 120 platform and poster presentations were given by scientists of different disciplines from the Great Lakes region and elsewhere. The presentations represented the most current research findings on the effects of the Great Lakes environment on human health. The reports covered environmental contaminant levels of persistent toxic substances (PTSs), routes and pathways of exposure, exposure assessment and human tissue levels of...
PTTs, human health outcomes, risk communication and assessment, and approaches to scientific collaboration. Reports indicate that levels of contaminants in the Great Lakes and St. Lawrence River basins have generally declined since the 1970s, although certain contaminants have plateaued or slightly increased. The findings include elevated body burden levels of contaminants in persons who consume large amounts of some Great Lakes sport fish, developmental deficits and neurologic problems in children of some fish-consuming parents, nervous system dysfunction in adults, and disturbances in reproductive parameters. The findings underscore the need for better public health intervention strategies.


Jones A.L. et al. Specificity of resistance to pea seed-borne mosaic potyvirus in transgenic peas expressing the viral replicase (Niβ) gene. *J Gen Virol.* 1998; 79 ( Pt 12) 3129-37p. Abstract: Transgenic pea lines carrying the replicase (Niβ) gene of pea seed-borne mosaic potyvirus (PsbMV) were generated and used in experiments to determine the effectiveness of induced resistance upon heterologous isolates. Three pea lines showed inducible resistance in which an initial infection by the homologous isolate (PsbMV-DP1) was followed by a highly resistant state. Resistance was observed in plants in either the homozygous or hemizygous condition and resulted in no overall yield loss despite the initial infection. Resistance was associated with a loss of both viral and transgene RNA, which is indicative of a mechanism based upon post-transcriptional gene silencing. There was no correlation between the steady-state levels of transgene RNA and ability of the plants to show resistance.

To test the specificity of the resistance, plants were also inoculated with the most distantly related sequenced PsbMV isolate, NY. PsbMV-NY varied between experiments in its ability to induce resistance, suggesting that the sequence identity in the Niβ gene is borderline for the specificity required for triggering gene silencing. Upon challenge inoculation of virus-free recovered leaves, the specificity of the induced resistance varied between the two isolates and indicated that the virus and transgene additively determined the resistant state. These results suggest that the sequence requirements for triggering gene silencing may differ from those involved in the degradation process.

Jones T.F. et al. Perceived etiology of foodborne illness among public health personnel. *Emerg Infect Dis.* 2001; 7(5) : 904-5p. Abstract: Few data exist about perceptions regarding the etiology of foodborne illness. Among public health staff throughout Tennessee, the three pathogens most commonly believed to cause foodborne illness in the United States actually account for only 12% of disease. Fewer than 3% of respondents correctly identified the leading cause of foodborne illness.

Jones T.F. et al. An outbreak of community-acquired foodborne illness caused by methicillin-resistant Staphylococcus aureus. *Emerg Infect Dis.* 2002; 8(1) : 82-4p. Abstract: Infections with methicillin-resistant Staphylococcus aureus (MRSA) are increasingly community acquired. We investigated an outbreak in which a food handler, food specimen, and three ill patrons were culture positive for the same toxin-producing strain of MRSA. This is the first report of an outbreak of gastrointestinal illness caused by community-acquired MRSA.

Jorm L.R. et al. An epidemiological study of an outbreak of Q fever in a secondary school. *Epidemiol Infect.* 1990; 104(3) : 467-77p. Abstract: Five cases of clinical Q fever were identified amongst students and staff of a Somerset secondary school between 23 October 1987 and 21 December 1987. Five goats which were kept at the school were found to have antibodies to Coxiella burnetii phase II. A cross-sectional study was conducted at the school in July 1988. A single CF test was used to identify evidence of prior infection, and a self-administered questionnaire was used to collect data on exposure variables and illness during 1987. Four hundred and ninety-nine eligible subjects took part in the study, and serological information was obtained from 461 of these. Eighty-seven subjects (18.9%) had CF titres of 20 or greater. It was estimated that only 1 in every 30 individuals with evidence of past C. burnetii infection had been recognized as a clinical case of Q fever. Antibody positive subjects were more likely to have been off school sick and to report having suffered chest pain than negative subjects. Contact with school animals, specifically cleaning the school poultry, collecting their eggs and visiting a school goat on the day of kidding, was associated with the presence of antibodies to C. burnetii. However, a large proportion of the antibody positives (24.2%) had no known contact with the school animals. Spread of organisms, either wind-borne or in straw or manure, may have been responsible for the high prevalence of unexplained infection.

Joshi D.D. Organisation of veterinary public health in the south Asia region. *Rev Sci Tech.* 1991; 10(4) : 1101-29p. Abstract: In the South Asia region vast human populations are exposed daily and with considerable intensity to close contact with vast animal populations and their excreta. There is no veterinary public health unit in the World Health Organisation (WHO) South-East Asia Regional Office (SEARO) in New Delhi (India), the Western Pacific Regional Office (WPRO) in Manila (Philippines) or the Eastern Mediterranean Regional Office (EMRO) in Alexandria (Egypt). However, these offices do support a number of activities on zoonoses and food-borne diseases in WHO member countries of the region. Maintenance of the health of farmers and of their families (often termed “rural health”) has assumed increasing importance in most member countries of the region. In most of the countries, there is no actual veterinary public health unit functioning as a national body common to the ministries of health and agriculture. Among the commonest zoonotic diseases prevalent in member countries are rabies, brucellosis, Japanese encephalitis, echinococcosis, tuberculosis, visceral leishmaniasis, taeniasis, salmonellosis, campylobacteriosis and leptospirosis. A national plan is necessary for each country to give priority to controlling these diseases, based on health systems research or primary health care, with intersectoral and regional cooperation through the South Asian Association for Regional Cooperation (SAARC) under
Technical Cooperation among Developing Countries (TCDC). There should be a strong unit for veterinary public health in all WHO regional offices to coordinate zoonotic disease surveillance, training and control programmes in countries of the region.

Joubert J.J. et al. Current status of food-borne parasitic zoonoses in South Africa and Namibia. Southeast Asian J Trop Med Public Health. 1997; 28 Suppl 1: 7-10p. Abstract: Epidemiological data on food-borne parasitic zoonoses in countries of southern Africa are sporadic. In a study of toxoplasmosis in South Africa, there was an overall prevalence of 21% (2,147/10,228). Prevalences vary between the different cultural groups and from one geographical region to another. The prevalence rate for the San (Bushmen) people of Namibia and Botswana was 9% (65/725) compared to the 30% (190/635) found in the Indian and Black communities of Kwazulu-Natal province, South Africa. These variations are probably linked to the dietary habits of the different cultural communities. Cysticercosis appears to be most prevalent in the Eastern Cape Province (former Transkei), where pigs roam freely and sanitation facilities are inadequate or non-existent. Segments of tapeworms often feature as an ingredient of concoctions prepared by traditional healers and are suspected sources of many of the cases of cysticercosis in South Africa. Trichinella nelsoni has been identified in wild game in South Africa: so far no cases of infection in humans have been recorded. Cases of Sarcocystis have been identified in some instances but infection is probably underdiagnosed in the country.

Jun-Shi C. The role of science in Codex standards. Biomed Environ Sci. 2001; 14(1-2): 145-8p. Abstract: The key principle in the development of Codex standards is to ensure that the decision-making process is based on sound science. The approval for the use of food additives and other chemicals in foods should be made only when adequate scientific data is available. The same principle applies to the development of maximum tolerable (or residue) levels for contaminants in foods. Using the General Standards for Contaminants and Toxins in Foods as an example, the following criteria are considered, when developing recommendations and standards: Toxicological information; Analytical data; Intake data; Fair trade considerations; Technological considerations; and Risk assessment and risk management considerations. The Codex Alimentarius Commission has repeatedly emphasized the use of risk analysis approach, in particular the use of risk assessment in conducting the safety evaluation of food additives agricultural and veterinary chemicals and environmental and industrial contaminants in foods. In this respect, the well known efforts of the FAO/WHO Joint Expert Committee on Food Additives (JECFA) and the FAD/WHO Joint Meeting on Pesticide Residues (JMPR) provide the much needed information and recommendations for the risk assessment of specific chemicals. The risk assessment approach is also used in the safety evaluation of foods derived from modern biotechnology as well as in the quantitative assessment of microbiological risks in foods.

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Kaferstein F. et al. Food safety in the 21st century. Bull World Health Organ. 1999; 77(4): 347-51p. Abstract: The global importance of food safety is not fully appreciated by many public health authorities despite a constant increase in the prevalence of foodborne illness. Numerous devastating outbreaks of salmonellosis, cholera, enterohaemorrhagic Escherichia coli infections, hepatitis A and other diseases have occurred in both industrialized and developing countries. In addition, many of the re-emerging or newly recognized pathogens are foodborne or have the potential of being transmitted by food and/or drinking water. More foodborne pathogens can be expected because of changing production methods, processes, practices and habits. During the early 21st century, foodborne diseases can be expected to increase, especially in developing countries, in part because of environmental and demographic changes. These vary from climatic changes, changes in microbial and other ecological systems, to decreasing freshwater supplies. However, an even greater challenge to food safety will come from changes resulting directly in degradation of sanitation and the immediate human environment. These include the increased age of human populations, unplanned urbanization and migration and mass production of food due to population growth and changed food habits. Mass tourism and the huge international trade in food and feed is causing food and feedborne pathogens to spread transnationally. As new toxic agents are identified and new toxic effects recognized, the health and trade consequences of toxic chemicals in food will also have global implications. Meeting the huge challenge of food safety in the 21st century will require the application of new methods to identify, monitor and assess foodborne hazards. Both traditional and new technologies for assuring food safety should be improved and fully exploited. This needs to be done through legislative measures where suitable, but with much greater reliance on voluntary compliance and education of consumers and professional food handlers. This will be an important task for the primary health care system aiming at "health for all".

Kamrin M.A. et al. Current status of sport fish consumption advisories for PCBs in the Great Lakes. Regul Toxicol Pharmacol. 1999; 29(2 Pt 1): 175-81p. Abstract: During the past two decades, there have been a number of efforts to harmonize the advice given by different jurisdictions to consumers of sport-caught fish from the Great Lakes. Five years ago, an eight-state task force arrived at consensus recommendations with respect to fish consumption advisories for PCB-contaminated fish from these bodies of water. This report will examine the impacts of these efforts on advisories in these eight states and also how these state advisories compare to that of the Province of Ontario which shares some of these Great Lakes. Careful analyses of the differences among jurisdictions in recommendations and in the bases for these recommendations will illustrate the difficulties in achieving complete consensus. It will be shown that there are a large number of choices that must be made in developing an advisory and that these choices depend largely on policy considerations rather than science. Examples of these policy choices include whether to adjust measured fish concentrations for PCB losses due to preparation and cooking and whether to adjust PCB concentrations to account for nonfish sources of PCBs. Considering the variations among jurisdictions with respect to managing the risks from contaminants in various environmental media, it appears unlikely that uniformity can be achieved unless a regional rather than a state by state approach is taken. Whether a regional or a state by state approach is taken, the information
in this report can be used to structure the fish consumption advisory decision-making process.

Kan S.P. et al. Review of sarcocystosis in Malaysia. *Southeast Asian J Trop Med Public Health.* 1991; 22 Suppl 129-34p. **Abstract:** Sarcocystis is a tissue coccidian with an obligatory two-host life cycle. The sexual generations of gametogony and sporogony occur in the lamina propria of the small intestine of definitive hosts which shed infective sporocysts in their stools and present with intestinal sarcocystosis. Asexual multiplication occurs in the skeletal and cardiac muscles of intermediate hosts which harbor Sarcocystis cysts in their muscles and present with muscular sarcocystosis. In Malaysia, Sarcocystis cysts have been reported from many domestic and wild animals, including domestic and field rats, moonrats, bandicoots, slow lorises, buffalo, and monkey, and man. The known definitive hosts for some species of Sarcocystis are the domestic cat, dog and the reticulated python. Human muscular sarcocystosis in Malaysia is a zoonotic infection acquired by contamination of food or drink with sporocysts shed by definitive hosts. The cysts reported in human muscle resembled those seen in the moonrat, Echinopsorex gymnurus, and the long-tailed monkey, Macaca fascicularis. While human intestinal sarcocystosis has not been reported in Malaysia so far, it can be assumed that such cases may not be infrequent in view of the occurrence of Sarcocystis cysts in meat animals, such as buffalo. The overall seroprevalence of 19.8% reported among the main racial groups in Malaysia indicates that sarcocystosis (both the intestinal and muscular forms) may be emerging as a significant food-borne zoonotic infection in the country.

Kaper J.B. Enterohemorrhagic Escherichia coli. *Curr Opin Microbiol.* 1998; 1(1) : 103-8p. **Abstract:** Enterohemorrhagic Escherichia coli has been responsible for an increasing number of large food-borne outbreaks of bloody diarrhea and hemolytic uremic syndrome. Recent developments in our understanding of the pathogenesis of disease due to enterohemorrhagic E. coli include the description of a pathogenicity island, a type III secretion system and potential plasmid-encoded virulence factors. Recent developments in our understanding of the epidemiology include a recognition of a widening spectrum of vehicles.

Kapperud G. [Investigation of outbreaks of food-borne diseases]. *Tidsskr Nor Laegeforen.* 1996; 116(28) : 3329-34p. **Abstract:** Investigation of outbreaks of food-borne disease requires close cooperation between the health service and the food control authorities. The primary objective is to stop the outbreak and provide a basis for specific control and preventive measures. The investigation consists of the following three steps: To confirm the existence of an outbreak and notify all authorities involved; to describe the outbreak according to the variables of time, place, person, and agent; to establish an interim diagnosis and identify the etiological agent responsible; to assemble all information and establish hypotheses about the source of infection using inspections, laboratory investigations, and pilot interviews; to test the hypotheses by laboratory-based methods and analytic epidemiological approaches; to eliminate the source of infection, implement preventive measures, and control that they are efficient; to report the results.

Karch H. et al. Epidemiology and diagnosis of Shiga toxin-producing Escherichia coli infections. *Diagn Microbiol Infect Dis.* 1999; 34(3) : 229-43p. **Abstract:** Shiga toxin-producing Escherichia coli (STEC) have been identified as a worldwide cause of serious human gastrointestinal disease and the life-threatening hemolytic uremic syndrome. The most common serotype implicated is E. coli O157: H7, but infections involving various non-O157 serotypes have been found with increasing frequency in many countries. Food-borne outbreaks caused by STEC can affect large numbers of people and cause serious morbidity, making the bacteria one of the most important emerging pathogens. Because there is no specific treatment of the disease currently available, there is an urgent need for effective preventive measures based on a detailed understanding of the epidemiology of STEC infections. Such measures will also be dependent on the availability of rapid, sensitive, and simple procedures for the detection of the pathogens both in human samples and in samples of nonhuman origin such as food. This review summarizes the current knowledge on the epidemiology of STEC infection and presents a survey of laboratory methods currently available for diagnosis of STEC. Special attention is given to new diagnostic procedures for the less readily detectable non-O157 STEC strains and to simple procedures, usually based on commercially available kits, that can be used in routine clinical microbiological laboratories.

Karlyshev A.V. et al. An improved physical and genetic map of Campylobacter jejuni NCTC 11168 (UA580). *Microbiology.* 1998; 144 (Pt 2) 503-8p. **Abstract:** Campylobacter jejuni is recognized as the major cause of food-borne gastrointestinal disease in the developed world. To facilitate the molecular genetic analysis of this pathogen, an approximately 18-fold redundant Tropl3 cosmid library was constructed from C. jejuni NCTC 11168 genomic DNA. The cosmid library was partially ordered by hybridization to 15 pulsed-field electrophoresis (PFGE) restriction fragments. This analysis confirmed the estimated size of the genome to be 1730 kb, but suggested discrepancies in some regions of the published physical map. The precise locations of two of the three 16S rRNA gene clusters were mapped using a combination of restriction fingerprinting, sample sequencing and riboprobing. Additionally, 15 further genes were located on the revised map. A more detailed physical and genetic map of C. jejuni NCTC 11168 is presented.


Kassa H. An outbreak of Norwalk-like viral gastroenteritis in a frequently penalized food service operation: a case for mandatory training of food handlers in safety and hygiene. *J Environ Health.* 2001; 64(5) : 9-12, 33; quiz 37-8p. **Abstract:** In 1999, in Toledo, Ohio, an outbreak of gastroenteritis occurred among people who had attended a Christmas dinner banquet and had eaten food prepared by a local caterer. Overall, 93 of the 137 attendees (67.9 percent) reported illness. Eight sought medical care, and one was hospitalized. Case-control studies revealed that the illness was associated with eating tossed salad (odds ratio [OR] = 2.5, 95 percent confidence interval [CI] = 1.02-6.26). Eleven of 12 stool specimens that were taken from ill people tested positive for a Norwalk-like virus (NLV) but were negative for E. coli O157:H7, Salmonella, and Shigella. The primary source of the outbreak was not determined, but an infected food handler may have played a role in the transmission of the virus. The catering facility had been cited frequently for
food safety and hygiene violations. None of the personnel or food handlers at this facility had been appropriately trained in safe food-handling practices, nor had the personnel at another local caterer that had prepared food items suspected of causing a multistate outbreak of NLVs. In Toledo, food service operations with trained personnel/food handlers received better inspection reports than food service operations without trained personnel and were less likely to contribute to foodborne outbreaks. Training of personnel and food handlers may be important for preventing outbreaks.

**Kassa H. et al.** Comparisons of microbiological evaluations of selected kitchen areas with visual inspections for preventing potential risk of foodborne outbreaks in food service operations. *J Food Prot.* 2001; 64(4): 509-13p. Abstract: Most local health departments utilize visual, but not microbiological, methods when inspecting food service operations. To evaluate the marginal utility of microbial testing for minimizing potential risks of foodborne outbreaks in restaurants, swab samples were taken from handwashing sink faucets, freshly cleaned and sanitized food-contact surfaces, and from cooler or freezer door handles in 70 of 350 category-three (high-risk) food service operations in Toledo, Ohio. The swabs were inoculated onto different selective media, and standard procedures were used to identify pathogenic and nonpathogenic bacteria. Microbiological evaluations of the sampled food service operations were compared with visual inspection reports, using a numeric rating scale. Enteric bacteria (that may indicate fecal contamination) were found on food contact surfaces, on cooler or freezer door handles, and on handwashing sink faucets in 86, 57, and 53% of the food service operations, respectively. Approximately 27, 40, and 33% of the restaurants received visual ratings of very poor to poor, fair, and good to very good, respectively. In comparison, 10, 17, and 73% of the restaurants received microbiological rating scores of very poor to poor, fair, and good to very good, respectively. Restaurants with trained personnel received significantly higher visual rating scores than restaurants without trained personnel (P < 0.01). Although more restaurants received poor rating scores by visual inspection than by microbiological evaluation, the presence of fecal bacteria from different sites in more than 50% of the food service operations indicated that visual inspection alone was not sufficient for minimizing potential risk for foodborne disease outbreaks. Therefore, we recommend periodic microbiological evaluation of high-risk food service operations, in addition to visual inspection, for minimizing the risk of foodborne disease outbreaks.

**Katz D. et al.** Cyclosporiasis associated with imported raspberries, Florida, 1996. *Public Health Rep.* 1999; 114(5): 427-38p. Abstract: OBJECTIVES: Until 1995, infection with Cyclospora cayetanensis, a parasite that causes gastroenteritis, was diagnosed in the US primarily in overseas travelers; its modes of transmission were largely unknown. In 1995, 45 cases of cyclosporiasis were diagnosed in Florida residents who had no history of recent foreign travel, but an investigation could not pinpoint a source for the parasite. In 1996, a North American outbreak of cyclosporiasis resulted in more than 1400 cases, 180 of them in Florida. The authors investigated the 1996 Florida outbreak to identify the vehicle of transmission. METHODS: The authors conducted a matched case-control study in which each of 86 laboratory-confirmed sporadic cases was matched with up to four controls. They also investigated nine clusters of cases associated with common meals and attempted to trace implicated foods to their countries of origin. RESULTS: In the case control study, eating raspberries was strongly associated with cyclosporiasis (matched odds ratio = 31.9; 95% confidence interval [CI] 7.4, 138.2). In the cluster investigation, raspberries were the only food common to all nine clusters of cases; a summary analysis showed a strong association between consumption of raspberries and confirmed or probable cyclosporiasis (risk ratio = 17.6; 95% CI 1.9, 188.8). Guatemala was the sole country of origin for raspberries served at six of nine events. CONCLUSIONS: Guatemalan raspberries were the vehicle for the 1996 Florida cyclosporiasis outbreak. Cyclospora is a foodborne pathogen that may play a growing role in the etiology of enteric disease in this country as food markets become increasingly international.

**Kazwala R.R. et al.** Isolation of Mycobacterium species from raw milk of pastoral cattle of the Southern Highlands of Tanzania. *Trop Anim Health Prod.* 1998; 30(4): 233-9p. Abstract: A study to determine the secretion of Mycobacterium spp. in milk from indigenous cattle was carried out in pastoral cattle reared in the Southern Highlands to Tanzania. The study was aimed at elucidating the dangers associated with milk-borne zoonoses in a society where milk is normally consumed raw. Out of 805 milk samples, 31 (3.9%) were positive for mycobacteria. There was a preponderance of atypical mycobacteria (87%) whereas only two isolates (6.5%) were confirmed as M. bovis. Atypical mycobacteria included: M. terrae (n = 7), M. fortuitum (n = 2), M. flavescens (n = 13), M. gordonae (n = 1) and M. smegmatis (n = 4). Although the number of M. bovis positive samples was low, the habit of pooling milk may still pose great public health dangers to milk consumers in this part of the world. Moreover, isolation of atypical mycobacteria should also be considered to be a danger to human health in countries such as Tanzania, where the number of people with lowered immunity due to HIV infection is on the increase.


**Keller K.E. et al.** Potyvirus genome-linked protein (VPg) determines pea seed-borne mosaic virus pathotype-specific virulence in *Pisum sativum*. *Mol Plant Microbe Interact.* 1998; 11(2): 124-30p. Abstract: The mechanism of *Pisum sativum* pathotype-specific resistance to pea seed-borne mosaic potyvirus (PbMV) was investigated and the coding region determinant of PbMV virulence was defined. Homozygous recessive sbm-1 peas are unable to support replication of PbMV pathotype 1 (P-1), whereas biochemically and serologically related pathotype 4 (P-4) is fully infectious in the sbm-1/sbm-1 genotype. We were unable to detect viral coat protein or RNA with double antibody sandwich-enzyme-linked immunosorbent assay and reverse transcription-polymerase chain reaction in sbm-1/sbm-1 P-1-inoculated protoplasts and plants. Lack of viral coat protein or RNA in P-1 transfected sbm-1/sbm-1 protoplasts suggests that sbm-1 resistance is occurring at the cellular level and that inhibition of cell-to-cell virus movement is not the operating form of resistance. In addition, because virus products were not detected at any time post-inoculation, resistance must either be constitutive or expressed very early in the virus infection process. P-1-resistant peas challenged with full-length, infectious P-1/P-4 recombinant clones demonstrated that a specific P-4 coding
region, the 21-kDa, genome-linked protein (VPg), was capable of overcoming sbm-1 resistance, whereas clones containing the P-1 VPg coding region were noninfectious to sbm-1/sbm-1 peas. VPg is believed to be involved in potyvirus replication and its identification as the PsbMV determinant of infectivity in sbm-1/sbm-1 peas is consistent with disruption of an early P-1 replication event.

Keskimaki M. et al. Shiga toxin-producing Escherichia coli in Finland from 1990 through 1997: prevalence and characteristics of isolates. J Clin Microbiol. 1998; 36(12): 3641-6p. Abstract: During the past 10 years Shiga toxin-producing Escherichia coli (STEC) has emerged as one of the most important causes of food-borne infections in industrialized countries. In Finland, with a population of 5.1 million, however, only four STEC O157:H7 infections were identified from 1990 through 1995; the occurrence of non-O157 STEC infections was unknown. In 1996, we established a national prospective study to determine the prevalence of STEC serotypes in feces of Finns with bloody diarrhea. During this enhanced 1-year study period eight sporadic cases of STEC infection were found; of them, only two were indigenously acquired O157:H7 infections. In 1997, O157 infections increased dramatically, with O157 strains causing 51 of all 61 STEC infections. Altogether 14 non-O157:H7 STEC strains were found in Finland in the 1990s: O26:H11 (four strains), O26:HNM (HNM indicates nonmotile), O2:H29, O91:H21, O91:H40, O101:HNM, O107:H27, O157:HNM, O165:H25, OX3:H21, and Rough:H49. All O157:H7 and O26:H11 isolates produced enterohemolysin, but seven of the other STEC strains did not. Most (n = 63) of the 71 STEC strains isolated carried the stx2 gene, five carried the stx1 gene only, and three carried both genes. The eaeA gene was detected in all other isolates except five non-O157 strains. There were seven distinct pulsed-field gel electrophoresis (PFGE) genotypes among 57 O157 strains and three distinct PFGE types among four O26:H11 strains. The main PFGE type was found among 65% of all O157 isolates.

Kessel A.S. et al. General outbreaks of infectious intestinal disease linked with poultry, England and Wales, 1992-1999. Commun Dis Public Health. 2001; 4(3): 171-7p. Abstract: Between 1992 and 1999, 1426 foodborne general outbreaks of infectious intestinal disease (IID) were reported to the Public Health Laboratory Service Communicable Disease Surveillance Centre. A fifth were associated with the consumption of poultry. Chicken was implicated in almost three quarters of these outbreaks, turkey in over a fifth and duck in 2% of outbreaks. The organisms most frequently reported were Salmonella (30% of outbreaks), Clostridium perfringens (21%) and Campylobacter (6%). Over 7000 people were affected, with 258 hospital admissions and 17 deaths. During the summer, outbreaks were mainly of salmonellosis and attributed to the consumption of chicken. In December, C. perfringens and turkey were the organism and vehicle most often implicated. Most outbreaks occurred on commercial catering premises (56%) or in private houses (21%). The highlight of this surveillance period was the fall in outbreaks of salmonellosis linked with poultry products, probably due, at least in part, to the vaccination of poultry flocks.

Khalhria R. et al. Extended phage-typing scheme for Escherichia coli 0157:H7. Epidemiol Infect. 1990; 105(3): 511-20p. Abstract: In Canada, the number of human isolates of verotoxinogenic (VT + ve) Escherichia coli 0157:H7 from diarrhoeal cases and haemolytic uraemic syndrome and haemorrhagic colitis has increased from 25 in 1982 to 2384 in 1989. A total of 3273 VT + ve E. coli 0157:H7 strains (3255 strains isolated in Canada and 18 isolates from other countries) were phage typed. The phage typing scheme has been extended from 14 to 62 phage types. Of these, five types occurred exclusively in other countries (type 47 in Japan; and types 49, 50, 51 and 52 in the U.K.). Thirty-five different phage types were identified in Canada; only nine of these (1, 2, 4, 8, 14, 21, 23, 31 and 32), each accounted for more than 1% of the cases from human sources. The same nine types were the only ones observed among the isolates from non-human sources (meat and slaughter houses) suggesting a food-borne transmission in most of the human cases. Phage types 1 (30.5%); 4 (21%); 8 (13.5%); 31 (8.9%) and 14 (8%) were encountered in varying frequencies in most of the provinces; infrequently occurring phage types also showed regional variation. Thirteen different phage types were identified among 151 outbreaks representing 556 isolates of E. coli 0157:H7. More than one phage type were encountered in 12 outbreaks whereas in 141 outbreaks, all strains in each, had the same phage type.

Khan R.A. et al. Sarcocystis in caribou (Rangifer tarandus ternaorae) in Newfoundland. Southeast Asian J Trop Med Public Health. 1991; 22 Suppl 142-3p. Abstract: Prevalence of species of Sarcocystis in muscle of 36 caribou, Rangifer tarandus ternaorae, shot in Newfoundland, Canada, was 53%. A greater percentage of infected animals were obtained from the central part of the island. The highest concentration of microscopic sarcocysts, 1/mm2 of tissue, was observed in a 5-year old animal. Although widely distributed throughout the body, cysts were more prevalent in the tongue and diaphragm. The potential of Sarcocystis in caribou as a food-borne disease organism in man cannot be overlooked in view of its prevalence in meat and its widespread consumption, when lightly cooked, in rural Newfoundland.

Kim S.H. et al. Inhibitory activity of Bifidobacterium longum strain HY8001 against Vero cytotoxin of Escherichia coli O157:H7. J Food Prot. 2001; 64(11): 1667-73p. Abstract: Vero cytotoxin (VT)-producing Escherichia coli (VTEC), such as E. coli O157:H7, are emerging foodborne pathogens worldwide. VTs are associated with hemorrhagic colitis and hemolytic uremic syndrome in humans. Attachment of the B subunit of VTs to its receptor, globotriaosylceramide (Gb3), at gut epithelium is the primary step and, consequently, the A subunit of VTs inhibits protein synthesis in the target cell. Proinflammatory cytokines, such as tumor necrosis factor (TNF)-alpha and interleukin (IL)-1beta, up-regulate Gb3 expression, increase sensitivity to VTs, and enhance VT action in developing disease. Currently, there is a growing interest in probiotics, given the increasing occurrence of antibiotic-resistant bacteria. In particular, much work on bifidobacteria among probiotics, regarded as microorganisms targeted for technological and therapeutic applications, has been performed. In Korea, the neutralizing effect of the culture supernatant of Bifidobacterium longum HY8001, Korean isolate, against the VTs from E. coli O157:H7 was found. Therefore, this study focused on the raveling of the inhibitory effect of B. longum HY8001 against VTs, through the interference B subunit of VTs and Gb3 interaction. Mice were inoculated intragastrically with B. longum HY8001 culture supernatant before and after challenge with E. coli.
Kimberlin R.H. Bovine spongiform encephalopathy: an appraisal of the current epidemic in the United Kingdom. *Intervirology.* 1993; 35(1-4): 208-18p. Abstract: Bovine spongiform encephalopathy (BSE) is a food-borne infection of cattle caused by the use of contaminated meat and bone meal in concentrated feeds. The UK epidemic was initiated by a sudden exposure to infection in 1981-1982, which was associated with a dramatic reduction in the use of organic solvents in the manufacture of meat and bone meal. This change almost certainly removed two partial disinfection steps and allowed enough contamination with a scrapie-like agent to infect cattle. Although it is assumed that the epidemic originated with scrapie infection crossing the species barrier, cattle-to-cattle recycling of infection, via feed, amplified the epidemic very considerably. There would have been a strong tendency for recycling to select a single cattle-adapted strain of agent, and this strain of BSE could well be different from scrapie. There is evidence to support both predictions. Because the median incubation period of BSE is 4-6 years, clinical cases did not appear until 1985-1986, by which time the recycling of infection in cattle was probably well established. However, the average food-borne exposure to infection has remained low resulting in a mainly sporadic occurrence of BSE. Signs of an imminent decline in the epidemic were unmistakable early in 1993, which is over 4 years after the feeding of ruminant-derived protein was associated with a dramatic reduction in the use of organic solvents.


Kinloch D. et al. \( O.157:H7 \). Control mice were inoculated intragastrically only with \( E. coli O157:H7 \). Cytokine, TNF-alpha, and IL-1 beta levels in sera and expression of their mRNA were decreased, and expression of GB3 in renal tubular epithelial cells was reduced in mice treated with \( B. longum \) HY8001 culture supernatant. In competitive enzyme-linked immunosorbent assays (ELISAs), the culture supernatant of \( B. longum \) HY8001 primarily binds VTs to interfere the VTs with GB3 interaction. These results suggest that soluble substance(s) in \( B. longum \) HY8001 culture supernatant may have inhibitory activity on the expression of GB3, VT-GH3 interaction, or both. Further study should be done to elucidate the property of soluble substances in \( B. longum \) HY8001 culture supernatant.


Kirk M. et al. A prolonged outbreak of Campylobacter infection at a training facility. *Commun Dis Intell.* 1997; 21(5): 57-61p. Abstract: Campylobacter outbreaks are rarely detected despite Campylobacter being the most common food-borne illness notified to public health authorities. We report a prolonged outbreak of Campylobacter occurring over a three month period at a training facility. Seventy-eight cases were detected, 16 of which were confirmed Campylobacter infections. In seven affected groups of people using the facility, the attack rate ranged between 19% and 67%. An investigation of one sporting group showed that illness was associated with consumption of cucumber served at a self-serve salad bar. Six people attending the facility in other weeks also reported illness after eating only at the salad bar. Transmission of Campylobacter ceased after changes were instituted to food preparation and storage in the facility kitchen.

Kirov S.M. The public health significance of Aeromonas spp. in foods. *Int J Food Microbiol.* 1993; 20(4): 179-98p. Abstract: There is now evidence that some strains of Aeromonas species are enteropathogens. Such strains possess virulence properties, such as the ability to produce enterotoxins, cytoxins, haemolysins and/or the ability to invade epithelial cells. Strains with these properties are common contaminants of drinking water and a wide range of foods. Contact or consumption of contaminated water, especially in summer, is a major risk factor in Aeromonas-associated gastroenteritis. Aeromonas-contaminated foods may also be vehicles of infection. Given the properties of strains that have been described in foods it has been suggested that food-borne illness could result not only from colonization and in vivo expression of virulence factors, but possibly also by intoxication following ingestion of foods that have been stored for a period of time, even under refrigeration. This paper reviews what is known about Aeromonas spp. in foods, their expression of virulence determinants, particularly at refrigeration temperatures, and the questions remaining to be answered to evaluate the risk they pose, so that an appropriate public health response can be determined.

Kohl I. et al. Family outbreak of alimentary tick-borne encephalitis in Slovakia associated with a natural focus of infection. *Eur J Epidemiol.* 1996; 12(4): 373-5p. Abstract: A family outbreak of tick-borne encephalitis involving 7 people, all of them hospitalized, was observed in the district of Považska Bystrica (central Slovakia). The disease was associated with the drinking of unboiled goat milk and tick-borne encephalitis virus was recovered from Ixodes ricinus ticks collected from places where goats were grazing.

of tick-borne encephalitis (TBE) and number of TBE infected ticks was analysed in the Brest Province since 1955. They revealed increasing tendency, which reached highest values in the last years. TBE incidence was the highest in June and it was observed predominantly in people between 30 and 39 of age. The studies of TBE incidence rate regularities have disclosed its cyclical nature.

Kosatsky T. et al. Fish consumption and contaminant exposure among Montreal-area sportfishers: pilot study. *Environ Res.* 1999; 80(2 Pt 2): S150-S158p. Abstract: A 1995 pilot study assessed sport fish consumption and contaminant exposure among Montreal-area residents fishing the frozen St. Lawrence River. Interviews conducted among 223 ice fishers met on-site were used to create an index of estimated exposure to fish-borne contaminants. A second-stage assessment of sport fish consumption and tissue contaminant burdens included 25 interviewees at the highest level of estimated contaminant exposure (of 38, or 66% of those solicited) and 15 low-exposure fishers (of 41, or 37% of those solicited). High-level fisher-consumers reported eating 0.92+/-.099 sport fish meals/week during the previous 3 weeks compared to 0.38+/-.021 (P<0.05) for the low-level group. Based on the product of consumption frequency times mass of sport fish meals consumed, high-level consumers ate a mean of 18.3 kg of sport fish annually versus 3.3 kg for the low-level consumers. Tissue contaminant assessments showed significant (P<0.05) groupwise differences: 0-1 cm hair mercury (median 0.73 microgram/g for the high versus 0.23 microgram/g for the low group), lipid-adjusted plasma PCB congeners (Aroclor 1260: median 0.77 microgram/g versus 0.47 microgram/g), and lipid-adjusted plasma DDE (median 0.35 microgram/g versus 0.26 microgram/g). No participant had a hair mercury or plasma DDE concentration above Health Canada recommendations but 2/25 high-level participants (8%) had plasma Aroclor 1260 concentrations above recommended limits. The results of this pilot study suggest that a small number of Montreal-area sportfishers consume their catch as often as three times weekly and that those consuming sport fish frequently have significantly higher tissue levels of mercury, PCBs, and DDE than do infrequent consumers. On the other hand, compared to other groups in Quebec, such as the Inuit or commercial fishers on the North Shore of the Gulf of St. Lawrence, Montreal-area sportfishers eat less fish and have lower tissue concentrations of fish-related contaminants.

Kosslak R.M. et al. Programmed cell death in the root cortex of soybean root necrosis mutants. *Plant J.* 1997; 11(4): 729-45p. Abstract: The soybean root necrosis (rn) mutation causes a progressive browning of the root soon after germination that is associated with accumulation of phytoalexins and pathogenesis-related proteins and an increased tolerance to root-borne infection by the fungal pathogen, *Phytophthora sojae*. Grafting and decapitation experiments indicate that the rn phenotype is root-autonomous at the macroscopic level. However, the onset and severity of browning was modulated in intact plants by exposure to light, as was the extent of lateral root formation, suggesting that both lateral roots and the rn phenotype could be directly or indirectly controlled by similar shoot-derived factors. Browning first occurs in differentiated inner cortical cells adjacent to the stele and is preceded by a wave of autofluorescence that emanates from cortical cells opposite the xylem poles and spreads across the cortex. Before any visible changes in autofluorescence or browning, fragmented DNA was detected by TUNEL (Terminal deoxynucleotidyl transferase-mediated dUTP-digoxigenin nick end labeling) in small clusters of inner cortical cells that subsequently could be distinguished cytologically from neighboring cells throughout r roots development. Inner cortical cells overlying lateral root primordia in either Rn or m roots were stained by TUNEL. Features commonly observed in animal cell apoptosis were confirmed by electron microscopy but, surprisingly, cells with a necrotic morphology were detected alongside apoptotic cells in the cortex of r roots when TUNEL-positive cells were first observed. The two morphologies may represent different stages of a common pathway for programmed cell death (pcd) in plant roots, or two separate pathways of pcd could be involved. The phenotype of m plants suggests that the Rn gene could either negatively regulate cortical cell death or be required for cortical cell survival. The possibility of a mechanistic link between cortical cell death in m plants and during lateral root emergence is discussed.

Kostyniak P.J. et al. Relation of Lake Ontario fish consumption, lifetime lactation, and parity to breast milk polychlorobiphenyl and pesticide concentrations. *Environ Res.* 1999; 80(2 Pt 2): S166-S174p. Abstract: Lactating female members and spouses of male members of the New York State Angler Cohort who agreed to provide breast milk samples were the subjects of this study. Questionnaires were provided to participants focusing on Lake Ontario fish consumption, reproductive history, and lactation history. Milk samples were analyzed for 77 polychlorinated biphenyls (PCB) congeners, 1,1-dichloro-2,2-bis (p-chlorophenyl)-ethylene (DDE), a metabolite of dichlorodiphenyltrichloroethane (DDT), hexachlorobenzene (HCB), and 1,1a,2,2,3,3a, 4,5,5,5a,5b,6-dodecachloroocatohydro-1,3, 4-methano-I-cyclobuta[c]d]pentalen (Mirex). The percentage of samples with quantifiable levels, above the limit of detection (LOD), varied among the individual congeners from 10 to 100%. Nine PCB congeners (designated by their IUPAC No.) and DDE were found in all of the 100 samples analyzed. These include the following, in decreasing order of concentration: DDE>153>138>180>118>187>188>177>200. Total PCB concentrations were estimated by taking the sum of the concentrations of all PCB congeners (up to 77 congeners) above their respective LOD in a given sample. PCB concentrations increased with increasing concentration of milk lipid. Lipid adjusted PCB concentrations increased as a function of maternal age. PCB congener profiles in milk favored the higher chlorinated congeners, with the four highest congeners having 5 to 7 chlorine atoms. Fish eaters had a significantly higher level of several major PCB congeners with congeners 153 and 138 being 1.36 and 1.34 times higher, respectively. PCB and DDE concentrations, expressed on a lipid basis, varied inversely with parity. The total number of months of lifetime lactation varied inversely with the total PCB concentration in breast milk. A similar relationship was evident for DDE. These data are of use for risk assessment in estimating the relative exposure to these environmental contaminants in breast fed infants whose mothers consumed contaminated Lake Ontario fish.

Cyclospora infection acquired in Florida in 1995, we conducted a matched case-control study (24 sporadic cases and 69 controls) and retrospective cohort studies of clusters of cases associated with two May social events (attack rates = 15.4% [8 of 52] and 54.5% [6 of 11]). In univariate analysis of data from the case-control study, consumption of fresh raspberries (odds ratio [OR] = 6.9, 95% confidence interval [CI] = 1.1-31.7) and bare-handed contact with soil (OR = 5.4, 95% CI = 1.4-20.7) were associated with infection; soil contact was also implicated in multivariate analysis. For the events, mixed-fruit items that had only fresh raspberries and strawberries in common had elevated relative risks (3.7 and 4.2), but the confidence intervals overlapped 1.0. The raspberries eaten at the events and by sporadic case-patients were imported. Given the cumulative evidence of the three studies and the occurrence in 1996 and 1997 of outbreaks in North America associated with consumption of Guatemalan raspberries, food-borne transmission of Cyclospora was likely in 1995 in Florida as well.

Kovats S. et al. The potential health impacts of climate change: an overview. Med War. 1995; 11(4) : 168-78p. Abstract: Climate change would have a range of impacts on human health. Health impacts would be caused by the direct effect of climatic factors on human health, such as heat stress, and possible changes in the frequency and intensity of extreme weather events such as storms, floods and droughts. Impacts on health would also be mediated by the indirect effects of climate change, such as changes in availability of food and water and the distribution of vector-borne diseases. The majority of health impacts would be adverse and would depend greatly on the vulnerability of populations.

Kristiansen E. et al. The ability of two cooked food mutagens to induce aberrant crypt foci in mice. Eur J Cancer Prev. 1997; 6(1) : 53-7p. Abstract: The aberrant crypt foci assay has been used extensively to study different compounds for chemopreventive action, but almost all investigations have used initiators not normally found in the diet. In the present study two food-borne initiators, 2-amino-3-methylimidazo[4,5-f]quinoline (IQ) and 2-amino-1-methyl-6-phenyl-imidazo[4,5-b]pyridine (PhIP) were used. To simulate the human exposure further, we chose a feeding regimen with continuous low IQ- and PhIP-doses. Throughout the study female mice were given diets with or without 0.03% IQ or 0.03% PhIP. Two additional groups were given azoxymethane (AOM) (5 mg/kg body weight) and 1,2-dimethylhydrazine dihydrochloride (DMH-2HCl) (20 mg/kg body weight), respectively, one dose a week for two weeks. Animals were killed after four and 10 weeks. After four weeks only the mice dosed with IQ and PhIP had aberrant crypt foci. A much higher number of aberrant crypt foci were found in the IQ mice (31.8 +/- 5.2) than in the PhIP mice (0.5 +/- 0.3). After 10 weeks aberrant crypt foci were found in all dosed groups. The IQ mice had significantly more (P < or = 0.001) small and total aberrant crypt foci than the other groups. AOM and DMH induced a higher percentage of medium or large sized aberrant crypt foci than PhIP or IQ. The interpretation of the aberrant crypt foci as precursor lesions for colon cancer in the PhIP and IQ mice is difficult because PhIP and IQ have not been reported to be colonic carcinogens. If cooked food mutagens such as IQ or PhIP are to be used as initiators in the aberrant crypt foci test, the use of rats may be preferable.

Krogmann U. et al. Land application of sewage sludge: perceptions of New Jersey vegetable farmers. Waste Manag Res. 2001; 19(2) : 115-25p. Abstract: Understanding farmers' perceptions and choices regarding land application of sewage sludge is key to developing locally accepted strategies for managing its sewage sludge. Semi-structured interviews, with mostly open-ended questions were conducted with 50 fruit and vegetable farmers at the New Jersey Annual Vegetable Meeting in 1999. The in-depth interviews indicated that the application of sewage sludge to land is currently not a common agricultural practice for these growers. Perceived risks, including heavy metals in sewage sludge (soil-build up, crop-uptake), negative public perception, odour complaints, and increase of contaminants in the water supply outweigh economic incentives and soil improvement benefits. When naming benefits and drawbacks, farmers tend to think first of their crop and their land, and do not mention the environment. It is only when they are questioned directly about environmental benefits and risks that they discuss these aspects. Communication efforts should focus on practical information to which farmers can relate.

Krol-van Straaten M.J. et al. Infected aneurysm of the abdominal aorta due to Listeria monocytogenes. Neth J Med. 1991; 38(5-6) : 254-6p. Abstract: A 79-yr-old man was known for a year with a deteriorating clinical condition, vague abdominal complaints and an elevated erythrocyte sedimentation rate; he was afibrile. Extensive evaluation revealed no cause for his progressive disease. Eventually an infected aneurysm of the abdominal aorta was diagnosed, from which Listeria monocytogenes was cultured. After resection of the aneurysm the patient recovered initially very well. Regrettably, therapy-resistant chylous ascites developed, and the patient died due to surgical complications following a second laparotomy. Infected aortic aneurysms can present as an insidious disease, which may have catastrophic consequences if undiagnosed. A high index of suspicion is required to make a correct diagnosis. L. monocytogenes is an emerging, food-borne pathogen that can cause a wide spectrum of human diseases.

Kudoh Y. [Current status of gastrointestinal infection in Japan--with special reference to enterohaemorrhagic Escherichia coli infection]. Rinsho Byori. 1997; 45(3) : 242-8p. Abstract: The annual incidence of gastrointestinal infections such as bacillary dysentery, typhoid fever and paratyphoid fever has declined markedly since the early 1960s. However, in parallel with the increase of international travel, the incidence of imported cases from abroad has recently tended to increase. Moreover, similar to North America and Europe, food-borne infections such as Salmonella food poisoning due to serovar Enteritidis and enterohaemorrhagic Escherichia coli infection has increased dramatically recently. In this paper, the current trend of gastrointestinal infections in Japan was discussed from the epidemiologic and bacteriologic view points.

Kulu K.M. et al. Development of a diagnostic DNA probe for xanthomonads causing bacterial spot of peppers and tomatoes. Appl Environ Microbiol. 1997; 63(11) : 4462-70p. Abstract: Xanthomonas vesicatoria and Xanthomonas axonopodis pv. vesicatoria, causal agents for bacterial spot of tomatoes and peppers, are difficult to distinguish from other xanthomonads found on field-grown plants. A genomic subtraction technique with subtractor DNA from nonpathogenic epiphytic xanthomonads was used to enrich for sequences that could serve as diagnostic probes for these
Kuklinska D. et al. [Listeriosis–selected aspects of laboratory diagnosis and epidemiology]. *Prezeł Epidemiol.* 1992; 46(3) : 187-94p. **Abstract:** This review presents distribution of human listeriosis in the world including the large food-borne outbreaks in USA and Canada with the rising number of cases especially in Europe. Usefulness of food examination for *L. monocytogenes* is discussed. Methods for differentiation *L. monocytogenes* from other bacteria, including 44 non-vesicatoria phytopathogenic xanthomonads and 43 epiphytic xanthomonad strains, only 8 were probe positive, but the responses were weak. Further testing revealed that one of these strains was actually a tomato pathogen. Pulsed-field gel electrophoresis and Southern blot analysis of 46 *bsx* strains indicated that KK1750 sequences could be either plasmid-borne (10%), chromosome-borne (43.4%), or present on both replicons (45.7%). KK1750, unique in its ability to hybridize to both *X. axonopodis* pv. vesicatoria and *X. vesicatoria* strains, should facilitate disease diagnosis for these important plant pathogens.

Kwitkowski V.E. et al. Infectious disease emergencies in primary care. *Lippincotts Prim Care Pract.* 1999; 3(1) : 108-25p. **Abstract:** Infectious disease emergencies can be described as infectious processes that, if not recognized and treated immediately, can lead to significant morbidity or mortality. These emergencies can present as common or benign infections, fooling the primary care provider into using more conservative treatment strategies than are required. This review discusses the pathophysiology, history and physical findings, diagnostic criteria, and treatment strategies for the following infectious disease emergencies: acute bacterial meningitis, cholangitis, Rocky Mountain spotted fever, meningococccemia, necrotizing soft tissue infections, toxic shock syndrome, food-borne illnesses, and infective endocarditis. Because most of the discussed infectious disease emergencies require hospital care, the primary care clinician must be able to judge when a referral to a specialist or a higher-level care facility is indicated.

Lacey R.W. Food-borne bacterial infections. *Parasitology.* 1993; 107 Suppl S75-93p. **Abstract:** The number of episodes of diseases caused by bacterial contamination of food has shown a real increase by about threefold in the last decade in the U.K. The numbers for 1992 are estimated to be 2 million. The causes are multifactorial and complex, and 4 representative pathogens are reviewed. The main increase in diseases due to salmonella has been caused by *Salmonella enteritidis*, especially from eggs. The commonest bacterial food pathogen is *Campylobacter*, which causes an illness with specific season peaks in May and June. This may be related to the activities of birds and mammals. Both these bacteria cause common diseases that are rarely fatal. In contrast, *Listeria* and *E. coli* are ubiquitous but rarely produce disease; however, the consequences of any such illness are often dire. Procedures and techniques are available for the control of most of these diseases, but society does not seem determined to implement them.

Ladona M.G. et al. Biotransformation and clearance of 3-(phenylamino)propane-1,2-diol, a compound present in samples related to toxic oil syndrome, in C57BL/6 and A/J mice. *Chem Res Toxicol.* 1999; 12(12) : 1127-37p. **Abstract:** In May 1981, a massive food-borne intoxication occurred in Spain. The so-called toxic oil syndrome (TOS) was associated with the consumption of aniline-denatured and refined rapeseed oil that was illegally sold as edible olive oil. Fatty acid anilides and fatty acid derivatives of 3-(phenylamino)propane-1,2-diol were detected in oils and implicated as potential toxic agents and markers of toxic oil batches. Epidemiological evidence points to 3-(phenylamino)propane-1,2-diol derivatives as the putative toxic agents, which were generated during the refining process at the ITH refinery. Here we present the biotransformation and clearance of 3-(phenylamino)propane-1,2-diol (PAP) administered intraperitoneally to A/J and C57BL/6 mice that have been proposed as a murine model for the immunological features of TOS. Mice eliminated 6 microCi of [U-(14)C]PAP during a 24 h period, mostly in urine. Animals exhibited urine elimination rates of 70 and 36% in A/J and C57BL/6 strains, respectively. A/J mice exhibited no increase in the elimination rate when induced with beta-naphthoflavone, whereas C57BL/6 did increase the rate of elimination to 57%. Feces contributed to a lesser extent to the elimination rate (0.6 and 3.3% in A/J and C57BL/6 mice, respectively). Radioactivity remaining in organ tissues was lower than 1% (liver, lung, kidney, spleen, heart, and muscle). Metabolic species in urine were identified by HPLC coupled to UV and radioisotope detectors and further GC/MS analyses. 2-Hydroxy-3-(phenylamino)propanoic acid metabolite was the major chemical species excreted in urine in both strains, in both control and induced animal groups. This compound was the main urinary metabolite of PAP, and unmetabolized PAP excreted in urine constituted less than 1% of the total administered dose. Two additional highly polar metabolites also detected in urine were identified as 3-[[4'-hydroxyphenyl]amino]propane-1,2-diol and 2-hydroxy-3-[[4'-hydroxyphenyl]amino]propanoic acid. These findings are the first reported on PAP metabolism and clearance in mice strains and suggest that PAP can be extensively metabolized in vivo and potential reactive species can be generated.

Lake R.J. et al. Estimated number of cases of foodborne infectious disease in New Zealand. *N Z Med J.* 2000; 113(1113) : 278-81p. **Abstract:** AIM: To estimate the annual number of cases of infectious intestinal disease caused by foodborne pathogens in New Zealand and estimate the impact of these diseases in terms of days lost to illness. METHODS: Incidence of foodborne diseases were derived from data from infectious disease surveillance and hospital sources, and estimates of unreported illnesses using published population based studies. RESULTS: The estimated number of cases of foodborne infectious disease is approximately 119 000 per year, including 19 000 general practitioner visits, 400
hospital admissions, 22 cases of long term illness and two deaths. It is estimated that the number of cases of potentially foodborne infectious disease is approximately 199 000. Total number of cases of all infectious intestinal disease are estimated as approximately 497 000. CONCLUSION: Foodborne infectious diseases represent a major public health burden in terms of the number of cases and days lost to illness.

Lambert T.W. et al. Ethical perspectives for public and environmental health: fostering autonomy and the right to know. *Environ Health Perspect*. 2003; 111(2) : 133-7p. Abstract: In this paper we develop an ethical perspective for public and environmental health practice in consideration of the "right to know" by contrasting consequential and deontological perspectives with relational ethics grounded in the concept of fostering autonomy. From the consequential perspective, disclosure of public and environmental health risks to the public depends on the expected or possible consequences. We discuss three major concerns with this perspective: respect for persons, justice, and ignorance. From a deontological perspective, the "right to know" means that there is a "duty" to communicate about all public health risks and consideration of the principles of prevention, precaution, and environmental justice. Relational ethics develops from consideration of a mutual limitation of the traditional perspectives. Relational ethics is grounded in the relationship between the public and public/environmental health providers. In this paper we develop a model for this relationship, which we call "fostering autonomy through mutually respectful relationships." Fostering autonomy is both an end in public health practice and a means to promote the principles of prevention, precaution, and environmental justice. We discuss these principles as they relate to practical issues of major disasters and contaminants in food, such as DDT, toxaphene, chlordane, and mercury.

Lamboley G. et al. [Type B botulism: a family outbreak]. *Arch Pediatr.* 2001; 8(3) : 286-9p. Abstract: CASE REPORTS: Three cases of an outbreak of familial foodborne botulism are reported. The food incriminated could not be identified despite a careful investigation into the food history of the patients. The outcome was good following endotracheal ventilation and botulism antitoxin trivalent therapy. CONCLUSION: In France, foodborne botulism is an uncommon public health disease, and with a good prognosis when the diagnosis is promptly performed. The value of emergency electromyographic findings is emphasized, particularly when the repetitive stimulation of the motor nerve shows a presynaptic block of neuromuscular transmission. Management depends on the symptomatology, and trivalent antitoxin therapy is the only specific treatment.

Landrigan P.J. et al. Chemical contaminants in breast milk and their impacts on children's health: an overview. *Environ Health Perspect.* 2002; 110(6) : A313-5p. Abstract: Human milk is the best source of nutrition for infants. Breast milk contains the optimal balance of fats, carbohydrates, and proteins for developing babies, and it provides a range of benefits for growth, immunity, and development. Unfortunately, breast milk is not pristine. Contamination of human milk is widespread and is the consequence of decades of inadequately controlled pollution of the environment by toxic chemicals. The finding of toxic chemicals in breast milk raises important issues for pediatric practice, for the practice of public health, and for the environmental health research community. It also illuminates gaps in current knowledge including a) insufficient information on the nature and levels of contaminants in breast milk; b) lack of consistent protocols for collecting and analyzing breast milk samples; c) lack of toxicokinetic data; and d) lack of data on health outcomes that may be produced in infants by exposure to chemicals in breast milk. These gaps in information impede risk assessment and make difficult the formulation of evidence-based health guidance. To address these issues, there is a need for a carefully planned and conducted national breast milk monitoring effort in the United States. Additionally, to assess health outcomes of toxic exposures via breast milk, it will be necessary to examine children prospectively over many years in longitudinal epidemiologic studies that use standardized examination protocols that specifically assess breast milk exposures. Finally, current risk assessment methods need to be expanded to include consideration of the potential risks posed to infants and children by exposures to chemical residues in breast milk.

Larsen J.C. et al. Report of workshop on the significance of excursions of intake above the ADI. *Regul Toxicol Pharmacol.* 1999; 30(2 Pt 2) : 52-12p. Abstract: The acceptable daily intake (ADI) for humans was originally developed by the Joint FAO/WHO Expert Committee on Food Additives (JECFA) and defined as "an estimate of the amount of a food additive, expressed on a body weight basis, that can be ingested daily over a lifetime without appreciable health risk." JECFA has not provided any firm guidance on how to evaluate excursions of intake above the ADI, but WHO in 1987 stated that "because in most cases, data are extrapolated from life-time animal studies, the ADI relates to life-time use and provides a margin of safety large enough for toxicologists not to be particularly concerned about short-term use at exposure levels exceeding the ADI, providing the average intake over longer periods of time does not exceed it." In discussing short-term intakes in excess of recommended limits, JECFA in 1989 concluded that short-term exposures to levels exceeding the provisional tolerable weekly intake (PTWI) for a contaminant is not a cause of concern, provided the individual's intake averaged over longer periods of time does not exceed the level set. JECFA also stated that it was impossible to make a generalization concerning the length of time during which intakes in excess of the PTWI would be toxicologically detrimental. Any detrimental effect would depend upon the nature of the toxicity and the biological half-life of the chemical concerned. JECFA considered intakes of food additives in excess of the ADI less likely to occur and easier to control than in the case of contaminants which are allocated either a PTWI or a tolerable daily intake (TDI). The ILSI Europe Acceptable Daily Intake Task Force together with the Food Chemical Intake Task Force initiated a workshop which took place April 21-23, 1998, in Milan, Italy, in order to help identify what information would be needed, with what precision, and what is already available to evaluate the significance of excursions of intake above the ADI. The specific aims of the workshop were to address the following questions: By how much can the ADI be exceeded? For how long can excursions above the ADI be tolerated with respect to chronic toxicity, accumulation, and mechanisms of toxicity? What methods should be used to estimate intakes so that the estimates are relevant to the ADI? Do the same principles apply to contaminants that have TDI or PTWI values?
Abstract: Fungal spores are a primary means of dissemination and are the major sources of inoculum in pathogenic species. Sporulation in the rice blast fungus Magnaporthe grisea involves the production of three-celled conidia, borne sympodially on an aerial conidiophore. A disease cycle initiates when spores are dispersed and attach to the rice plant surface. Using insertional mutagenesis we have identified a major regulator of conidiophore morphogenesis in *M. grisea*. A null mutation in the acropetal (ACR1) locus causes a hypermorphic conidiation phenotype where indeterminate growth of the conidial tip cell results in the production of head-to-tail (acropetal) arrays of spores. acropetal mutants are nonpathogenic and fail to undergo infection-related morphogenesis. The ACR1 locus encodes a gene expression. Copyright 1998 Academic Press.


Abstract: From July 1994 through June 1996, 28 strains of *Escherichia coli* were isolated from 1,260 patients with acute diarrhea. These strains were further differentiated with serotypes and virulence factors. Enterotoxigenic *E. coli* (ETEC), enteropathogenic *E. coli* (EPEC), enterohemorrhagic *E. coli* (EHEC), and enteroinvasive *E. coli* (EIPEC) were accounted for 53.6 (15 of 28 strains), 28.6 (8 of 28), 10.7 (3 of 28) and 7.1% (2 of 28), respectively. Therefore, ETEC and EPEC are playing an important role in food-borne illness in Taiwan. *Escherichia coli* O157:H7, a new emerging pathogen of food-borne disease, has not been isolated in this study.

Abstract: A total of 66 isolates of *Salmonella javiana* isolated from food, food handlers, and patrons that were epidemiologically linked to an outbreak of gastroenteritis were analyzed by pulsed-field gel electrophoresis. Analysis with restriction endonucleases XbaI and SpeI supported the epidemiologic association and suggested a pathway of transmission among food, food handlers, and patrons.

Abstract: The average prevalence of reported foodborne illness from 1981 to 1995 was 2.44 per 100,000 population in Korea and 28.01 in Japan. The mean case fatality rate in Korea was 0.74% and in Japan, 0.03%. When both prevalence and case fatality rates in Japan were compared during the same period, the prevalence in Japan was much higher than that in Korea. However, the case fatality rate of patients in Korea was much higher than that in Japan. The distribution of monthly and seasonal patterns of foodborne illness outbreaks strongly indicate the outbreaks may be associated with climatic conditions, frequencies of national holidays, and vacation seasons. Comparison study indicates that the foodborne illness outbreaks in Korea most frequently involved homemade foods (47% of the total cases); in Japan, restaurants accounted for 31.3%. Foodborne illness cases of bacterial origin in Korea were 59.3% of the total and included *Salmonella* spp. (20.7%), *Vibrio* (17.4%), *Staphylococcus* (9.7%), pathogenic *Escherichia coli* (2.4%), and other species (9.1%); in Japan, 72.8% of the total cases and the majority of the bacterial foodborne illness was caused by *Vibrio* (32.3%), *Staphylococcus* (15.9%), *Salmonella* (14.2%), pathogenic *E. coli* (3.0%), and other species (7.2%). In conclusion, the outbreaks of foodborne illness in Korea and Japan may be mainly caused by improper food handling.
and their occurrences may be differentiated according to food sources.

Levengood J.M. et al. Use of a simulated gizzard to measure bioavailability of metals and other elements to waterfowl. *Ecotoxicology.* 2001; 10(5) : 299-304p. **Abstract:** We used a simulated gizzard environment to examine the bioavailability of barium, cadmium, copper, lead and zinc to wild and sentinel mallards (Anas platyrhynchos) using a seasonally-flooded wetland. This impoundment was originally constructed as a containment area for dredged sediments which were contaminated through previous smelting operations. Extraction of elements from gizzard contents indicated that sentinel mallards experienced greater exposure to contaminants than their wild counterparts. Concentrations of the selected elements extracted from ingesta were lower than in seeds and sediments from the study site. Notable exceptions were barium and lead, which were not detected in seeds of some plant species, though they were present in the ingesta of one or more treatment groups. This technique may provide a more realistic means of estimating bioavailability and exposure than methods which measure total concentrations of elements in dietary components. The use of sentinel mallards may result in inflated estimates of risk to wild ducks using seasonally-available wetlands.

Levine M.M. et al. Changes in human ecology and behavior in relation to the emergence of diarrheal diseases, including cholera. *Proc Natl Acad Sci U S A.* 1994; 91(7) : 2390-4p. **Abstract:** Human populations throughout the world can be found in diverse conditions. A proportion of the population of developing countries lives in deprived conditions characterized by ramshackle housing, lack of piped water and sanitation, and widespread fecal contamination of the environment. Enteric infections, particularly due to bacterial pathogens, are readily transmitted under these circumstances. In contrast, the majority of inhabitants of industrialized countries live in a sanitary environment that generally discourages the transmission of enteric pathogens, particularly bacteria. In both these ecologic niches, changes in human ecology and behavior are leading to the emergence of certain enteric infections. Relevant factors in developing areas include urbanization (leading to urban slums), diminished breastfeeding, and political upheaval that results in population migrations. In industrialized areas, large-scale food production (e.g., enormous poultry farms), distribution, and retailing (e.g., fast-food chains) create opportunities where widespread and extensive outbreaks of food-borne enteric infection can ensue if a breakdown in food hygiene occurs.

Levine O.S. et al. Houseflies (Musca domestica) as mechanical vectors of shigellosis. *Rev Infect Dis.* 1991; 13(4) : 688-96p. **Abstract:** Houseflies (Musca domestica) are mechanical vectors of Shigella organisms. Seasons during which both flies and cases of dysentery are prevalent often coincide. Houseflies have an affinity for human excrement and, as documented by bacteriologic culture of trapped flies, become contaminated with Shigella organisms following contact with infected human feces. The inoculum required to transmit shigellosis is only 10-10(2). Since houseflies cohabit with humans, they can readily contaminate food and eating utensils. With the advent of insecticides in the 1940s, intervention studies in the United States provided evidence of the role of the housefly in transmission of shigellae. In towns that were exposed to fly-control measures, the density of flies and the prevalence of carriage of Shigella organisms, diarrhea, and mortality due to diarrheal disease among young children all markedly diminished as compared with the situation in control towns. Investigations that quantitate the importance of fly-borne transmission of Shigella organisms relative to other modes of transmission and that provide evaluation of measures to diminish fly-borne transmission are warranted in developing areas.

Lewis R.J. et al. HPLC/tandem electrospray mass spectrometry for the determination of Sub- ppb levels of Pacific and Caribbean ciguatoxins in crude extracts of fish. *Anal Chem.* 1999; 71(1) : 247-50p. **Abstract:** Ciguatera is a significant food-borne disease caused by potent polyether toxins (ciguatoxins) which accumulate in the flesh of ciguateric reef fish at risk levels > 0.1 ppb for Pacific ciguatoxins. Research on ciguatera has been severely hindered by the lack of analytical methods that detect and characterize low levels of ciguatoxin in crude extracts of fish. Here we report a new procedure for ciguatoxin analysis based on gradient reversed-phase HPLC/tandem mass spectrometry (HPLC/MS/MS). The method gave a linear response to pure Pacific and Caribbean ciguatoxins (P-CTX-1 and C-CTX-1) and the structurally related brevetoxin (PbTx-2) spiked into crude extracts of fish. Levels equivalent to 40 ppt P-CTX-1, 100 ppt C-CTX-1, and 200 ppt PbTx-2 in fish flesh could be detected by HPLC/MS/MS. Using P-CTX-1 as an internal standard, the analysis of extracts of 30 ciguateric fish from the Caribbean Sea (8 toxic, 12 borderline, and 10 nontoxic by mouse bioassay) confirmed the reliability of the method and allowed an estimated risk level of > 0.25 ppb C-CTX-1 to be established. HPLC/MS/MS provides a sensitive analytical approach, not previously available, for the determination of Pacific and Caribbean ciguatoxins at sub-ppb levels in fish flesh.


Liess M. et al. Combined effects of ultraviolet-B radiation and food shortage on the sensitivity of the Antarctic amphipod Paramoera walkeri to copper. *Environ Toxicol Chem.* 2001; 20(9) : 2088-92p. **Abstract:** Investigations on the combined effects of ultraviolet (UV)-B radiation and anthropogenic toxicants have focused primarily on the chemical interactions between UV-B and organic compounds. Only a few studies have examined whether exposure to UV-B changes sensitivity to toxicants. This question is addressed in a laboratory study using the common shoreline Antarctic amphipod Paramoera walkeri and exposure to environmentally realistic levels of copper, UV-B radiation, and food shortage. Exposure to copper for 21 d in the absence of any additional stressors (food present, no UV-B) showed a lowest observable effective concentration (LOEC) of greater than 100 microg Cu/L. Exposure to copper and UV-B in combination, with no shortage of food, resulted in a LOEC of 45 microg Cu/L. When exposed to copper and UV-B, with shortage of food, a LOEC of 3 microg Cu/L was recorded. Hence, the combination of environmental stress from exposure to UV-B radiation and shortage of food increases the sensitivity of P. walkeri to copper more than 30-fold. Increased metabolic energy requirements for defense mechanisms in response to toxicants and UV-B are discussed as possible explanations. It is concluded that consideration of environmental stressors in combination with toxicants
increases the accuracy of ecological risk assessments of toxicants and should be part of the process for developing guidelines for ecologically acceptable concentrations of contaminants in the environment.

Lin J.S. et al. Development and use of polymerase chain reaction for the specific detection of Salmonella Typhimurium in stool and food samples. J Food Prot. 1999; 62(10) : 1103-10p. Abstract: Salmonella Typhimurium is one of the most important Salmonella serovars that may cause foodborne disease and human salmonellosis infection. Detection of this organism in the clinical samples of persons with gastroenteritis and the food samples associated with such persons may allow us to trace the cause of disease. Because malic acid dehydrogenase, an enzyme of the citric acid cycle, is common to organisms, the gene (mdh) coding for this enzyme was selected for the design of Salmonella Typhimurium-specific polymerase chain reaction (PCR) primers. By comparison of the mdh gene sequences of Salmonella Typhimurium and other Salmonella serotypes and of some isolates of other genera, two oligonucleotides were designed and used as PCR primers for the specific detection of Salmonella Typhimurium. The molecular weight of the PCR product was 261 bp as expected. Salmonella serovars other than Salmonella Typhimurium and isolates of other genera in the Enterobacteriaceae that is closely related to Salmonella did not generate any false-positive results. When this primer pair was used for the detection of Salmonella Typhimurium cells artificially inoculated into human stool specimens and food samples, such as milk and raw chicken meat, levels as low as 10(0) CFU per 0.1 g of stool specimen or per ml of milk or food homogenate could be detected if an 8- to 12-h preculture step using combined lactose-tetrahtionate broth was performed prior to the PCR.

Lindberg A. [Risk of food-borne infections is both reduced and increased. Expertise is greater, but so is the risk of exposure]. Lakartidningen. 1999; 96(25) : 3064-6p. Abstract: Foodborne disease is increasingly reported, and the spectrum of microorganisms involved is broad. Diarrhoeal disease is common, and official statistics represent only a minority of cases. Factors associated with an increasing risk of infection include industrialization and globalization of food production, international travel, and the import of exotic foodstuffs. The risk is diminished by good animal husbandry, hygienic handling and transportation of foodstuffs, and technical procedures such as heat and radiation treatment. Our expertise is expanding, but food-handling skills in the general public seem to be deteriorating. However, the impression of increasing risk may to some extent be attributable to intensified publicity in the media, and on the whole our food has probably become safer.

Lindqvist R. et al. A one-year study of foodborne illnesses in the municipality of Uppsala, Sweden. Emerg Infect Dis. 2001; 7(3 Suppl) : 588-92p. Abstract: Surveillance was enhanced and a retrospective interview study performed in 1998-99 to determine incidence, causes, and costs of foodborne illnesses in Uppsala, Sweden. Sixty-eight percent of the detected foodborne illness incidents were single cases, and 32% were outbreaks. Most (85%) of the incidents came to the attention of the municipal authorities through telephone calls from affected persons. Calicivirus, Campylobacter spp., and Staphylococcus aureus were the most common etiological agents; meat, meat products, and mixed dishes were the most implicated food categories. The incidence of foodborne illness was estimated to be 38 cases per 1,000 inhabitants per year. The estimated average costs per illness were 2,164 Swedish Krona (SEK) ($246) to society and 500 SEK ($57) to the patient. The annual cost of foodborne illnesses in Sweden was estimated to be 1,082 million SEK ($123 million).

Linkov I. et al. Risk based management of contaminated sediments: consideration of spatial and temporal patterns in exposure modeling. Environ Sci Technol. 2002; 36(2) : 238-46p. Abstract: This paper addresses interactions among foraging behavior, habitat preferences, site characteristics, and spatial distribution of contaminants in developing PCB exposure estimates for winter flounder at a hypothetical open water dredged material disposal site in the coastal waters of New York and New Jersey (NY-NJ). The implications of these interactions for human health risk estimates for local recreational anglers who fish for and eat flounder are described. The models implemented in this study include a spatial submodel to account for spatial and temporal characteristics of fish exposures and a probabilistic adaptation of the Gobas bioaccumulation model that accounts for temporal variation in concentrations of hydrophobic contaminants in sediment and water. We estimated the geographic distribution of a winter flounder subpopulation offshore of NY-NJ based on species biology and its vulnerability to local recreational fishing, the foraging area of individual fish, and their migration patterns. We incorporated these parameters and an estimate of differential attraction to a management site into a spatially explicit model to assess the range of exposures within the population. The output of this modeling effort, flounder PCB tissue concentrations, provided exposure point concentrations for an estimate of human health risk through ingestion of locally caught flounder. The risks obtained for the spatially nonexplicit case are as much as 1 order of magnitude higher than those
obtained with explicit consideration of spatial and temporal characteristics of winter flounder foraging and seasonal migration. This practice of "defaulting" to extremely conservative estimates for exposure parameters in the face of uncertainty ill serves the decision-making process for management of contaminated sediments in general and specifically for disposal of dredged materials. Consideration of realistic spatial and temporal scales in food chain models can help support sediment management decisions by providing a quantitative expression of the confidence in risk estimates.

Linkov I. et al. Uncertainty and variability in risk from trophic transfer of contaminants in dredged sediments. Sci Total Environ. 2001; 274(1-3) : 255-69p. Abstract: The risks associated with bioaccumulative contaminants must be considered when evaluating dredged material disposal alternatives. The bioaccumulation of organochlorines and other contaminants by higher trophic level organisms represents one of the most significant sources of uncertainty in risk assessment. Both population variability (e.g. true population heterogeneity in body weight, lipid content, etc.) and uncertainty (e.g. measurement error) in trophic transfer can lead to large errors in predicted risk values for ecological receptors. This paper describes and quantitatively evaluates sources of uncertainty and variability in estimating the risk to an ecological receptor (osprey) from the trophic transfer of polychlorinated biphenyls (PCBs) in sediments from the New York-New Jersey (NY-NJ) Harbor. The distribution of toxicity quotients is obtained using a food chain model for the osprey and specifying distributions for input parameters, which are disaggregated to represent either uncertainty or variability. PCB concentrations in sediment and water are treated as predominantly uncertain, whereas lipid content in fish, feeding preferences, and fish weight are assumed to contribute primarily to population variability in PCB accumulation. The analysis shows that point estimates of reasonable maximum exposure (RME) exceed the uncertainty bounds on the 95th percentile of variability. The analysis also shows that uncertainties in the sediment and water contaminant concentrations contribute more to the range of risk estimates than does the variability in the population exposure parameters. The separation of uncertainty and variability in food chain models can help to support management decisions regarding dredged material disposal by providing a quantitative expression of the confidence in ecological risk estimates. A rationale is provided for the distinction between uncertain and variable parameters based on management goals and data availability.

Lipp E.K. et al. The role of seafood in foodborne diseases in the United States of America. Rev Sci Tech. 1997; 16(2) : 620-40p. Abstract: In the United States of America, seafood ranked third on the list of products which caused foodborne disease between 1983 and 1992. Outbreaks connected with fish vectors were caused by scombroid, ciguatoxin, bacteria and unknown agents; in shellfish, unknown agents, paralytic shellfish poisoning, Vibrio spp. and other bacteria, followed by hepatitis A virus, were responsible for the outbreaks. At least ten genera of bacterial pathogens have been implicated in seafood-borne diseases. Over the past twenty-five years, bacterial pathogens associated with faecal contamination have represented only 4% of the shellfish-associated outbreaks, while naturally-occurring bacteria accounted for 20% of shellfish-related illnesses and 99% of the deaths. Most of these indigenous bacteria fall into the family Vibrionaceae which includes the genera Vibrio, Aeromonas and Plesiomonas. In general, Vibrio spp. are not associated with faecal contamination and therefore faecal indicators do not correlate with the presence of Vibrio. Viruses are the most significant cause of shellfish-associated disease: in New York State, for example, 33% and 62% of 196 outbreaks between 1981 and 1992 were caused by Norwalk virus and gastrointestinal viruses (small round structured viruses), respectively. In addition, several illnesses are a result of toxic algal blooms, the growth of naturally occurring bacteria and diatoms causing neurotoxic shellfish poisoning, paralytic shellfish poisoning, diarthroic shellfish poisoning, amnesic shellfish poisoning and ciguatera. Current estimates place the annual number of ciguatera cases at 20,000 world-wide. Scombroid poisoning is the most significant cause of illness associated with seafood. Scombrototoxin is of bacterial origin and halophilic Vibrio spp. causing high histamine levels are implicated as the source. Scombroid poisoning is geographically diverse and many species have been implicated, namely: tuna, mahi-mahi, bluefish, sardines, mackerel, amberjack and abalone. Temperature abuse has been cited as a major cause of scombroid poisoning. For routine work, the use of faecal indicators to predict the relative level of faecal contamination should not be disposed of. However, the main source of seafood illness is due to species which are not predicted by these organisms. In order to protect public health, routine surveillance using new pathogen-specific techniques such as polymerase chain reaction should be used. This, in combination with risk assessment methods and hazard analysis and critical control points, will begin to address the need for improvement in the safety of seafood.

Lo S.V. et al. The role of the pre-symptomatic food handler in a common source outbreak of food-borne SRSV gastroenteritis in a group of hospitals. Epidemiol Infect. 1994; 113(3) : 513-21p. Abstract: A common source outbreak of small round structure virus (SRSV) gastroenteritis affected 81 patients and 114 staff in four hospitals served by one central hospital kitchen. Eating salad items was found to be significantly associated with illness. In a cohort study of a staff buffet function eating turkey salad sandwiches was associated with illness (relative risk = 2.4; 95% CI = 1.4-4.1; P = 0.003), and a case control study of patients in one hospital showed an odds ratio of 6.6 (95% CI = 1.0-71.6; P = 0.04) for eating tuna salad and becoming ill. One of two food handlers who prepared the salads became ill the day following food preparation; she also had a young child at home who had been ill with a gastrointestinal illness during the previous two days. Contamination of food by mechanical transmission of the virus from the child via clothes and hands of the mother, or pre-symptomatic faecal excretion in the mother are possible explanations of contamination of food.

Loaharanu P. et al. Preliminary estimates of economic impact of liver fluke infection in Thailand and the feasibility of irradiation as a control measure. Southeast Asian J Trop Med Public Health. 1991; 22 Suppl 384-90p. Abstract: Liver fluke infection by Opisthorchis viverrini is the leading cause of food-borne parasitic disease in Thailand. Approximately one third of the population in the northeastern region of the country, ie, 6-7 million, are infected by this parasite through the habit of consuming raw or insufficiently cooked freshwater fish, especially those of cyprinoid family. A recent survey showed that 60% of the work force in the Northeast between the age of 15 and 60 is infected. The
estimated wage loss of this population may be approximately Baht 1,620 million (US$65 million) per annum. The estimated direct cost of medical care may be as high as Baht 495 million (US$19.4 million) per annum. Thus, the total direct cost of the infected work force is estimated to be Baht 2,115 million (US$84.6 million) per annum. Irradiation of fish flesh infected by metacercaria of O. viverinii has been demonstrated as an effective method of control. A minimum dose of 0.1 kGy is effective without changing physicochemical properties of the fish flesh. This technology, therefore, shows promise as a method to control infection by O. viverinii acquired by the habit of consuming raw freshwater fish in the country. Preliminary economic analyses indicate that the public health benefit from preventing infection with this parasite could outweigh the investment cost of irradiation facilities. Detailed economic feasibility studies should be carried out to demonstrate the practical efficacy and cost-effectiveness of the treatment as a public health intervention measure in the country.

Long S.G. et al. Listeria meningitis after bone marrow transplantation. Bone Marrow Transplant. 1993; 12(5): 537-9p. Abstract: Over the past decade infections from food-borne Listeria monocytogenes have become an important cause of septicaemia and meningitis and immunocompromised patients are at particular risk. We report three cases of Listeria meningitis occurring post-BMT. The patients were aged 53, 51 and 56 years and presented 4, 7 and 90 months post-transplant, respectively. The first patient had undergone allogeneic BMT for myelodysplasia and the other two patients had ABMT for AML in second and first CR, respectively. All the patients presented with classical features of meningitis and L. monocytogenes was cultured from cerebrospinal fluid. All made a full recovery with appropriate antibiotic therapy. We have not seen cases of meningitis due to other organisms in our transplant programme and the cases represent a risk of one episode per 59 surviving patient years. None of the patients was receiving prophylactic post-BMT antibiotics and the episodes may strengthen the case for using prophylactic penicillin. Recent epidemics of septicaemia and meningitis caused by L. monocytogenes-contaminated milk and cheese suggest that these patients should be informed about potential sources of infection.

Lopolco P.L. et al. [Epidemiologic study and cost analysis of an Salmonella enteritidis epidemic]. Ann Ig. 2000; 12(4) : 279-85p. Abstract: Salmonellosis is one of the most common forms of foodborne infection. An outbreak of gastroenteritis associated with a wedding party was investigated, even to value the costs falling on individuals, the health services and society as a whole. One hundred and fifty nine wedding guests were interviewed by phone. Multivariate analysis was used to assess which food were significantly associated with infection. One hundred and thirteen cases were identified; ten stool samples were culture positive for Salmonella enteritidis. Handmade ice-cream and baba (a typical Italian pastry) were significantly associated with infection. The cost of a case was estimated to be between US $ 74 (for non hospitalised patients) and US $ 1,896 (for hospitalised patients). The outbreak was caused by a strain of Salmonella enteritidis and the vehicle of infection were unpasteurised eggs used to prepare the ice-cream. The economic impact of this outbreak was considerable and mainly due to the hospitalisation.

Lorber M. Indirect exposure assessment at the United States Environmental Protection Agency. Toxicol Ind Health. 2001; 17(5-10) : 145-56p. Abstract: In the early 1980s, exposures and subsequent health impact assessments from contaminants emitted into the air from stationary sources focused on the inhalation pathway. This 'direct' pathway of exposure was thought to be the most critical pathway, as it is for many contaminants. However, by the latter 1980s, the focus at the Environmental Protection Agency (EPA) shifted to contaminants that would persist in the environment and could bioaccumulate up the food chain. Consumption of impacted food products, and other 'indirect' pathways of exposure, such as soil-related exposures, were shown to result in exposures that exceeded inhalation exposures by two to up to four orders of magnitude. A historical background of indirect exposure assessment at EPA is provided in this paper, followed by an overview of modeling methodologies commonly used in indirect exposure assessments. These methodologies are demonstrated on a contaminant of primary focus for indirect exposure impact, dioxins. Two examples are provided. In the first, an air-to-beef model validation exercise is described. In the second, an indirect exposure assessment on a municipal solid waste incinerator in Ohio conducted by the EPA is summarized. This incinerator emitted very large amounts of dioxin, more than any single source known to EPA. Models were used to predict the movement of dioxins from the stack to a nearby hypothetical farm, where individuals in the farm family were exposed to dioxins from consumption of home-produced beef and milk. The predicted lifetime cancer risk of 2.8 x 10(-4) based on these food pathways was used by EPA's Region 5 to initiate regulatory activity on this incinerator.

Loscher T. et al. Vaccination of travelers against hepatitis A and B. J Travel Med. 1999; 6(2) : 107-14p. Abstract: Despite the fact that effective preventive measures have become available, there has been no decline in the incidences of both hepatitis A and hepatitis B in most industrialized countries to date. This is, in part, due to the rapid increase in the number of travelers to areas of medium and high endemicity for both diseases, primarily developing countries. Targeting of travelers at risk of contracting these diseases for vaccination offers a chance of significantly reducing their incidence. Hepatitis A, an acute disease associated with poor food hygiene, is the most common vaccine-preventable infection in travelers. Hepatitis A immunity should, therefore, be considered essential for anyone visiting an area of high endemicity. In contrast, hepatitis B is a blood-borne virus which was thought, until recently, to pose a relatively low risk to the majority of travelers. However, the 1990s has seen international tourism and business travel grow faster in Europe than anywhere else in the world, with travel to areas of high endemicity for hepatitis B (Africa, Asia and South America) being commonplace. Thus the number of reported hepatitis B cases is increasing in many countries. Furthermore, there is considerable overlap of high-endemicity areas of hepatitis A and hepatitis B so that travelers are often considered to be at risk from both viruses. As well as separate hepatitis A and B vaccine preparations, a combination of hepatitis A and B vaccine is now available which may offer improvements in vaccination schedule, enhanced patient compliance, and reduced cost.

A beta-hemolytic streptococci type T 12 occurred at a military base. An epidemiologic investigation indicated that the outbreak was food borne. Consumption of boiled egg salad at lunch was significantly associated with the illness. Immediate institution of antibiotic therapy and isolation of the patients prevented secondary respiratory spread of the infection. No cases of poststreptococcal suppurative and nonsuppurative complications were found during a 6-week period after the outbreak. Medical personnel should be aware of the possibility of food-borne streptococcal pharyngitis. Regular health surveillance of food handlers and food preparation processes are important for prevention of such outbreaks.

Luetzow M. Harmonization of exposure assessment for food chemicals: the international perspective. Toxicol Lett. 2003; 140-141 419-25p. Abstract: The assessment of human exposure to chemicals present in the diet is a rapidly developing discipline. The formulation of the "risk analysis paradigm" by the Codex Alimentarius Commission in 1994 defined the exposure assessment as an essential step of the risk assessment process. This has re-enforced demands to those joint FAO/WHO scientific bodies who evaluate the safety of chemicals in foods to estimate routinely intakes for food additives, flavors, contaminants, and residues of pesticides and veterinary drugs as part of their safety assessments. The approaches chosen by the Joint FAO/WHO Expert Committee for Food Additives (JECFA) and the Joint FAO/WHO Expert Meeting on Pesticide Residues (JMPR) for these compounds are considerably different. These differences can only be understood when considering the different risk policies of the Codex Alimentarius Committees involved. Specific problems emerge if global intake assessments are requested; lack of representative regional data for consumption patterns and insufficient knowledge about levels of chemicals occurring in foods in many countries bear the risk that exposure assessments do not provide risk managers with a true global picture. There is a need to improve the collection and dissemination of such data.

Lupien J.R. et al. Tolerance limits and methodology: effect on international trade. J Food Prot. 1998; 61(11): 1571-8p. Abstract: Microbiological contamination of foods with Listeria monocytogenes, Salmonella spp., Campylobacter spp., and other pathogens and toxins and chemical and environmental contaminants can cause serious health and trade problems in the international trade of foods. Consequently, a system of monitoring and surveillance of the quality and safety of imported foods can have a significant impact on food trade between two or more countries. The World Trade Organization (WTO) provides a framework for ensuring fair trade and harmonizing standards and import requirements on foods traded, through the Agreements on Sanitary and Phytosanitary Measures and Technical Barriers to Trade. Countries are required to base their standards on science, to base programs on risk analysis methodologies, and to develop ways of achieving equivalence between methods of inspection, analysis, and certification between trading countries. To facilitate the harmonization of standards the WTO recommends the use of standards, guidelines, and recommendations developed by the Codex Alimentarius. Other international cooperative measures with the objective of assisting trade include the accreditation of laboratories that conform to international standards and the work of the Codex Committee on Food Import and Export Inspection and Certification on equivalency and harmonization.

Maguire H. et al. Hospital outbreak of Salmonella virchow possibly associated with a food handler. J Hosp Infect. 2000; 44(4): 261-6p. Abstract: A foodborne outbreak of salmonella infection at a private hospital in London in 1994 was found to be associated with eating turkey sandwiches prepared by a food handler. One patient, nine staff, and a foodhandler's baby were confirmed to have Salmonella enterica serotype virchow, phage type 26 infection. The attack rate was estimated to be 5% among the approximately 200 patients and staff at risk. A food handler reportedly became ill days after, but her baby days before, the first hospital case. Although it appeared to be a single outbreak, antibiogram analysis, supplemented by plasmid profile typing, demonstrated that there were two strains of S. virchow involved, one with resistance to sulphonamides and trimethoprim and a second sensitive to these antimicrobial drugs. Mother and child had different strains. The investigation demonstrated the importance of full phenotypic characterization of putative outbreak strains including antimicrobial susceptibility testing. Outbreaks of foodborne infection in hospitals are preventable and are associated with high attack rates and disruption of services. There is a need for good infection control policies and training of all staff involved in patient care as well as in catering services. Consultants in Communicable Disease (CCDCs) should include private hospitals in their outbreak control plans. Good working relations between Infection Control Doctors (ICDs) in the private health sector and their local CCDCs are important if outbreaks are to be properly investigated.

Mahon B.E. et al. Consequences in Georgia of a nationwide outbreak of Salmonella infections: what you don't know might hurt you. Am J Public Health. 1999; 89(1): 31-5p. Abstract: OBJECTIVES: This study assessed the impact in Georgia of a nationwide salmonellosis outbreak caused by ice cream products and the effectiveness of the subsequent warning against eating the implicated products. METHODS: A telephone survey of 250 randomly selected Georgia customers of the ice cream producer was conducted 13 to 17 days after the warning. RESULTS: Respondents from 179 households representing 628 persons were interviewed. The median date of first hearing the warning was 5 days after it was issued, and 16 respondents (9%) had not heard it. Among those who had heard the warning, 42 (26%) did not initially believe the products were unsafe. In 22 (31%) of the 72 households that had the implicated ice cream when the respondent heard the warning, someone subsequently ate the ice cream. Diarrhea was reported in 26% (121/463) of respondents who had eaten the products but in only 5% (8/152) of those who had heard the warning, 42 (26%) did not initially believe the products were unsafe. In 22 (31%) of the 72 households that had the implicated ice cream when the respondent heard the warning, someone subsequently ate the ice cream. Diarrhea was reported in 26% (121/463) of persons who had eaten the products but in only 5% (8/152) who had not (odds ratio [controlling for household clustering] = 3.8; 95% confidence interval = 2.0, 7.5). We estimate this outbreak caused 11,000 cases of diarrhea in Georgia, 1760 (16%) with exposure after the warning. CONCLUSIONS: A large outbreak occurred in Georgia, much of which might have been prevented by a more timely and convincing warning.

Mangin B. et al. Temporal and multiple quantitative trait loci analyses of resistance to bacterial wilt in tomato permit the resolution of linked loci. Genetics. 1999; 151(3): 1165-72p. Abstract: Ralstonia solanacearum is a soil-borne bacterium that causes the serious disease known as bacterial wilt in many plant species. In tomato, several QTL controlling resistance have been found, but in different studies, markers spanning a large region of chromosome 6 showed strong association with the resistance. By using two different approaches to analyze the data from a field test F3 population, we show that at least two separate loci approximately 30 cM apart on this chromosome are most likely involved in the resistance. First, a temporal analysis of the progression of symptoms reveals a distal locus early in the development of the disease. As the disease progresses, the maximum LOD peak observed shifted toward the proximal end of the chromosome, obscuring the distal locus. Second, although classical interval mapping could only detect the presence of one locus, a statistical "two-QTL model" test, specifically adapted for the resolution of linked QTL, strongly supported the hypothesis for the presence of two loci. These results are discussed in the context of current molecular knowledge about disease resistance genes on chromosome 6 and observations made by tomato breeders during the production of bacterial wilt-resistant varieties.

Manuel D.G. et al. The first reported cluster of food-borne cyclosporiasis in Canada. Can J Public Health. 1999; 90(6): 399-402p. Abstract: INTRODUCTION: Prior to 1996, sporadic cases of cyclosporiasis in Canada were most often associated with foreign travel and outbreaks throughout the world were associated with contaminated drinking water. In May 1996, the North York Public Health Department was notified of three laboratory-confirmed cases of cyclosporiasis among persons who attended a luncheon at a religious institution. A ceremonial bath (mikvah) was initially identified as a possible source of exposure to contaminated water. METHODS: Guests of a luncheon were interviewed regarding food, beverage and water exposure. The institution kitchen and water sources were inspected and environmental testing was performed. RESULTS: Eating strawberry flan, decorated with raspberries and blueberries, was associated with developing illness (relative risk = 2.13, p = 0.02). There was no evidence that water exposure was associated with illness. DISCUSSION: This event was the index Canadian cluster of a widespread North American outbreak associated with imported Guatemalan raspberries. The local investigation highlights the role of public health departments in multijurisdictional food-borne outbreaks of emerging pathogens.


Marien K. The importance of weight-normalized exposure data when issuing fish advisories for protection of public health. Environ Health Perspect. 2002; 110(7): 671-7p. Abstract: Public health protection from environmental contaminants requires an understanding of the extent of contamination and of the extent of exposure to the contamination. My argument here is that weight-normalized, species-specific, individual-consumption pattern data are vital for determining exposure levels used to ascertain health protection measures and impacts from consuming contaminated fish. This study demonstrates the importance of adequate consumption pattern data for determining exposure distributions used for public health protection by examining three populations exposed to methylmercury through fish consumption: one recreational angler population and two Native-American populations. I compared exposure distributions derived from empirically derived species-specific, individual-consumption data from the three populations and exposure distributions derived, in part, from summary statistics for populations. In so doing, I conducted sensitivity analyses and population-specific probabilistic assessments of exposure. Although the goals of present-day accepted practices—using exposure distributions derived partly from point-estimate-based consumption and body-weight values—are laudable, results presented here indicate that weight-adjusted intake values for a population of concern are warranted when determining exposure distributions and should not be neglected in a health assessment instigated by available data on contaminant concentrations. If individual intake data are unobtainable, raw data from similar populations or tabulated values providing contaminant intake normalized for body weight may be viable alternatives to default values, and can be used to adequately protect public health. Without weight-normalized consumption pattern data to determine exposure, health assessment conclusions can mislead the public and have diminishing protective value.

Mariscal Larrubia A. et al. Risk assessment of the use of sub-optimal levels of weak-acid preservatives in the control of mould growth on bakery products. Int J Food Microbiol. 2002; 79(3): 203-11p. Abstract: The hurdle technology approach was used to prevent fungal growth of common contaminants of bakery products including isolates belonging to the genera Eurotium, Aspergillus and Penicillium. Several levels (0.003%, 0.03% and 0.3%) of calcium propionate, potassium sorbate and sodium benzoate were assayed on a model agar system in a full-factorial experimental design in which the other factors assayed were pH (4.5, 6 and 7.5) and a(w) (0.80, 085, 0.90 and 0.95). Potassium sorbate was found to be the more suitable preservative to be used in combination with the common levels of pH and a(w) in Spanish bakery products. Sub-optimal concentrations (0.003% and sometimes 0.03%) led to an enhancement of fungal growth. None of the preservatives had a significant inhibitory effect at neutral pH.

Marin S. et al. Molecular epidemiology of Salmonella enterica poisoning: correlation of the serotype and protein profile and plasmid DNA analysis. Enferm Infecc Microbiol Clin. 1992; 10(6): 328-33p. Abstract: Food-borne diseases nosocomial outbreaks due to Salmonella enterica strains have a high incidence nowadays. We describe here an outbreak that occurred in July 1990 in the Malaga University Hospital, that only involves one shift of health care workers. Salmonella enterica was detected in stool samples from HCW and a first analysis revealed the presence of two different antibiotic susceptibility patterns (resistotypes) among isolated strains. Two months after the outbreak started, the CNVIS (Majadahonda, Spain) confirmed the presence of two different serotypes (bovismorbillicans and enteritidis). The delayed availability of the results (due to the lack of specific sera needed in most of the clinical Laboratories) was responsible for finishing only a partial and restricted epidemiologic study in terms of source identification for one particular serotype as well as for the antimicrobial resistance studies. The molecular identification
Marx A. et al. An outbreak of acute gastroenteritis in a geriatric long-term-care facility: combined application of epidemiological and molecular diagnostic methods. *Infect Control Hosp Epidemiol.* 1999; 20(5): 306-11p. Abstract: OBJECTIVE: To assess possible transmission modes of, and risk factors for, gastroenteritis associated with Norwalk-like viruses (NLVs) in a geriatric long-term-care facility. METHODS: During a prolonged outbreak of acute gastroenteritis, epidemiological data on illness among residents and employees were collected in conjunction with stool, vomitus, and environmental specimens for viral testing. NLVs were identified by electron microscopy in stool and vomitus specimens, and further characterized by reverse-transcriptase polymerase chain reaction and nucleotide sequencing. Potential risk factors were examined through medical-record review, personal interview, and a self-administered questionnaire sent to all employees. RESULTS: During the outbreak period, 52 (57%) of 91 residents and 34 (35%) of 90 employees developed acute gastroenteritis. Four case-residents were hospitalized; three residents died at the facility shortly after onset of illness. A point source was not identified; no association between food or water consumption and gastroenteritis was identified. A single NLV strain genetically related to Toronto virus was the only pathogen identified. Residents were at significantly higher risk of gastroenteritis if they were physically debilitated (relative risk [RR], 3.5; 95% confidence interval [CI95], 1.0-12.9), as were employees exposed to residents with acute gastroenteritis (RR, 2.6; CI95, 1.1-6.5) or ill household members (RR, 2.3; CI95, 1.4-3.6). Adherence to infection control measures among the nursing staff may have reduced the risk of gastroenteritis, but the reduction did not reach statistical significance. CONCLUSIONS: In the absence of evidence for food-borne or waterborne transmission, NLVs likely spread among residents and employees of a long-term-care facility through person-to-person or airborne droplet transmission. Rapid notification of local health officials, collection of clinical specimens, and institution of infection control measures are necessary if viral gastroenteritis transmission is to be limited in institutional settings.

Maslanka S.E. et al. Molecular subtyping of Clostridium perfringens by pulsed-field gel electrophoresis to facilitate food-borne-disease outbreak investigations. *J Clin Microbiol.* 1999; 37(7): 2209-14p. Abstract: Clostridium perfringens is a common cause of food-borne illness. The illness is characterized by profuse diarrhea and acute abdominal pain. Since the illness is usually self-limiting, many cases are undiagnosed and/or not reported. Investigations are often pursued after an outbreak involving large numbers of people in institutions, at restaurants, or at catered meals. Serotyping has been used in the past to assist epidemiologic investigations of C. perfringens outbreaks. However, serotyping reagents are not widely available, and many isolates are often untypeable with existing reagents. We developed a pulsed-field gel electrophoresis (PFGE) method for molecular subtyping of C. perfringens isolates to aid in epidemiologic investigations of food-borne outbreaks. Six restriction endonucleases (Smal, Apal, FspI, MluI, KspI, and XbaI) were evaluated with a select panel of C. perfringens strains. Smal was chosen for further studies because it produced 11 to 13 well-distributed bands of 40 to approximately 1,100 kb which provided good discrimination between isolates. Seventeen distinct patterns were obtained with 62 isolates from seven outbreak investigations or control strains. In general, multiple isolates from a single individual had indistinguishable PFGE patterns. Epidemiologically unrelated isolates (outbreak or control strains) had unique patterns; isolates from different individuals within an outbreak had similar, if not identical, patterns. PFGE identifies clonal relationships of isolates which will assist epidemiologic investigations of food-borne-disease outbreaks caused by C. perfringens.


Matthies M. Exposure assessment of environmental organic chemicals at contaminated sites: a multicompartment modelling approach. *Toxicol Lett.* 2003; 140-141 367-77p. Abstract: For the prevention of future damages from chemicals at large contaminated sites, all transfer pathways leading to the exposure of man and vulnerable ecosystems have to be taken into account. For organic contaminants, the uptake into vegetation is the major entry route for the transfer into the food chains. Lipophilic substances are taken up by roots but are not translocated with the transpiration stream. Atmospheric background concentrations have a significant impact on foliage contamination due to the effective gaseous and particle deposition. Vegetables can also be contaminated after irrigation with contaminated water supplied by groundwater wells. By means of a multicompartment model, the various uptake processes into roots and foliage as well as the transformation and translocation processes are described and the concentration pattern resulting from daily irrigation with methyl-t-butyl ether in the edible parts is simulated. The results demonstrate the advantage of a dynamic multicompartment model over the static environmental quality standard approach in terms of derivation of possible exposure reduction measures for organic chemicals.

Matuszczek I. et al. [The outbreak of an epidemic of tick-borne encephalitis in Kielec province induced by milk ingestion]. *Przegl Epidemiol.* 1997; 51(4): 381-8p. Abstract: Outbreak of tick-borne encephalitis (TBE) was reported between May 14 and June 20 1995 in Busko Zdroj in Kielce Province. Drinking fresh (unboiled) goat's milk from private breeding was probable reason of the outbreak. 63 person drank goat's milk from the same source; 15 were hospitalized with neurological symptoms, 33 persons had an influenza-like symptoms and were treated in out-patient department (27) or healed spontaneously (6), and 15 persons were healthy. TBE virus antibodies were found in CSF of all 15 persons with neuroinfection syndromes. IgM and IgG against TBE virus were detected in sera of 15 hospitalized patients and 20 patients with influenza like-syndromes. Antibodies to TBE virus were detected in serum of one of 19 goats from the breeding farm confirming the source of TBE virus infection.

May H. et al. Fishing in a polluted estuary: fishing behavior, fish consumption, and potential risk. *Risk Anal.* 1996; 16(4): 459-71p. Abstract: People make subjective judgments about hazards relying on what they know and feel. These risk perceptions may be based on accurate or inaccurate information and are often optimistically biased. The existence of uncertainties in the evaluation of many environmental hazards effects how risks are perceived. This paper examines fish consumption and risk perception of urban fishermen in...
the New York/New Jersey estuary, in areas where there were consumption advisories. We interviewed 318 fishermen and crabbers in the Arthur Kill, Raritan Bay, and New Jersey shore. Fish were eaten an average of at least four times per month in all regions, but fishermen in the Arthur Kill fished most frequently, averaging over eight times per month. Although 60% of fishermen and crabbers in the Arthur Kill reported hearing warnings about consuming fish caught in these waters, 70% of fishermen and 76% of crabbers said they were their catch. Significantly fewer fishermen in the Bay and Shore regions had heard warnings (28% and 30%, respectively), and more reported consuming their catch (88% and 82%, respectively). In all regions, most people thought that the fish were safe to eat, many believing they were " fresher" than store bought fish. Thus, most people ignored the consumption advisories in effect for these waters. Some of these people are consuming high quantities of fish and crabs, and thus are exposed to potentially deleterious levels of contaminants. In general, people failed to consider the possibility of chronic effects and did not perceive that this enjoyable, familiar pastime could be hazardous. Further, fishermen generally had great confidence in their own knowledge, which proved to be inaccurate in many cases, and often expressed distrust in the information source (government). Clearly, simply issuing consumption advisories is insufficient to promote risk-reducing behavior.

Mayeno A.N. et al. Biotransformation of 3-(phenylamino)-1,2-propanediol to 3- (phenylamino)alanine: a chemical link between toxic oil syndrome and eosinophilia-myalgia syndrome. Chem Res Toxicol. 1995; 8(7): 911-6p. Abstract: During late 1989, the eosinophilia-myalgia syndrome (EMS) developed as an epidemic in the United States, with numerous additional cases reported in several other countries worldwide. Eight years earlier, a closely-related disease, the toxic oil syndrome (TOS), occurred in Spain as a massive food-borne epidemic. Although EMS was linked to the ingestion of tainted L-tryptophan, and TOS to aniline-denatured rapeseed oil, the etiologic agent(s) responsible for both diseases remains undetermined. Contaminants in these foodstuffs are believed to have triggered the diseases. Aniline contaminants, including 3- (phenylamino)-1,2-propanediol (PAP), have been reported in oil used by patients who developed TOS. A related aniline derivative, 3- (phenylamino)-L-alanine (PAA), was recently isolated from L-tryptophan associated with the onset of EMS. Here, we demonstrate the biotransformation of PAP into PAA by both rat hepatocytes and human liver tissue. The structural characterization of PAA was unequivocally determined using on-line HPLC coupled with atmospheric pressure chemical ionization tandem mass spectrometry (LC-APCI-MS/MS). This finding is the first reported chemical link between TOS and EMS and suggests that these two related diseases share a common etiology, namely, PAA.


McEwen S.A. et al. Contaminants of non-biological origin in foods from animals. Rev Sci Tech. 1997; 16(2): 684-93p. Abstract: The authors provide an overview of non-biological contaminants in foods from animals. These contaminants comprise chemical and physical hazards which may be introduced during animal production, slaughter and processing or packaging. Emphasis in this paper is placed on those residues which are of most interest to Veterinary Services and for which Veterinary Services have responsibility, namely: residues of veterinary drugs, industrial chemicals, heavy metals and pesticides which may be introduced during animal production. The most contentious residues which occur in meat, milk and eggs are antibacterial drugs, hormonal growth promoters and certain pesticides, heavy metals and industrial chemicals. While rare incidents of human disease have been attributed to hazardous levels of these contaminants in milk and meat, residues of chemical contaminants in foods of animal origin are, in general, rarely detected at more than trace levels and consequently are not of major public health concern. Nevertheless, non-biological contaminants continue to be very important with respect to international trade and consumer confidence, and efforts to reduce the incidence of occurrence in foods is warranted. Furthermore, continued monitoring and periodic reassessment of risks posed by these contaminants is needed to detect or anticipate new problems so that appropriate action can be taken in the interests of public safety.

McKone T.E. Uncertainty and variability in human exposures to soil contaminants through home-grown food: a Monte Carlo assessment. Risk Anal. 1994; 14(4): 449-63p. Abstract: This paper presents a general model for exposure to homegrown foods that is used with a Monte Carlo analysis to determine the relative contributions of variability (Type A uncertainty) and true uncertainty (Type B uncertainty) to the overall variance in prediction of the dose-to-concentration ratio. Although classification of exposure inputs as uncertain or variable is somewhat subjective, food consumption rates and exposure duration are judged to have a predicted variance that is dominated by variability among individuals by age, income, culture, and geographical region. Whereas, biotransfer factors and partition factors are inputs that, to a large extent, involve uncertainty. Using ingestion of fruits, vegetables, grains, dairy products, and meat and soils assumed to be contaminated by hexachlorobenzene (HCB) and benzo(a)pyrene (BaP) as cases studies, a Monte Carlo
analysis is used to explore the relative contribution of uncertainty and variability to overall variance in the estimated distribution of potential dose within the population that consumes home-grown foods. It is found that, when soil concentrations are specified, variances in ratios of dose-to-concentration for HCB are equally attributable to uncertainty and variability, whereas for BaP, variance in these ratios is dominated by true uncertainty.

McKone T.E. et al. Screening the potential risks of toxic substances using a multimedia compartment model: estimation of human exposure. Regul Toxicol Pharmacol. 1986; 6(4): 359-80p. Abstract: Managing environmental health risks requires the assessment of environmental fate, exposure, and health risk of an ever-increasing list of contaminants. The magnitude of this list precludes an experimental evaluation of each contaminant. For this reason, computer models are being used more frequently to simulate the transport and transformation of chemicals based on physical and chemical properties. This paper describes a multimedia compartment model that we have developed for screening toxic substances. This model, referred to as GEOTOX, uses a combination of physical, chemical, and landscape properties to establish the partitioning, reaction, and interphase-transport characteristics of a chemical. These properties are used to estimate concentrations in the air, soil, water, and food of a representative or generic environment. We use these concentrations in exposure-pathway models to calculate the quantities absorbed by humans; then dose-response data are used to estimate health risks. The capability of GEOTOX as a screening tool is illustrated in a sample ranking of three chemicals (i.e., 2,4,6-trinitrotoluene, hexahydro-1,3,5-trinitro-1,3,5-triazine, and benzene) being continuously added to the upper-soil compartment. We find that ranking based on both toxic potency and environmental fate can enhance the risk-management process when compared to ranking based on toxic potency alone.

Mead P.S. et al. Food-related illness and death in the United States. Emerg Infect Dis. 1999; 5(5): 607-25p. Abstract: To better quantify the impact of foodborne diseases on health in the United States, we compiled and analyzed information from multiple surveillance systems and other sources. We estimate that foodborne diseases cause approximately 76 million illnesses, 325,000 hospitalizations, and 5,000 deaths in the United States each year. Known pathogens account for an estimated 14 million illnesses, 60,000 hospitalizations, and 1,800 deaths. Three pathogens, Salmonella, Listeria, and Toxoplasma, are responsible for 1,500 deaths each year, more than 75% of those caused by known pathogens, while unknown agents account for the remaining 2 million illnesses, 265,000 hospitalizations, and 3,200 deaths. Overall, foodborne diseases appear to cause more illnesses but fewer deaths than previously estimated.

Meer R.R. et al. Human disease associated with Clostridium perfringens enterotoxin. Rev Environ Contam Toxicol. 1997; 150 75-94p. Abstract: Clostridium perfringens continues to be a common cause of food-borne disease. Characteristics of this organism that contribute to its ability to cause food-borne illness include the formation of heat-resistant spores that survive normal cooking/heating temperatures, a rapid growth rate in warm food, and the production of enterotoxin (CPE) in the human gut. Time and temperature abuse associated with food preparation contributes to the majority of outbreaks of C. perfringens food-borne disease. CPE-induced diarrhea has been reported in the absence of a defined food vehicle. These cases have been typically associated with the elderly and following a course of antibiotic therapy. The incidence of CPE-induced diarrhea may be expected to increase with the growing population of immunocompromised (disease-, treatment-, or age-induced) individuals. Clostridium perfringens has been implicated as a possible contributor to the development of SIDS in susceptible individuals. Specifically, it has been hypothesized that CPE acts as a triggering agent, initiating the events associated with the development of SIDS. Continued refinement of both immunoassays and molecular methods for toxin and gene detection, respectively, will facilitate their eventual availability as commercial kits, providing rapid and simplified methods for the detection of C. perfringens isolates that produce or have the capacity to produce CPE as well as other toxins associated with this organism.

Mele A. et al. Incidence of and risk factors for hepatitis A in Italy: public health indications from a 10-year surveillance. SEIEVA Collaborating Group. J Hepatol. 1997; 26(4): 743-7p. Abstract: BACKGROUND/AIMS: This study aimed to evaluate the incidence of and risk factors for acute viral hepatitis A (HAV) in Italy. METHODS: Data were from a surveillance system for type-specific acute viral hepatitis (SEIEVA). To estimate the association of hepatitis A cases with the potential risk factors (Odds Ratios) and the proportion of all hepatitis A cases attributable to a given risk factor (population attributable risk), hepatitis B cases were used as controls. Independent predictors of HAV were estimated by conditional multiple logistic regression. RESULTS: During the period 1985-1994, 25,553 viral hepatitis cases were reported. Of these, 6,408 (25%) were due to hepatitis A (HAV). HAV incidence declined from 10/100 000 in 1985 to 2/100 000 in 1987. Since 1991, however, an increase in HAV has been observed. The majority of cases were 15-24 years old; the incidence was higher in males and in subjects residing in southern Italy. Only one death (0.02%) was observed. Shellfish consumption was the most frequently reported risk factor (62%). The proportion of cases reporting personal contact with an icteric case, travel to a high-medium endemic areas, and family contact with a child attending a day-care centre (household of day-care child) was 17%, 19% and 15%, respectively. The results of multivariate analysis showed that shellfish consumption (OR=2.6; 95% CI=2.4-2.9), travel to endemic areas for people residing in northern and central Italy (OR=5.4; 95% CI=4.6-6.2) and household of day-care child (OR=1.2; 95% CI=1.03-1.4), were all types of exposure independently associated with HAV. The estimates of population-attributable risk show that shellfish consumption explained as many as 42.2%, travel to high-medium endemic areas for people residing in northern and central Italy 24.2%, and household of day-care child only 1.4% of all acute hepatitis A cases in Italy. CONCLUSIONS: These findings indicate that HAV in Italy is mainly a food-borne disease. Vaccination against hepatitis A is strongly recommended for travellers to endemic areas.

Meng J. et al. Emerging issues in microbiological food safety. Annu Rev Nutr. 1997; 17 255-75p. Abstract: Many microorganisms previously unrecognized as food-borne or harmful are emerging as human pathogens transmitted by food. This is a result of recent acquisition of key virulence factors, detection by newly developed isolation procedures,
or astute detective-like laboratory skills of microbiologists. Six microbial pathogens, including Shiga toxin-producing Escherichia coli, Listeria monocytogenes, Arcobacter butzleri, Helicobacter pylori, Cryptosporidium parvum, and Cyclospora, have become recognized as significant causes of human illness. Although the ecology and epidemiology of illness caused by some of these pathogens have not been fully elucidated, food has the potential of being an important vehicle in their dissemination. Existing technologies and new approaches such as irradiation and hazard analysis critical control point (HACCP) programs are useful tools in the control of food-borne hazards. However, because of ever-changing products, processes, food-handling practices, societal habits, and pathogens, emerging food-borne diseases will continue to be an important public health concern.


Meng X. et al. Isolation and characterisation of neurotoxigenic Clostridium butyricum from soil in China. J Med Microbiol. 1999; 48(2): 133-7p. Abstract: Soil specimens collected from a site around the home of patients with food-borne type E. botulism probably caused by neurotoxigenic Clostridium butyricum in Guanyun, Jiangsu province, China, were examined for the presence of neurotoxigenic C. butyricum. Five lakeside sites of WeiShan lake, in an area near to the sites where the type E. botulism outbreaks caused by neurotoxigenic C. butyricum occurred were also surveyed. Type E toxin-producing C. butyricum was isolated from soil from four sites including the site in Guanyun. Polymerase chain reaction assay demonstrated the presence of the type E toxin gene in all the toxigenic isolates. The biochemical properties of the isolates from the Guanyun soil and the lakeside soil were identical except for inulin fermentation and starch hydrolysis properties. These results indicate that neurotoxigenic C. butyricum has its principal habitat in soil.

Menudier A. et al. [Virulence of Listeria monocytogenes in pregnant mice]. Pathol Biol (Paris). 1994; 42(5): 510-5p. Abstract: Serious food-borne outbreaks of listeriosis have been reported in North America and in Europe, during the past decade. The predominant risk groups appear to be immunocompromised adults, elderly people, newborn babies and pregnant women. In order to examine the relationship between alimentation, listeriosis and pregnant females, we developed an experimental model using Swiss mice fed ad libitum during 4 days with pellets containing a high concentration of Listeria monocytogenes serovar 4b (10(9) u.f.c/g). Samples were taken from many series of pregnant mice which had been infected respectively by L. monocytogenes from 6th, 10th, 14th and 18th day of pregnancy onwards. This was compared to non infected control series. The transmission of infection from mother to progeny and contamination of surviving progeny were evaluated by Listeria numeration in liver, brain and intestines. Females infected between day 6 and day 10, and between day 10 and day 14 after fertilization, aborted or died of encephalitis. Mice contaminated between day 14 and day 18, were the least prone to experimental listeriosis. On the other hand, some mice contaminated between day 18 and day 22, i.e. at the end of their pregnancy, may develop encephalitis a few days after parturition of a healthy litter. Series contaminated between day 6 and day 10, and between day 10 and day 14 turned out to be highly sensitive to the transmission of infection from mother to young. In two other series (day 14--day 18; day 18--day 22), the young mice contained generally no Listeria. Our experimental model shows the relationship between listeriosis and alimentation. In pregnant mice, sensitivity to infection depends on their gestational status with large individual variability.


Miller M.A. et al. Other food borne infections. Vet Clin North Am Food Anim Pract. 1998; 14(1): 71-89p. Abstract: This article presents an update of several emerging or reemerging pathogens: Yersinia, Cryptosporidia, Cyclospora, Brucella, and Mycobacterium. All of these zoonotic pathogens show evidence of food borne transmission. Yersiniosis is presented as an emerging pathogen that has as its major route of transmission preparation and consumption of pork products. New evidence is presented that supports the transmission of brucellosis via the food chain, especially through contaminated raw milk and cheese. While TB has limited transmission via raw milk, it is highlighted as a reemerging infection due to the development of multiple drug resistance. Public health veterinarians stand in an excellent position to recognize these emerging diseases and apply intervention strategies to prevent and control these infections in the future. This article is intended to raise their consciousness as to the management and medical practices that can diminish food borne transmission.

Mines D. et al. Poisonings: food, fish, shellfish. Emerg Med Clin North Am. 1997; 15(1): 157-77p. Abstract: Not every traveler who gets sick away from home has an infection; some are poisoned. This article describes common and dangerous illnesses caused by food-borne toxins. It explores the toxic illnesses acquired from fish or seafood, including scombroid, ciguatera, pufferfish toxicity, and a variety of shellfish poisonings. It also provides a brief overview of plant toxicity. Although gastroenteritis is a common feature of many food poisonings, this article emphasizes those processes associated with neurologic manifestations, as they tend to be more dangerous to patients and less well understood by physicians. It also stresses strategies to prevent food poisoning.

Mintz E. et al. Not just a drop in the bucket: expanding access to point-of-use water treatment systems. Am J Public Health. 2001; 91(10): 1565-70p. Abstract: Since 1990, the number of people without access to safe water sources has remained constant at approximately 1.1 billion, of whom approximately 2.2 million die of waterborne disease each year. In developing countries, population growth and migrations strain existing water and sanitary infrastructure and complicate planning and construction of new infrastructure. Providing safe water for all is a long-term goal; however, relying only on time- and resource-intensive centralized solutions such as piped, treated water will leave hundreds of millions of people without safe water far into the future. Self-sustaining, decentralized approaches to making drinking water safe, including point-of-use chemical and
Mitsuda T. et al. [Bleeding infectious enteritis]. Nippon Rinsho. 1998; 56(9): 2376-81p. Abstract: A recent trend on bleeding intestinal infections in Japan was described. Salmonella Enteritidis infection occupied over 42% of food-borne diseases in 1996. Salmonella Enteritidis is the most popular infectious agent for food-borne outbreak in Japan. Salmonella Typhimurium DT104 which is widely spread in Europe and in U.S.A. is not common in Japan. We experienced large outbreak of foodborne EHEC/VTEC O157: H7 infections in 1996. Since then, diagnostic and therapeutic studies on EHEC/VTEC infection and haemolytic uremic syndrome are promoted by the Government. HACCP may take an important roll for the prevention of large outbreaks of foodborne EHEC/VTEC infections.

Mitsuda T. et al. Epidemiological study of a food-borne outbreak of enterotoxigenic Escherichia coli O25:NM by pulsed-field gel electrophoresis and randomly amplified polymorphic DNA analysis. J Clin Microbiol. 1998; 36(3): 652-6p. Abstract: This study investigated the applicability of molecular epidemiological techniques to the identification of the causal agent of an outbreak of diarrhoea caused by ingestion of food contaminated with enterotoxigenic Escherichia coli (ETEC). The outbreak occurred at four elementary schools in July 1996 and affected more than 800 people. Illness was most strongly associated with eating tuna paste (relative risk, 1.79; 95% confidence interval = 1.16 to 2.79; P = 0.0001). To evaluate the epidemiological characteristics of the pathogen, the DNAs from numerous isolated ETEC strains were subjected to randomly amplified polymorphic DNA analysis, pulsed-field gel electrophoresis of nucleic S1-treated plasmid DNA, and analysis of genomic DNA restriction fragment length polymorphisms. All ETEC isolates were of the O25:NM (nonmotile) serotype, which carries a heat-stable enterotoxin Ib gene. Genotypic analysis demonstrated that the strains isolated from the patients at all four schools were identical. The isolates of ETEC O25:NM obtained from the tuna paste that had been served for lunch at these schools were genetically indistinguishable from those isolated from the patients. Results suggest that this outbreak was food borne. The molecular biology-based epidemiological techniques used in this study were useful in characterizing the causal agent in this food-borne epidemic.

Moreno-Lopez J. Contaminants in feed for food-producing animals. Pol J Vet Sci. 2002; 5(2): 123-5p. Abstract: Outbreaks of Bovine Spongiform Encephalopathy (BSE) and food borne microbial infections, dioxin contaminated animal products, the presence of veterinary drug residues, microbial resistance to antibiotics, mycotoxins, agricultural and industrial chemicals, etc. are serious concerns for the food industry in many countries. Since the direct links between feed safety and safety of foods of animal origin are obvious, feed production and manufacture should be considered as an integral part of the food production chain. Industry is responsible for the quality and safety of food and feed that is produced. This paper is a brief review of some microorganisms as source of infections for farm animals that could result in human illnesses. These include Salmonella enterica, Bacillus anthracis, Toxoplasma gondii, Trichinella spiralis, prions, Listeria monocytogenes, EHEC, Campylobacter, Clostridium botulinum, Hog Cholera virus, Foot and Mouth Disease virus, etc. as well as other contaminants associated with animal feed such as mycotoxins, veterinary drugs, dioxins and PCB and Genetically Modified Organisms.

Morner T. The ecology of tularaemia. Rev Sci Tech. 1992; 11(4): 1123-30p. Abstract: Tularaemia, a zoonotic disease caused by the bacterium Francisella tularensis McCoy, 1912, is reported from North America, Europe and northern parts of Asia, but not from the Southern Hemisphere. Two subspecies of F. tularensis are recognised: the highly virulent type A and the milder type B, with additional subdivisions reported. Tularaemia has been reported in more than 250 animal species including man, other mammals, birds, fish, amphibians, arthropods and protozoa. Type A is reported to have a terrestrial cycle with the main reservoirs being cottontail rabbits (Sylvilagus spp.) and ticks. Type B is reported to have a mainly water-borne cycle with aquatic rodents as reservoirs, e.g. muskrats (Ondatra zibethicus) and beaver (Castor canadensis) in North America, and ground voles (Arvicola terrestris) in the former Soviet Union. In Europe, tularaemia is most frequently seen in hares (Lepus spp.) although hares probably do not constitute a reservoir for the disease. Tularaemia is transmitted by direct contact with infected animals, through contaminated water or food, or by vectors such as mosquitoes or ticks. The disease normally...
occurs as an epidemic, both in man and in animals, depending on the types of reservoir involved and the means of transmission at different times of the year.

Mossel D.A. [The veterinarian active in the field of veterinary public health, towards the year 2000]. Tijdschr Diergeneeskd. 1990; 115(3): 115-24p. Abstract: Introductory classes taught to seventeen successive generations of postgraduate veterinary students, intensive consultations, during about 40 years, with scientists in executive positions in the food industry, catering and military-medical organisations, and the response of participants after public lectures support the impression that, in the Netherlands, the public is not aware of the professional profile of the Public Health Veterinarian. This contrasts sharply to that of the small animal practitioner and of the herd management veterinarian. In the years immediately before the Second World War the professional standing of the Veterinary Public Health Officer was demonstrably better observable. The reason for this altered public image of the Public Health Veterinarian is sought in changes in the aetiology and transmission of zoonoses and other diseases spread by food, water and the environment. Whereas the majority of the latter was previously transmitted off intra vitam foci of infection, food-borne infections and intoxications presently mainly originate from the environment. Consequently adequate protection of the consumer has to rely on the elaboration and application of measures of intervention sensu Wilson. These include: well designed techniques of hygiene supported by disinfection at the farm and during transportation and holding animals for slaughter, use of probiotics in decontaminated animal feeds, meticulous adherence to expertly designed measures of hygiene and chilling at slaughterhouses and, to the extent required, terminal decontamination of carcasses and/or consumer size cuts. Many of these facets do not traditionally belong to the veterinarian's vistas.(ABSTRACT TRUNCATED AT 250 WORDS).

Motes M.L. et al. Influence of water temperature and salinity on Vibrio vulnificus in Northern Gulf and Atlantic Coast oysters (Crassostrea virginica). Appl Environ Microbiol. 1998; 64(4): 1459-65p. Abstract: This study investigated the temperature and salinity parameters associated with waters and oysters linked to food-borne Vibrio vulnificus infections. V. vulnificus was enumerated in oysters collected at three northern Gulf Coast sites and two Atlantic Coast sites from July 1994 through September 1995. Two of these sites, Black Bay, La., and Apalachicola Bay, Fla., are the source of the majority of the oysters implicated in V. vulnificus cases. Oysters in all Gulf Coast sites exhibited a similar seasonal distribution of V. vulnificus: a consistently large number (median concentration, 2,300 organisms [most probable number] per g of oyster meat) from May through October followed by a gradual reduction during November and December to < or = 10 per g, where it remained from January through mid-March, and a sharp increase in late March and April to summer levels. V. vulnificus was undetectable (< 3 per g) in oysters from the North and South Carolina sites for most of the year. An exception occurred when a late-summer flood caused a drop in salinity in the North Carolina estuary, apparently causing V. vulnificus numbers to increase briefly to Gulf Coast levels. At Gulf Coast sites, V. vulnificus numbers increased with water temperatures up to 26 degrees C and were constant at higher temperatures. High V. vulnificus levels (> 10(3) per g) were typically found in oysters from intermediate salinities (5 to 25 ppt). Smaller V. vulnificus numbers (< 10(2) per g) were found at salinities above 28 ppt, typical of Atlantic Coast sites. On 11 occasions oysters were sampled at times and locations near the source of oysters implicated in 13 V. vulnificus cases; the V. vulnificus levels and environmental parameters associated with these samples were consistent with those of other study samples collected from the Gulf Coast from April through November. These findings suggest that the hazard of V. vulnificus infection is not limited to brief periods of unusual abundance of V. vulnificus in Gulf Coast oysters or to environmental conditions that are unusual to Gulf Coast estuaries.

Moxley R.A. et al. Comparative pathology of bacterial enteric diseases of swine. Adv Exp Med Biol. 1999; 473:83-101p. Abstract: Enteric bacterial infections are among the most common and economically significant diseases affecting swine production worldwide. Clinical signs of these infections include diarrhea, reduced growth rate, weight loss, and death of preweaned, weaning, grower-finisher, young and adult age breeding animals. The most common etiological agents include Escherichia coli, Clostridium perfringens, Lawsonia intracellularis, Salmonella enterica, and Brachyspira (Serpulina) spp. With the exception of Brachyspira (Serpulina) hydysenteriae, the cause of swine dysentery, and Lawsonia intracellularis, the cause of proliferative enteropathy, the pathological changes seen with these agents closely resemble the diseases occurring in human beings. Histological changes in the intestines of swine with enteric bacterial infections include bacterial colonization without significant damage (e.g., certain enterotoxigenic E. coli and C. perfringens type A), attaching and effacing lesions with enteropathogenic E. coli and Brachyspira pilosicoli, the cause of colonic spirochetosis, inflammation with S. enterica, and necrotizing and hemorrhagic lesions with certain C. perfringens. Extraintestinal spread of bacteria and/or toxins occurs with some serotypes of E. coli and most serotypes of S. enterica. Enteric bacterial diseases of swine have been used as models to study the pathogenesis of similar diseases of human beings. Several of these pathogens are also important causes of food-borne disease in humans.

Moya J. et al. Analysis of consumption of home-produced foods. J Expo Anal Environ Epidemiol. 2001; 11(5): 398-406p. Abstract: One of the potential exposure pathways of concern when assessing human exposures to environmental contaminants is the ingestion of contaminated foods. Individuals who live near contaminated sites and who grow their own food may be at a higher risk than the general population. Estimating exposures to this subpopulation requires an analysis of homegrown food intake rates. The Nationwide Food Consumption Survey (NFCS) 1987-1988 data were used to generate intake rates for home-produced foods. Results of the analysis show that, among the general population, homegrown vegetables (18%) were the most commonly consumed of the major food groups, followed by fruit (8%), meat (5%), fish (2%), and dairy products (0.8%). The intake rates for the major food groups vary according to region, age, urbanization, and race. In general, intake rates of home-produced foods are higher among populations in non-metropolitan and suburban areas and lowest in central city areas.

Muntoni S. et al. Results of a five-year community-based programme for cardiovascular disease prevention: the ATS-Sardegna Campaign. *Eur J Epidemiol.* 1999; 15(1): 29-34p. **Abstract:** The objective of this study was to evaluate the effects of the ATS-Sardegna Campaign on lifestyle and cardiovascular disease (CVD) risk factors in the Sardinian population. The Campaign was a community-based public health action programme funded by the Sardinian Government with a view to prevent CVD and promote healthy behaviour. It was also part of the Targeted Project FAT.MA. of the Italian National Research Council (CNR), with the main purpose of evaluating the effects of this public health initiative after a five-year intervention. The evaluation was effected with three parallel procedures: individual interviews with 1486 randomly chosen people; assessment of eating patterns through a food-frequency questionnaire; measurement of the mean levels of the major CVD risk factors in 1729 randomly chosen subjects (1044 in the calendar year 1992, and 685 in 1995, two and five years, respectively, after the beginning of the Campaign). Overall, we recorded a favourable trend in eating habits in both sexes; a significant decrease in LDL-cholesterol in males, and in systolic and diastolic blood pressure in both sexes; a non-significant decrease in prevalence of smokers among males and increase among females. The ATS-Sardegna Campaign was the first CVD prevention programme in Italy to have attained reduction in the risk profile of an entire region at the lowest ever borne cost.

Murao M. Food-borne outbreaks of gastroenteritis caused by small round structured viruses. 1. Four outbreaks of gastroenteritis associated with oyster consumption. *Kansenshogaku Zasshi.* 1991; 65(9): 1104-10p. **Abstract:** Between December 9, 1988 and January 28, 1989, there were four outbreaks of acute gastroenteritis in Saitama prefecture. Eighty-two of 123 persons (67%) attending four banquets in restaurants became ill: 44 cases attending three banquets were related to eating raw oysters, and 38 attending one banquet to eating sashimi. The most common symptoms were nausea, diarrhea, abdominal cramps, and vomiting. Average incubation periods were 29 to 32 hours long. Bacteriologic analysis of stool specimens did not reveal causative agents. Small round structured viruses were detected in fecal specimens from 19 of 39 ill persons (49%) by electron microscopy. In one of four outbreaks, the formation of antibody to small round structured virus in paired serum samples was detected by western blot test. Small round structured viruses were implicated as the etiologic agents in four outbreaks of acute gastroenteritis.

Murata T. et al. A large outbreak of foodborne infection attributed to Providencia alcalifaciens. *J Infect Dis.* 2001; 184(8): 1050-5p. **Abstract:** The enteropathogenicity of Providencia alcalifaciens, a member of the family Enterobacteriaceae, has not yet been well established. In November 1996, a large outbreak of foodborne infection occurred in Fukui, Japan. In this study, the etiology of the outbreak was investigated. No other recognized enteropathogens were detected in patient fecal samples, but P. alcalifaciens was detected in 7 of 18 samples. The isolates were found to be clonal by pulsed-field gel electrophoresis. The patients who presented with gastroenteritis had elevated levels of specific antibody against the isolated P. alcalifaciens. The isolates showed invasion of Caco-2 cells and fluid accumulation in rabbit ileal loops. This study strongly suggests that the outbreak was caused by P. alcalifaciens. This is the first report of a large outbreak of foodborne infection attributed to the organism and provides definitive evidence that P. alcalifaciens is a causative agent of gastroenteritis.

Nachamkin I. et al. Role of Campylobacter jejuni flagella as colonization factors for three-day-old chicks: analysis with flagellar mutants. *Appl Environ Microbiol.* 1993; 59(5): 1269-73p. **Abstract:** Campylobacter jejuni, an important cause of human gastrointestinal infection, is a major foodborne pathogen in the United States and worldwide. Since poultry becomes colonized and/or contaminated during the early stages of production and is a major food-borne source for this organism, we studied the role of C. jejuni flagella on the ability of the bacterium to colonize the chicken gastrointestinal tract. Three-day-old chicks were orally challenged with a motile wild-type strain of C. jejuni IN9 or with flagellar mutants created from IN9 by disrupting the flagellin genes with a kanamycin resistance cassette by using shuttle mutagenesis (A. Labigne-Roussel, P. Courcoux, and L. Tompkins, J. Bacteriol. 170:1704-1708, 1988). One mutant, IN9-N3, lacked flagella and was nonmotile. The other, IN9-N7, produced a truncated flagellum and was partially motile. Three-day-old chicks were orally challenged with different doses of the wild-type strain and the two mutants. At challenge doses ranging from 3.0 x 10(4) to 6.6 x 10(8) CFU per chick, only the fully motile, wild-type strain colonized the chick ceca. Our results show that intact and motile flagella are important colonization factors for C. jejuni in chicks.

Nagao M. A new approach to risk estimation of food-borne carcinogens--heterocyclic amines--based on molecular information. *Mutat Res.* 1999; 431(1): 3-12p. **Abstract:** Identification of causative agents for human cancers is the goal of our studies. We analyzed ordinary foods for mutagenicity, using the well-established Salmonella test. Heating fish and meat yielded mutagens that require metabolic activation for exhibition of mutagenicity. Structural determination revealed these mutagens to be heterocyclic amines (HCAs), their precursors in some cases being creatin(in)e, sugars and amino acids. Ten HCAs so far examined have all proved carcinogenic in mice and rats, inducing cancers in various organs such as in the mammary glands, prostate, lung, colon, skin, bladder and liver. Human exposure to HCAs is 0.1-12 microg/day, predominantly to 2-amino-1-methyl-6-phenyl-imidazo[4,5-b]pyridine (PhIP) and
2-amino-3,8- dimethylimidazo[4,5-f]quinoline (MeIQx). For these types of genotoxic carcinogens, DNA-adduct formation is crucially important and PhIP-DNA adducts have been detected in human tissues. However, the amounts of individual HCAs ingested by humans may not be sufficient to induce cancers by themselves and many environmental factors have also been implicated in neoplasia in man, with other considerable inter-individual variation in susceptibility, e.g., to colon carcinogenesis. This is in line with results obtained by feeding different strains of rats with HCA. Studies using lacI transgenic mice and rats have revealed that DNA adducts do not directly correlate with mutant frequencies at the organ level, or cancer incidence. However, sequencing of the Apc gene of rat colon tumors induced by PhIP revealed that it induces a signature mutation of G deletion from the GGGA sequence. This type of mutation is found in the p53 gene of 0.3% human cancers having p53-somatic mutations, and it has been calculated that 3%-10% of the p53 mutations detected in human cancers could be ascribable to PhIP. Although there remains the possibility that other carcinogens involved in human carcinogenesis cause the same signature mutation, the available data point to an important role for PhIP.

Neimann B.J. et al. [An outbreak of Salmonella enteritidis at the New Year celebration of the Copenhagen Medical Association]. Ugeskr Laeger. 1999; 161(19): 2803-6p. Abstract: In order to determine the extent and infectious vehicle of an outbreak of Salmonella enteritidis phage type 6 at the New Year celebration of the Copenhagen Medical Association on 15 January 1999, a cohort study including 77 guests (90% of the participants) and 11 staff was carried out. There was little variation in the degree of exposure among the guests, meaning that identification of the probable infectious vehicle was not possible here. However, among the staff, intake of minced raw salmon was associated with increased risk of disease. Uncooked eggs were used in the preparation of this dish and since S. enteritidis phage type 6 is in Denmark almost exclusively found among egg-laying hens, these findings led to the conclusion that the outbreak was most likely caused by the use of raw eggs. The importance of notification of suspected foodborne disease and microbiological examination of people thereby exposed is stressed.

Nilsson R. Endocrine modulators in the food chain and environment. Toxicol Pathol. 2000; 28(3): 420-31p. Abstract: Recently, considerable attention has been focused on certain environmental contaminants--"endocrine disruptors"--of industrial origin that may mimic the action of sex hormones. Natural compounds and their effects on other types of hormonal activity (eg, on adrenal or thyroid function) have for some reason not provoked similar attention. As exemplified by tributyltin and certain bioaccumulating chlorinated compounds, available evidence indicates that "endocrine disruption" caused by xenobiotics is primarily an ecotoxicologic problem. In mammals, certain phenylmethyl-substituted siloxanes have been found to be by far the most potent endocrine disrupters among various synthetic xenobiotics. On the other hand, it has not been possible to scientifically substantiate either certain alarming reports of powerful synergistic effects between chlorinated pesticides or the alleged adverse effects on the male reproductive tract in rodents (induced by alkylphenols and plasticizers at extremely low exposures). Whereas there is compelling evidence that estrogens in certain foods and herbal medicines can induce hormonal changes in women as well as overt toxicity in men, existing data are insufficient to support a causal relationship between exposure of the general human population to nonpharmaceutical industrial chemicals and adverse effects operating via the endocrine system. Moreover, in terms of magnitude and extent, all such exposures to so-called endocrine disruptors are dwarfed by the extensive use of oral contraceptives and estrogens for treatment of menopausal and postmenopausal disorders. Also, the exposure to hormonally active xenobiotics is virtually insignificant when compared with the intake of the phytoestrogens that are present in food and beverages, and it is even more insignificant when compared with certain herbal potions used in "alternative medicine." Furthermore, while there has been much concern about negligible exposures to xenobiotics with weak hormone-like activities, the potent endocrine disrupter licorice is freely given to children. Long-term exposure to this substance induces severe toxic symptoms of mineral corticoid hormone imbalance. Although exposures to xenobiotics and many natural compounds occur by identical routes of administration and may contribute to the same toxicological end point, they are, regrettably, judged by completely different standards. As is the case with all other chemicals, rational risk assessment and risk management of man-made and natural endocrine modulators must be based on the mode of action and dose-response relationships. Such end points as the induction of reproductive developmental effects, cancer, etc, relating to actual exposures must also be taken into consideration.

Nishikawa H. et al. [The effects of improved diets on the daily intake of environmental contaminants as calculated from personal food consumption data, by Monte Carlo simulation]. Nippon Eiseigaku Zasshi. 1998; 53(2): 441-6p. Abstract: In a previous paper, we discussed the Estimated Ecological Daily Intake (EEDI), which is a new method for the estimating daily intake of environmental contaminants based on individual food consumption data. This method makes it possible to identify high-risk cases, using a Monte Carlo simulation for varying contamination levels in each food item and permits epidemiological assessment of the individual, rather than the population, intake of environmental contaminants. We attempted to identify those contaminants whose maximum dietary levels were most commonly exceeded. The results obtained were as follows: 1) After a 1,000-fold extrapolation, performed for each person and contaminant, some cases exceeded allowable maximums in dieldrin, lead, cadmium, and total mercury. In dieldrin and lead intake, few cases exceeded dieldrin and lead maximums by a factor of 2 or 3, but in the cases of cadmium and total mercury, individual maximum intake was significantly exceeded. 2) After estimating a high-risk individual's times of exceeding the allowance in cadmium intake with dietary improvement, we found a 10.5% excess intake after 40% improvement. Clearly, the issue of environmental contaminants exposure due to dietary intake is a significant one.

Nobre D. et al. Crotalaria juncea intoxication in horses. Vet Hum Toxicol. 1994; 36(5): 445-8p. Abstract: Twenty horses died 30 d after being fed a diet containing 40% of triturated Crotalaria juncea seeds. Before death, they had staggering, dyspnea and fever. At necropsy the most evident lesions were areas of lung parenchyma consolidation and enlarged and congested livers. Histopathological examination revealed diffuse fibrosing alveolitis with hyaline membranes,
suggesting a blood-borne insult, and passive congestion in the liver with compression of the hepatocyte trabecules. To confirm the diagnosis, guinea pigs were given 60% of a commercial diet + 40% triturated C junea seeds. After 4 mo of feeding the animals died with dyspnea. Their lungs had diffuse fibrosing alveolitis with discrete formation of hyaline membranes and the livers were congested. Reproduction of 

the lesions implicated the plant and supported the diagnosis of C junea intoxication in the horses.


Notermans S. et al. DNA hybridization and latex agglutination for detection of heat-labile- and shiga-like toxin-producing Escherichia coli in meat. Int J Food Microbiol. 1991; 13(1): 31-9p. Abstract: DNA-hybridization and latex-agglutination tests were used for screening of a group of Escherichia coli isolates for heat-labile enterotoxin (LT)- and shiga-like toxin (SLT1 or VT1) -producing strains, respectively. Strains tested originated from 162 meat samples (poultry, pigs and beef) chosen at random. Additionally LT- and SLT1-producing reference strains were tested. The DNA-hybridization technique allowed screening of large numbers of strains, whereas large scale testing of strains by latex agglutination was laborious. Of 800 E. coli strains tested by DNA hybridization none contained the gene encoding LT. Production of LT as tested by latex agglutination was not found. The gene encoding SLT1 was detected in 10 of the 800 isolates tested. None of these strains, however, showed cytotoxicity on Vero cells. Serotyping was done with sorbitol-negative E. coli strains, first by using the latex-agglutination test for 0157 followed by complete serotyping. No E. coli of serogroup 0157 were found. Therefore the results obtained also indicate that routine screening of E. coli isolated randomly from food for toxin production is not useful and should be limited to food-borne disease outbreaks with an etiology resembling an E. coli infection.

Nylen G. et al. An international outbreak of Salmonella enteritidis associated with lasagne; lessons on the need for cross-national co-operation in investigating food-borne outbreaks. Epidemiol Infect. 1999; 123(1): 31-5p. Abstract: We investigated an outbreak of Salmonella enteritidis involving at least 19 British tourists returning from one hotel in another European country. A retrospective cohort study of 47 hotel guests identified lasagne as the most likely vehicle of transmission (RR 11.5; 95% CI 3.0-44.1; P < 0.0001). However, difficulties in information exchange and lack of formal mechanisms to agree on the aims of the cross-national investigation hampered efficient management of the outbreak. The factors leading to contamination of the food vehicle were not identified and therefore specific action to prevent reoccurrence could not be taken. There is need to develop protocols for cross-national investigations of outbreaks in Europe which should include specifying objectives, roles and responsibilities of investigators and control agencies, with formal reporting of the outcome of the investigation.

O'Brien S.J. et al. Surveillance of foodborne outbreaks of infectious intestinal disease in England and Wales 1992-1999: contributing to evidence-based food policy? Public Health. 2002; 116(2): 75-80p. Abstract: Between 1992 and 1999, a total of 1426 general outbreaks of infectious intestinal disease reported to the Public Health Laboratory Service (PHLS) Communicable Disease Surveillance Centre (CDSC) were described as foodborne. Where the evidence base to support the conclusions drawn was provided (66.3% of outbreaks) a combination of microbiological and analytical evidence was reported in 4% of outbreaks (60/1426); microbiological evidence alone in 10% of outbreaks (149/1426); analytical evidence alone in 23% of outbreaks (322/1426); microbiological evidence in combination with descriptive epidemiology in 3% of outbreaks (46/1426) and descriptive epidemiology alone in 26% of outbreaks (365/1426). Information supplied to CDSC by local investigators appears to be of varying quality and depth and may be influenced by the individual characteristics of outbreaks such as size and duration, outbreak setting, causative organism, vehicles of infection and time of year. These findings have implications for the use of these surveillance data in developing evidence-based food policy.

O'Brien S.J. et al. A foodborne outbreak of Vero cytotoxin-producing Escherichia coli O157:H-phage type 8 in hospital. J Hosp Infect. 2001; 49(3): 167-72p. Abstract: This paper describes the epidemiological and microbiological aspects of the largest outbreak of Vero cytotoxin-producing Escherichia coli O157 (VTEC O157) infection in a hospital setting in which the route of transmission was foodborne. The outbreak, which was caused by a relatively uncommon phage type of VTEC O157, occurred in four geriatric continuing care wards in May 1997. The total number of people found to be excreting the organism was 37, of whom 16 were inpatients and 11 were staff. Twelve people displayed enteric symptoms. In addition, all but two of 10 cases identified in the local community were thought to be associated with the outbreak. An epidemiological investigation amongst the hospital patients revealed a statistically significant association between VTEC O157 infection and attendance at a concert party in the continuing care wards on 17 May 1997 (relative risk = 3.22; P= 0.006). There was an even stronger relationship between consumption of home-baked cream-filled cakes brought to that party and evidence of infection (relative risk = 19.35; P= 0.00002). Further investigations in the local community, coupled with microbiological evidence, supported the epidemiological finding that homemade cream cakes brought into the hospital were the vehicle of infection for the outbreak. There was no secondary spread within the hospital. The outbreak serves as a reminder of the hazard posed by foodstuffs brought into a hospital from outside.
O'Gorman M.R. et al. Interpretive criteria of the Western blot assay for serodiagnosis of human immunodeficiency virus type 1 infection. Arch Pathol Lab Med. 1991; 115(1): 26-30p. Abstract: This project was designed to evaluate different criteria used in the interpretation of the human immunodeficiency virus type 1 (HIV-1) Western blot assay on a group of serum samples blinded to the examiner that were collected from individuals attending three different public health departments in central North Carolina. Each individual also completed an anonymous linked questionnaire regarding sociodemographics and risk factors for blood-borne infections. All of the Western blot assays for human immunodeficiency virus type 1 were interpreted according to the criteria established at the University of North Carolina Hospitals, Chapel Hill, the Centers for Disease Control, Atlanta, Ga, in association with the Association of State, Territorial, and Public Health Laboratory Directors, Iowa City, Iowa, the American Red Cross, Washington, DC, the Consortium for Retrovirus Serology Standardization, Davis, Calif, and the Food and Drug Administration, Washington, DC. The results obtained were grouped as positive, negative, and indeterminate according to each organization's criteria and analyzed in the context of the associated risk factors. The results indicate that institutions performing human immunodeficiency virus type 1 Western blot confirmatory testing should adopt the criteria of the Centers for Disease Control and the State, Territorial, and Public Health Laboratory Directors.

O'Neil L.L. et al. Frequent perinatal transmission of feline immunodeficiency virus by chronically infected cats. J Virol. 1996; 70(5): 2894-901p. Abstract: Vertical transmission of feline immunodeficiency virus (FIV) was studied in cats infected with either of two FIV clinical isolates (FIV-B-2542 or FIV-AB-2771) prior to breeding and conception. Queens infected 4 to 30 months (mean = 14 months) prior to conception transmitted FIV to 59 of 83 (71%) kittens; 50.6% were virus positive on the day of birth. To examine potential routes of FIV transmission from mother to offspring, kittens were delivered via either vaginal or cesarean birth and nursed by either their virus-infected natural mothers or uninfected surrogate mothers. Comparison of FIV infection rates at birth with those at 6 months of age in kittens delivered by cesarean and surrogate raised demonstrated that late in utero transmission occurred in approximately 20% of kittens. Comparison of kittens nursed by FIV mothers with those by uninfected surrogate mothers demonstrated a 13.5% increase in infection rate of kittens exposed to milk-borne virus. Isolation of virus from 40% of maternal vaginal wash samples and the slightly greater infection rate in vaginally versus cesarean-delivered surrogate-nursed kittens suggested that intrapartum transmission may occur. In addition, we found that low maternal CD4 count (<200 cells per microl), longer duration of maternal infection (>15 months), and maternal symptoms of clinical immunodeficiency correlated with increased rates of mother-to-kitten FIV transmission, paralleling observations in human immunodeficiency virus-infected women. We conclude that FIV infection provides a model in which to explore aspects of human immunodeficiency virus vertical transmission and intervention difficult to address in human patients.

Obata H. et al. [The trends of Vibrio parahaemolyticus foodborne outbreaks in Tokyo during the last 12 years between 1989 and 2000 were 710. The number of outbreaks in a year was 55 in 1989, 75 in 1990, and there was a gradual decrease to 24 outbreaks in 1993 which was the smallest number during those 12 years. After 1994, the number of outbreaks increased dramatically year by year until 1998 (107 outbreaks). Then they had decreased slightly to 74 in 1999, 65 in 2000. The monthly incidence of V. parahaemolyticus foodborne outbreaks showed a peak in August (44.2%) each year. In the last 12 years, 88.7% of V. parahaemolyticus foodborne outbreaks occurred during the 3 months between July and September, while 99.9% occurred between June and October. The most prevalent serotype of V. parahaemolyticus also changed, the most prevalent was O4:K4 in 1989, O4:K8 in both 1990 and 1991, O1:K56 in 1992, and O4:K8 from 1993 through 1995. Serotype O3:K6 became the most prevalent in 1996 and has remained so to date. In addition, the new serotype O4:K68 had also appeared in 1998. The number of outbreaks due to serotype O4:K68 followed that of O3:K6. Thus, the trends of V. parahaemolyticus foodborne outbreaks during the last 12 years in Tokyo showed various characteristics and dramatic changes in causal organisms.

Oberhansli T. et al. Indole-3-acetic acid (IAA) synthesis in the biocontrol strain CHA0 of Pseudomonas fluorescens: role of tryptophan side chain oxidase. J Gen Microbiol. 1991; 137 (Pt 10) 2273-9p. Abstract: Pseudomonas fluorescens strain CHA0 is an effective biocontrol agent against soil-borne fungal plant pathogens. In this study, indole-3-acetic acid (IAA) biosynthesis in strain CHA0 was investigated. Two key enzyme activities were found to be involved: tryptophan side chain oxidase (TSO) and tryptophan transaminase. TSO was induced in the stationary growth phase. By fractionation of a cell extract of strain CHA0 on DEAE-Sepharose, two distinct peaks of constitutive tryptophan transaminase activity were detected. A pathway leading from tryptophan to IAA via indole-3-acetamide, which occurs in Pseudomonas syringae subsp. savastanoi, was not present in strain CHA0. IAA synthesis accounted for less than or equal to 1.5% of exogenous tryptophan consumed by resting cells of strain CHA0, indicating that the bulk of tryptophan was catabolized via yet another pathway involving anthranilic acid as an intermediate. Strain CHA750, a mutant lacking TSO activity, was obtained after Tn5 mutagenesis of strain CHA0. In liquid cultures (pH 6.8) supplemented with 10 mM-L-tryptophan, growing cells of strains CHA0 and CHA750 synthesized the same amount of IAA, presumably using the tryptophan transaminase pathway. In contrast, resting cells of strain CHA750 produced five times less IAA in a buffer (pH 6.0) containing 1 mM-L-tryptophan than did resting cells of the wild-type, illustrating the major contribution of TSO to IAA synthesis under these conditions. In artificial soils at pH approximately 7 or pH approximately 6, both strains had similar abilities to suppress take-all disease of wheat or black root rot of tobacco. This suggests that TSO-dependent IAA synthesis is not essential for disease suppression.

Oboegbulem S.I. et al. Epidemiological aspects of outbreaks of food-borne salmonellosis in Scotland between 1980 and 1989. Rev Sci Tech. 1993; 12(3): 957-67p. Abstract: Between 1980 and 1989, 2,212 outbreaks of food-borne infection were reported in Scotland. Of 2,073 episodes for which a causative agent was established, 1,732 (84%) were caused by salmonellae. An average of 980 people were affected each year, while the average number of individuals
injured per general outbreak was 16.8. The infected foods were consumed outside Scotland in 25% of the outbreaks. In 75% of 1,107 episodes where the location was specified, the implicated foods were consumed in the home; hotels and restaurants accounted for 15%. Specific food items were identified in 603 (35%) of the 1,732 outbreaks; poultry meat was responsible for 332 (55%) and milk 49 (8%), while eggs accounted for 23 (4%) outbreaks.

Ogata K. et al. Short report: gnathostomiasis in Mexico. Am J Trop Med Hyg. 1998; 58(3): 316-8p. Abstract: Gnathostomiasis is an important food-borne parasitic zoonosis that is endemic mainly in Asian countries where some people prefer to eat raw freshwater fish. In North America, the first recorded case of gnathostomiasis was in Mexico in 1970, and the numbers of gnathostomiasis patients in Mexico seems to be increasing dramatically with time. However, the epidemiology of this disease in Mexico has never been described in detail. Here we review the current status of gnathostomiasis in Mexico.

Ohtani Y. et al. [An outbreak of gastroenteritis possibly caused by Escherichia coli O167:H9]. Kansenshogakuzasshi. 1991; 65(1): 35-9p. Abstract: An outbreak of gastroenteritis involving a total of 256 patients (49.7%) among 515 persons occurred at a primary and secondary school in Agatsama Town, Gunma Prefecture between the 23rd and 28th of June 1988. The majority of the cases occurred within the first 4 days. The main symptoms were abdominal pain (81.6%), diarrhea (57.0%) and headache (40.2%). In most cases, the stools were watery and occasionally mucous. Although food-borne infection was strongly suggested epidemiologically evidence did not incriminate any foods as the cause of the outbreak. In the bacteriological study on stool specimens from 25 patients, Escherichia coli O167:H9 was isolated from 20 of these specimens, virtually in pure culture. The isolates of the E. coli serovar were negative for recognized diarrheagenic virulence properties: production of heat-labile and heat-stable enterotoxins, enteroinvasion, and production of Shiga-like toxin. When the HEp-2 cell-adherence test was used, however, they exhibited localized adherence. All the strains were demonstrated to carry 56 Md plasmids that presumably mediate the production of the adherence factor.

Ohyama T. et al. Detection and nucleotide sequence analysis of human caliciviruses (HuCVs) from samples in non-bacterial gastroenteritis outbreaks in Hokkaido, Japan. Microbiol Immunol. 1999; 43(6): 543-50p. Abstract: Samples of feces and vomit collected from patients during 13 non-bacterial gastroenteritis outbreaks which occurred in Hokkaido between 1995 and 1998 were examined by electron microscopy (EM) and reverse- transcription polymerase chain reaction (RT-PCR) for evidence of infection with human caliciviruses (HuCVs). In 6 food-borne outbreaks, oysters were the probable source of infection, while the origin of HuCVs was not found out for the other 7 outbreaks. One-hundred-eleven of 214 stool, vomit and oyster specimens examined gave positive results by RT-PCR, while HuCVs were detected by EM in 36 of 121 stool specimens examined. We determined the nucleotide sequences of 470-bp or 373-bp PCR products amplified from the RNA polymerase region of the HuCV genomes with primer sets MR3/4 and Yuri22F/R, respectively. The sequences of different strains revealed great heterogeneity, with a range of 60 to 100% homology among strains. In a few cases, a mixed genotype was found in the same patient or same outbreak by means of nested PCR and cloning of PCR products into an appropriate vector. Of the 19 different strains found, 4 strains could be classified as Norwalk virus (genogroup 1) and the other 15 strains as Snow Mountain agent (genogroup 2) based on genotyping with homology analysis. Furthermore, the strains belonging to genogroup 2 could be classified into 4 subgroups with more than 93% homology in amino acids among strains in the subgroup.

Oishi I. et al. An occurrence of diarrheal cases associated with group C rotavirus in adults. Microbiol Immunol. 1993; 37(6): 505-9p. Abstract: Six of the 23 college students who joined a group trip in February of 1993 developed acute nonbacterial gastroenteritis with severe diarrhea. The causal agent was identified as group C rotaviruses by electron microscopy (EM), immune-EM (IEM) and the molecular examinations including polyacrylamide gel electrophoresis (PAGE) and polymerase chain reaction (PCR) on virus particles detected in the extract of watery fecal specimens of the patients. The patients positive for virus isolation showed significant increase in IEM antibody to the isolated virus in their paired sera. These findings suggest that the group C rotavirus is an important etiological agent of diarrhea and may also cause serious food-borne diarrheal disease in adults.

Olesen B. et al. Cluster of multiresistant Escherichia coli O78:H10 in Greater Copenhagen. Scand J Infect Dis. 1994; 26(4): 406-10p. Abstract: A multiresistant, lactose-negative Escherichia coli O78:H10 was isolated from 19 patients in Greater Copenhagen over a period of 8 months. At least 14 cases were community-acquired. 18 isolates originated from urine cultures and 1 from a faecal sample. 13 patients were predisposed to urinary tract infection (UTI) and 11 patients showed clinical signs of UTI. This is the first report of E. coli O78:H10 causing human disease. The cluster was probably food-borne, but the source was not identified. This cluster of identical disease associated E. coli was only uncovered because of its multiresistance and lactose-negative phenotype.

Olsen A.R. et al. Regulatory action criteria for fifth and other extraneous materials v. strategy for evaluating hazardous and nonhazardous filth. Regul Toxicol Pharmacol. 2001; 33(3): 363-92p. Abstract: The U.S. Food and Drug Administration (FDA) uses regulatory action criteria for fifth and extraneous materials to evaluate adulteration of food products. The criteria are organized into three categories: health hazards, indicators of insanitation, and natural or unavoidable defects. The health hazard category includes criteria for physical, chemical, and microbiological hazards associated with fifth and extraneous materials. The health hazard category encompasses criteria for HACCP (Hazard Analysis and Critical Control Point) hazards and HACCP contributing factors. The indicators of insanitation category includes criteria for visibly objectionable contaminants, contamination from commensal pests, and other types of contamination that are associated with insanitary conditions in food processing and storage facilities. The natural or unavoidable category includes criteria for harmless, naturally occurring defects and contaminants. A decision tree is presented for the sequential application of regulatory action criteria for fifth or extraneous materials associated with each category and with each type of fifth or extraneous material in the three categories. This final report of a series in the development of a transparent science base for a revised
FDA regulatory policy in the area of filth and extraneous materials in food includes a comprehensive list of the references that form the science base for the FDA regulatory policy.

Olsen A.R. et al. Isolation of Salmonella spp. from the housefly, Musca domestica L., and the dump fly, Hydrotaea aenesclens (Wiedemann) (Diptera: Muscidae), at caged-layer houses. J Food Prot. 2000; 63(7) : 958-60p. Abstract: Flies, especially houseflies, are widely recognized as potential reservoirs and vectors of foodborne Salmonella pathogens. In this study, flies were collected at caged-layer facilities that had produced eggs that were implicated as the food vehicle in two recent outbreaks of Salmonella Enteritidis infections. The flies were separated by species into pools for microbiological testing. A total of 15 species pools of houseflies, Musca domestica L., and 7 species pools of bronze dump flies, Hydrotaea aenesclens (Wiedemann) (Diptera: Muscidae), were analyzed. Salmonella Enteritidis was isolated from 2 of the 15 pools of houseflies. Other species of Salmonella were isolated from three pools of flies, including Salmonella Infantis from houseflies and from dump flies and Salmonella Heidelberg from houseflies. Salmonella Mbandaka was isolated from a lesser mealworm, Alphitobius diaperinus (Panzer) (Coleoptera: Tenebrionidae).

Olsen S.J. et al. The changing epidemiology of salmonella: trends in serotypes isolated from humans in the United States, 1987-1997. J Infect Dis. 2001; 183(5) : 753-61p. Abstract: Salmonellosis is a major cause of illness in the United States. To highlight recent trends, data for 1987-1997 from the National Salmonella Surveillance System were analyzed. A total of 441,863 Salmonella isolates were reported, with the highest age-specific rate among infants (159/100,000 infants at 2 months). Annual isolation rates decreased from 19 to 13/100,000 persons; however, trends varied by serotype. The isolation rate of Salmonella serotype Enteritidis increased until 1996, whereas declines were noted in Salmonella serotypes Hadar and Heidelberg. Overall, serotypes that increased in frequency were significantly more likely than those that decreased to be associated with reptiles (P=.008). Salmonella infections continue to be an important cause of illness, especially among infants. Recent declines in food-associated serotypes may reflect changes in the meat, poultry, and egg industries that preceded or anticipated the 1996 implementation of pathogen-reduction programs. Additional educational efforts are needed to control the emergence of reptile-associated salmonellosis.

Olsen S.J. et al. An outbreak of Campylobacter jejuni infections associated with food handler contamination: the use of pulsed-field gel electrophoresis. J Infect Dis. 2001; 183(1) : 64-7p. Abstract: In 1998, an outbreak of Campylobacter jejuni infections occurred in Kansas among persons attending a school luncheon; community cases were also reported. In a cohort study of luncheon attendees, 27 (17%) of 161 persons reported illness. Consuming gravy (relative risk [RR], 4.2; 95% confidence interval [CI], 1.5-11.7) or pineapple (RR, 2.4; 95% CI, 1.0-5.7) was associated with illness. Both foods were prepared in a kitchen that served 6 other schools where no illness was reported. A cafeteria worker at the luncheon had a diarrheal illness and was the likely source of the outbreak. The pulsed-field gel electrophoresis (PFGE) patterns of the isolates from the food handler and those of 8 lunch attendees were indistinguishable. Isolates from 4 community patients differed. This was the first use of PFGE in a Campylobacter outbreak in the United States; its use was critical in determining that community cases were not linked.

Olsen S.J. et al. Surveillance for foodborne-disease outbreaks--United States, 1993-1997. Mor Mortal Wkly Rep CDC Surveill Summ. 2000; 49(1) : 1-62p. Abstract: PROBLEM/CONDITION: Since 1973, CDC has maintained a collaborative surveillance program for collection and periodic reporting of data on the occurrence and causes of foodborne-disease outbreaks (FBDOs) in the United States. REPORTING PERIOD COVERED: This summary reviews data from January 1993 through December 1997. DESCRIPTION OF SYSTEM: The Foodborne-Disease Outbreak Surveillance System reviews data concerning FBDOs, defined as the occurrence of two or more cases of a similar illness resulting from the ingestion of a common food. State and local public health departments have primary responsibility for identifying and investigating FBDOs. State, local, and territorial health departments use a standard form to report these outbreaks to CDC. RESULTS: During 1993-1997, a total of 2,751 outbreaks of foodborne disease were reported (489 in 1993, 653 in 1994, 628 in 1995, 477 in 1996, and 504 in 1997). These outbreaks caused a reported 86,058 persons to become ill. Among outbreaks for which the etiology was determined, bacterial pathogens caused the largest percentage of outbreaks (75%) and the largest percentage of cases (86%). Salmonella serotype Enteritidis accounted for the largest number of outbreaks, cases, and deaths; most of these outbreaks were attributed to eating eggs. Chemical agents caused 17% of outbreaks and 1% of cases; viruses, 6% of outbreaks and 8% of cases; and parasites, 2% of outbreaks and 5% of cases. INTERPRETATION: The annual number of FBDOs reported to CDC did not change substantially during this period or from previous years. During this reporting period, S. Enteritidis continued to be a major cause of illness and death. In addition, multistate outbreaks caused by contaminated produce and outbreaks caused by Escherichia coli O157:H7 remained prominent. ACTIONS TAKEN: Current methods to detect FBDOs are improving, and several changes to improve the ease and timeliness of reporting FBDO data are occurring (e.g., a revised form to simplify FBDO reporting by state health departments and electronic reporting methods). State and local health departments continue to investigate and report FBDOs as part of efforts to better understand and define the epidemiology of foodborne disease in the United States. At the regional and national levels, surveillance data provide an indication of the etiologic agents, vehicles of transmission, and contributing factors associated with FBDOs and help direct public health actions to reduce illness and death caused by FBDOs.

Olsen S.J. et al. A waterborne outbreak of Escherichia coli O157:H7 infections and hemolytic uremic syndrome: implications for rural water systems. Emerg Infect Dis. 2002; 8(4) : 370-5p. Abstract: In the summer of 1998, a large outbreak of Escherichia coli O157:H7 infections occurred in Alpine, Wyoming. We identified 157 ill persons; stool from 71 (45%) yielded E. coli O157:H7. In two cohort studies, illness was significantly associated with drinking municipal water (town residents: adjusted odds ratio=10.1, 95% confidence intervals [CI]=1.8-56.4; visitors attending family reunion: relative risk=9.0, 95% CI=1.3-63.3). The unchlorinated water supply had microbiologic evidence of fecal organisms and the potential for chronic contamination with surface water. Among persons exposed to water, the
attack rate was significantly lower in town residents than in visitors (23% vs. 50%, $p<0.01$) and decreased with increasing age. The lower attack rate among exposed residents, especially adults, is consistent with the acquisition of partial immunity following long-term exposure. Serologic data, although limited, may support this finding. Contamination of small, unprotected water systems may be an increasing public health risk.

**Orduz S. et al.** Transfer of toxin genes to alternate bacterial hosts for mosquito control. *Mem Inst Oswaldo Cruz.* 1995; 90(1) : 97-107p. **Abstract:** Mosquitoes are vectors of serious human and animal diseases, such as malaria, dengue, yellow fever, among others. The use of biological control agents has provide an environmentally safe and highly specific alternative to the use of chemical insecticides in the control of vector borne diseases. Bacillus thuringiensis and B. sphaericus produce toxic proteins to mosquito larvae. Great progress has been made on the biochemical and molecular characterization of such proteins and the genes encoding them. Nevertheless, the low residuality of these biological insecticides is one of the major drawbacks. This article present some interesting aspects of the mosquito larvae feeding habits and review the attempts that have been made to genetically engineer microorganisms that while are used by mosquito larvae as a food source should express the Bacillus toxin genes in order to improve the residuality and stability in the mosquito breeding ponds.

**Osaka K. et al.** Electronic network for monitoring travellers' diarrhoea and detection of an outbreak caused by Salmonella enteritidis among overseas travellers. *Epidemiol Infect.* 1999; 123(3) : 431-6p. **Abstract:** The Traveller's Diarrhoea Network, by which the Infectious Disease Surveillance Center is electronically connected with two major airport quarantine stations and three infectious disease hospitals, was launched in February 1988 in Japan. The data on travellers' diarrhoea detected is reported weekly by e-mail. Two clusters of infection among travellers returning from Italy were reported by two airport quarantine stations at the end of September 1998. A total of 12 salmonella isolates from 2 clusters were examined. All were identified as Salmonella enteritidis, phage type 4 and showed identical banding patterns on pulsed-field gel electrophoresis. A case-control study showed that the scrambled eggs served at the hotel restaurant in Rome were the likely source of this outbreak. This outbreak could not have been detected promptly and investigated easily without the e-mail network. International exchange of data on travellers' diarrhoea is important for preventing and controlling food-borne illnesses infected abroad.

**Oskarsson A. et al.** Risk assessment in relation to neonatal metal exposure. *Analyst.* 1998; 123(1) : 19-23p. **Abstract:** Rapid changes in organ development and function occur during the neonatal period. During this period the central nervous system is in a rapid growth rate and highly vulnerable to toxic effects of, e.g., lead and methylmercury. Furthermore, the kinetics of many metals is age-specific, with a higher gastrointestinal absorption, less effective renal excretion as well as a less effective blood-brain barrier in newborns compared to adults. Due to their low body weight and high food consumption per kg of body weight, the tissue levels of contaminants can reach higher levels in newborns than in adults. Generally, there is a low transfer of toxic metals through milk when maternal exposure levels are low. However, knowledge is limited about the lactational transport of metals and the potential effects of metals in the mammary gland on milk secretion and composition. There are some data from rodents on the lactational transfer and the uptake in the neonate of inorganic mercury, methylmercury, lead and cadmium. Metal levels in human breast milk and blood samples from different exposure situations can give information on the correlation between blood and milk levels. If such a relationship exists, milk levels can be used as an indicator of both maternal and neonatal exposure. Better understanding of the neonatal exposure, including kinetics in the lactating mother and in the newborn, and effects of toxic metals in different age groups is needed for the risk assessment. Interactions with nutritional factors and the great beneficial value of breast-feeding should also be considered.

**Ould-Dada Z. et al.** Assessment of prospective foodchain doses from radioactive discharges from BNFL Sellafield. *J Environ Radioact.* 2002; 59(3) : 273-91p. **Abstract:** This paper presents the method used by the UK Food Standards Agency (FSA) to assess the potential impact of proposed radioactive discharges from the Sellafield nuclear site on food and determine their acceptability. It explains aspects of a cautious method that has been adopted to reflect the UK government policy and uncertainties related to people's habits with regard to food production and consumption. Two types of ingestion doses are considered in this method: 'possible' and 'probable' doses. The method is specifically applied to Sellafield discharge limits and calculated possible and probable ingestion doses are presented and discussed. Estimated critical group ingestion doses are below the dose limit and constraint set for members of the public. The method may be subject to future amendments to take account of changes in government policy and the outcome of a recent Consultative Exercise on Dose Assessments carried out by FSA. Uncertainties inherent in dose assessments are discussed and quantified wherever possible.

**Padua L. et al.** Neuropathophysiological assessment in the diagnosis of botulism: usefulness of single-fiber EMG. *Muscle Nerve.* 1999; 22(10) : 1388-92p. **Abstract:** We report the clinical, serological, and neuropathophysiological findings in seven patients with foodborne botulism caused by ingestion of black olives in water. The clinical picture was characterized by mild symptoms with a long latency of onset and by involvement of cranial and upper limb muscles; only one patient, a child, developed respiratory failure. Spores of Clostridium botulinum were found in stools in some but not all cases. Conventional neuropathological tests had low sensitivity; abnormal findings were present only in the patient with severe clinical involvement, in whom compound muscle action potentials (CMAPs) appeared reduced. Repetitive nerve stimulation at a high rate showed pseudofacilitation and not true posttetanic facilitation, but single-fiber electromyography (SFEMG) showed abnormalities of neuromuscular transmission in every case. Neuropathophysiological evaluation, particularly SFEMG, is important because it allows rapid identification of abnormal neuromuscular transmission while bioassay studies are in progress.

**Palmer S. et al.** The role of outbreaks in developing food safety policy: population based surveillance of salmonella outbreaks
Pan T.M. et al. Food-borne disease outbreaks in Taiwan, 1994. J Formos Med Assoc. 1996; 95(5) : 417-20p. **Abstract:** In 1994, 102 outbreaks of food-borne disease involving 4726 cases were reported to the Taiwan Department of Health. This is the highest number of outbreaks and cases in recent years in Taiwan. Of these outbreaks, 72.5% (74/102) were caused by bacterial pathogens, with Vibrio parahaemolyticus responsible for 56.7% (42/74), Staphylococcus aureus 20.3% (15/74), Bacillus cereus 14.9% (11/74) and Salmonella spp other than S. typhi and S. paratyphi 8.1% (6/74). V. parahaemolyticus has been a leading cause of problems in Taiwan for many years. Contamination of seafood with this organism has been reported frequently, particularly in the warmer months. In 1994, small outbreaks (fewer than 5 cases) and large outbreaks (more than 50 cases) represented 31.4% (32/102) and 12.7% (13/102), respectively, of the total. The median outbreak size was 10 cases. A high proportion (54%, 7/13) of the large outbreaks was associated with commercial lunch-boxes supplied to elementary and junior high schools. Health education to improve food sanitation and supervision of food sanitation practices need to be strengthened.

Pan T.M. et al. Food-borne disease outbreaks due to bacteria in Taiwan, 1986 to 1995. J Clin Microbiol. 1997; 35(5) : 1260-2p. **Abstract:** Between 1986 and 1995, 852 outbreaks of food-borne disease involving 26,773 cases and 20 deaths were reported in Taiwan. About 80% of the outbreaks occurred in the warmer months, i.e., between April and October. Of the 852 reported outbreaks, 555 (65%) were caused by bacterial pathogens. The three most common bacteria involved were Vibrio parahaemolyticus (35%, 197 of 555 outbreaks), Staphylococcus aureus (30%, 169 of 555 outbreaks), and Bacillus cereus (18%, 104 of 555 outbreaks).

Panisello P.J. et al. Application of foodborne disease outbreak data in the development and maintenance of HACCP systems. Int J Food Microbiol. 2000; 59(3) : 221-34p. **Abstract:** Five-hundred and thirty general foodborne outbreaks of food poisoning reported in England and Wales between 1992 and 1996 were reviewed to study their application to the development and maintenance of HACCP systems. Retrospective investigations of foodborne disease outbreaks provided information on aetiological agents, food vehicles and factors that contributed to the outbreaks. Salmonella spp. and foods of animal origin (red meat, poultry and seafood) were most frequently associated with outbreaks during this period. Improper cooking, inadequate storage, cross-contamination and use of raw ingredients in the preparation of food were the most common factors contributing to outbreaks. Classification and cross tabulation of surveillance information relating to aetiological agents, food vehicles and contributory factors facilitates hazard analysis. In forming control measures and their corresponding critical limits, this approach focuses monitoring on those aspects that are critical to the safety of the product. Incorporation of epidemiological data in the documentation of HACCP systems provides assurance that the system is based on the best scientific information available.

Parashar U.D. et al. An outbreak of viral gastroenteritis associated with consumption of sandwiches: implications for the control of transmission by food handlers. Epidemiol Infect. 1998; 121(3) : 615-21p. **Abstract:** Although food handlers are often implicated as the source of infection in outbreaks of food-borne viral gastroenteritis, little is known about the timing of infectivity in relation to illness. We investigated a gastroenteritis outbreak among employees of a manufacturing company and found an association (RR = 14.1, 95% CI = 2.0-97.3) between disease and eating sandwiches prepared by 6 food handlers, 1 of whom reported gastroenteritis which had subsided 4 days earlier. Norwalk-like viruses were detected by electron microscopy or reverse transcriptase- polymerase chain reaction (RT-PCR) in stool specimens from several company employees, the sick food handler whose specimen was obtained 10 days after resolution of illness, and an asymptomatic food handler. All RT-PCR product sequences were identical, suggesting a common source of infection. These data support observations from recent volunteer studies that current recommendations to exclude food handlers from work for 48-72 h after recovery from illness may not always prevent transmission of Norwalk-like viruses because virus can be shed up to 10 days after illness or while exhibiting no symptoms.

Parashar U.D. et al. "Norwalk-like viruses" as a cause of foodborne disease outbreaks. Rev Med Virol. 2001; 11(4) : 243-52p. **Abstract:** While outbreaks of foodborne disease remain an important public health concern, their aetiology is not identified in a majority of instances. In targeted studies, the application of newly developed molecular assays has demonstrated that a large proportion of these outbreaks may be caused by the "Norwalk-like viruses" (NLV), a genus of genetically related viruses belonging to the family Caliciviridae. NLV outbreaks associated with consumption of faecally contaminated oysters are frequently reported and can best be controlled by preventing contamination of oyster-harvesting waters. Infectious foodhandlers are another frequent source of contamination, and such transmission can be minimised by exclusion of ill foodhandlers and the maintenance of strict personal hygiene. Molecular assays have greatly refined the epidemiological investigation of foodborne NLV outbreaks, allowing the linking of outbreaks in different locations and permitting the identification of the virus in the implicated vehicle. The development of simpler and more sensitive assays and their use on a broader scale will assist in defining the true burden of foodborne NLV outbreaks and improve strategies for their prevention and control.

1996, a study of the etiology of diarrhea was carried out among 332 travelers to five all-inclusive hotels in Negril, Jamaica. METHODS: Stool specimens were collected and sent to Montego Bay for laboratory analysis. Escherichia coli strains isolated at the Jamaican laboratory were sent to Houston for toxin testing. RESULTS: A recognized enteropathogen was found in 118 of the 332 (35.5%) cases. Enterotoxigenic E. coli (ETEC) were the most commonly identified pathogen (87/332; 26.2%) followed by Salmonella (4.2%) and Shigella (4.2%). Clustering of etiologically defined cases was studied at each hotel. A cluster was defined as 2 or more cases with the same pathogen identified in the same hotel within 7 days. In the 3 hotels with the highest number of cases of diarrhea, enteropathogens were part of a cluster in 65 of 99 cases (65.7%) of diarrhea of which an etiologic agent was identified. In the other 2 hotels, only 4 of 20 cases (20%) occurred in clusters. CONCLUSIONS: A total of 25 clusters of travelers' diarrhea cases was detected at the five hotels during the study period. Seventeen of 25 (68%) ETEC isolations occurred as part of a clustering of diarrhea cases. The largest outbreak of pathogen-identified diarrhea consisted of 7 cases of ETEC producing both heat-stable and heat-labile enterotoxins. In the Jamaican hotels with all inclusive meal packages most diarrhea cases occurred as small clusters, presumably as the result of foodborne outbreaks.

Parish M.E. Public health and nonpasteurized fruit juices. Crit Rev Microbiol. 1997; 23(2) : 109-19p. Abstract: Well publicized outbreaks of foodborne illness have occurred in recent years due to consumption of commercial, nonpasteurized ("fresh" or "unpasteurized") fruit juices. Nonpasteurized and heat treated juices have been associated with at least 15 foodborne illness outbreaks since the early 1900s. Disease syndromes have included salmonellosis, typhoid fever, cryptosporidiosis, Escherichia coli-related diarrhea, and hemolytic uremia. Mortality has occasionally occurred during these outbreaks. An increase in the number of reported outbreaks in recent years possibly reflects greater consumption of fresh juices and closer scrutiny of these products by medical and public health authorities. This article reviews the fruit juice borne outbreaks in the 1900s, methods to control pathogens, and regulatory issues related to production of nonpasteurized fruit juices in the U.S.

Park Y.K. et al. Early recognized antigen (p34) of Toxoplasmagondii after peroral ingestion of tissue cyst forming strain (Me49 strain) in mice. Korean J Parasitol. 1999; 37(3) : 157-62p. Abstract: Serum from mouse orally ingested with tissue cyst forming strain (Me49) of Toxoplasma gondii was assayed by Western blot and immunofluorescence assay (IFA) to establish early responses in antigenicity of the parasite in mouse model of foodborne toxoplasmosis. Sera were collected weekly to blot the RH antigen transferred onto nitrocellulose paper after being separated by 12% SDS-PAGE. With the second week serum, 34 kDa protein (p34) was detected uniquely, and all antigens of T. gondii were detected with the sera from 3 or 4 weeks. p34 was not a member of the major surface membrane proteins and confirmed to be localized in the rhoptry by IFA. It was secreted into parasitophorous vacular membrane (PVM) during the entry into host cells. When applied to the human sera of which the ELISA absorbance was in negative range, 10.3% of sera detected p34, while all the ELISA positive sera detected the band. It has diagnostic usefulness of presumed T. gondii infection. We suggest the name of the p34 protein as ROP9.

Parrilla-Cerrillo M.C. et al. [Outbreaks of food poisonings of microbial and parasitic origins]. Salud Publica Mex. 1993; 35(5) : 456-63p. Abstract: In order to know the agents and foods related more frequently with food-borne disease outbreaks, we reviewed all the outbreaks studied between 1980 and 1989 by the National Laboratory of Public Health. A total of 79 outbreaks of food-borne diseases of microbial origin were reviewed. The causative agent was identified in 50 (73%) outbreaks. Twenty-four per cent of the outbreaks occurred in parties, 10.3 per cent in school or nurseries, 8.6 per cent in restaurants and 8.6 per cent in hospitals. Staphylococcus aureus was the most common agent, causing 48.2 per cent of the outbreaks. Salmonella enterica was involved in 34 per cent of them. The most frequent serovar was typhimurium. Foods involved were: cheese in 29.3 per cent of the cases; cakes in 15.5 per cent; cooked meat in 15.1 per cent; milk in 13.8 per cent; and fish and seafood in 7.0 per cent of the cases. Since the number of studied incidents represents only a small proportion of all the outbreaks occurring in the country, the constant exchange of information among the laboratories which work on the problem and the promotion of the health care team are necessary in order to improve the epidemiologic surveillance systems and the study and prevention of food-borne disease and food poisoning outbreaks.

Paton A.W. et al. Shiga toxin-producing Escherichia coli isolates from cases of human disease show enhanced adherence to intestinal epithelial (Henle 407) cells. Infect Immun. 1997; 65(9) : 3799-805p. Abstract: Shiga toxin-producing Escherichia coli (STEC) strains are a diverse group of organisms which are known to cause diarrhea and hemorrhagic colitis in humans. We have recently described a large food-borne outbreak of STEC disease caused by contaminated semidry fermented sausage (A. W. Paton, R. Ratcliff, R. M. Doyle, J. Seymour-Murray, D. Davos, J. A. Lanser, and J. C. Paton, J. Clin. Microbiol. 34:1622-1627, 1996). STEC strains belonging to several O serotypes were isolated from the contaminated food source, but of these, only a subset were isolated from patients with diarrhea or hemolytic-uremic syndrome (HUS). In the present study, we characterized these STEC isolates with respect to the presence of putative virulence-associated genes and the capacity to adhere to a human intestinal epithelial cell line (Henle 407). The O111:H- STEC strain 95NR1 (isolated from one of the outbreak HUS patients) was shown to adhere to Henle 407 cells in a dose-dependent, mannose-resistant fashion. Microscopic examination revealed a diffuse pattern of adherence for this as well as several other STEC strains. Interestingly, the adherence of STEC strains from HUS cases (both outbreak related and sporadic) was significantly greater than that of STEC strains found in the contaminated food source but not found in any patients. These studies support the hypothesis that an enhanced capacity to adhere to intestinal cells is one of the factors which distinguishes human-virulent STEC strains from those of lesser clinical significance.

serious human gastrointestinal disease, which may result in life-threatening complications such as hemolytic-uremic syndrome. Food-borne outbreaks of STEC disease appear to be increasing and, when mass-produced and mass-distributed foods are concerned, can involve large numbers of people. Development of therapeutic and preventative strategies to combat STEC disease requires a thorough understanding of the mechanisms by which STEC organisms colonize the human intestinal tract and cause local and systemic pathological changes. While our knowledge remains incomplete, recent studies have improved our understanding of these processes, particularly the complex interaction between Shiga toxins and host cells, which is central to the pathogenesis of STEC disease. In addition, several putative accessory virulence factors have been identified and partly characterized. The capacity to limit the scale and severity of STEC disease is also dependent upon rapid and sensitive diagnostic procedures for analysis of human samples and suspect vehicles. The increased application of advanced molecular technologies in clinical laboratories has significantly improved our capacity to diagnose STEC infection early in the course of disease and to detect low levels of environmental contamination. This, in turn, has created a potential window of opportunity for future therapeutic intervention.

**Pavia A.T. et al.** Hemolytic-uremic syndrome during an outbreak of Escherichia coli O157:H7 infections in institutions for mentally retarded persons: clinical and epidemiologic observations. *J Pediatr.* 1990; 116(4): 544-51p. **Abstract:** PURPOSE: To describe an outbreak of Escherichia coli O157:H7 infection resulting in a high rate of progression to hemolytic-uremic syndrome, and to attempt to identify predictors of and risk factors for progression. DESIGN: Case-control study among employees and comparison of daily clinical features in two groups: infected residents with subsequent development of HUS and those who had no complications. SETTING: Two institutions for retarded persons in Utah. PATIENTS: Twenty residents with E. coli O157:H7 infection (13 culture confirmed, 2 probable, and 5 possible); HUS developed in 8, and 4 died. Thirty-one infected employees (3 with culture-confirmed, 6 with probable, and 22 with possible infection). MEASUREMENTS and MAIN RESULTS: In a case-control study among employees, infection was independently associated with eating ground beef from a single lot prepared at several barbecues and with close contact with a resident who had diarrhea. Five of eight residents in whom HUS developed had received trimethoprim-sulfamethoxazole, compared with none of seven who had no subsequent complications (p = 0.026); this finding may reflect antimicrobial treatment of patients with more severe illness. Compared with infected residents without complications, persons with HUS were younger (median age 13 vs 27 years, p = 0.043) and, by the third day of illness, had higher leukocyte counts (median 23.7 X 10(9)/L vs 9.1 X 10(9)/L, p = 0.018) and temperature (median 38.5 degrees C vs 37.0 degrees C, p = 0.016). Leukocytosis peaked on day 4, more than 24 hours before signs of HUS appeared. CONCLUSIONS: Food-borne outbreaks of E. coli O157:H7 in institutions may have devastating effects. Leukocytosis and fever may precede and predict HUS in patients with E. coli O157:H7 infection.

**Payne M.A. et al.** The Food Animal Residue Avoidance Databank (FARAD). Past, present and future. *Vet Clin North Am Food Anim Pract.* 1999; 15(1) : 75-88p. **Abstract:** During the last one-and-one-half decades, FARAD has established an unparalleled compilation of residue and pharmacokinetic information for veterinary species. In order to fulfill its mission, FARAD has become as much a research project as an educational one. Pressing problems, such as disease-altered kinetics, minor-species drug use, and industrial contaminants in livestock, require the new methods of analysis FARAD is developing. The data upon which this work is based can be greatly augmented by participation by other nations. In the United States, it was the cooperation of both academic and regulatory organizations that made the success of FARAD possible. Similar international cooperation can facilitate use of the FARAD model in other countries for the economic benefit of all participants, enhancement of food safety, and promotion of animal welfare.

**Peeters E.T. et al.** Evaluation of bioassays versus contaminant concentrations in explaining the macroinvertebrate community structure in the Rhine-Meuse delta, The Netherlands. *Environ Toxicol Chem.* 2001; 20(12) : 2883-91p. **Abstract:** It is often assumed that bioassays are better descriptors of sediment toxicity than toxicant concentrations and that ecological factors are more important than toxicants in structuring macroinvertebrate communities. In the period 1992 to 1995, data were collected in the enclosed Rhine-Meuse delta, The Netherlands, on macroinvertebrates, sediment toxicity, sediment contaminant concentrations, and ecological factors. The effect of various groups of pollutants (polycyclic aromatic hydrocarbons, trace metals, oil, polychlorinated biphenyls) and of ecological variables on the structure of the macroinvertebrate community were quantified. Ecological factors explained 17.3% of the macroinvertebrate variation, while contaminants explained 13.8%. Another 14.7% was explained by the covariation between ecological variables and contaminants. Polycyclic aromatic hydrocarbons explained a larger part of the variation than trace metals. The contributions of oil and polychlorinated biphenyls were small but significant. Elevated contaminant concentrations were significantly associated with differences in the macroinvertebrate food web structure. The response in bioassays (Vibrio Fischeri, Daphnia magna, Chironomus riparius) was susceptible to certain contaminants but also to certain ecological factors. There was a weak correlation between in situ species composition and bioassays; 1.9% of in situ macroinvertebrate variation was explained by the bioassay responses. This seems to contradict the validity of using bioassays for a system-oriented risk assessment. Possible reasons for this discrepancy might be the manipulations of the sediment before the test and a higher pollutant tolerance of the in situ macroinvertebrates. Thus, macroinvertebrate field surveys and laboratory bioassays yield different types of information on ecotoxicological effects, and both are recommended in sediment risk assessment procedures.

**Pellizzari E. et al.** Population-based exposure measurements in EPA region 5: a phase I field study in support of the National Human Exposure Assessment Survey. *J Expo Anal Environ Epidemiol.* 1995; 5(3) : 327-58p. **Abstract:** The National Human Exposure Assessment Survey (NHEXAS) Phase I study is designed to be part of the total NHEXAS framework developed from a series of scientific discussions and workshops conducted by the U.S. Environmental Protection Agency (EPA) during 1992 and 1993. NHEXAS examines...
Peresi J.T. et al. [Food borne disease outbreaks caused by Salmonella enteritidis]. Rev Saude Publica. 1998; 32(5) : 477-83p. Abstract: OBJECTIVE: It is to describe outbreaks of salmonellosis reported from July 1993 through June 1997 in the Northwest region of S. Paulo State, Brazil, one of the areas where several foodborne outbreaks of salmonellosis have been recently detected. METHOD: Data of 19 epidemiological investigations were analysed; 87 stool specimens and 38 food samples (including 12 of shell eggs) were processed for microbiological analysis. Salmonella strains were identified by serotyping, phagetyping and antimicrobial susceptibility testing. RESULTS: There were 906 ill persons including 295 hospitalized patients. Phage type 4 (PT 4) Salmonella Enteritidis strains were isolated from 80.5% of stool samples, from all food samples and from 41.7% of eggs. Of the outbreaks, 95.7% were associated with the consumption of food containing raw or undercooked eggs. All strains were susceptible to the 13 antimicrobials, except the strains from the nosocomial outbreak. CONCLUSIONS: The results obtained show the need for the implementation of control measures regarding egg and storage, as well as for guidance to the public as to the risks involved in the consumption of inadequately prepared eggs.

Perez-Ciordia I. et al. [Salmonella enteritis in Huesca. 1996-1999]. Enferm Infecc Microbiol Clin. 2002; 20(1) : 16-21p. Abstract: BACKGROUND: The enteritis due to Salmonella is still an important cause of infectious gastroenteritis, that is responsible of 85% of the foodborne outbreaks in Spain. It represents without any doubt a public health problem that involves several health care services and preventive services. SUBJECTS AND METHOD: Using two sources of information: the National Diseases Surveillance System and the Microbiology Laboratories of the Hospitals (MLH) we estimated the incidence of Salmonella infection by the capture-recapture method. Besides, a descriptive study of the disease is done and the more frequent serogroups in the province of Huesca during the period 1996-1999. RESULTS: The total number of cases was 959, which means a media annual rate of 116.6 3 105. The estimated number of cases was 1,145 (media annual rate 5 139.5 3 105). The completeness is higher for the MLH (68%, CI 95%: 66-71). The group D is the more frequent (53.4%) and of this, specially the Salmonella enteritidis. 31% of the cases are under 5 years, and 38.2% are admitted to the hospital. The cases appear seasonally from May to September, with an important peak during the month of August. CONCLUSIONS: The improve in the notification and identification of cases by the reporting sources and by the Laboratory Services allowed us to better know the disease. Our results and the proportion of groups-serotypes are similar to the results of other studies.

Petersen B.J. Methodological aspects related to aggregate and cumulative exposures to contaminants with common mechanisms of toxicity. Toxicol Lett. 2003; 140-141 427-35p. Abstract: Consumers can be simultaneously exposed to more than one substance having a similar mechanism of toxicity. In those cases the total exposure should be computed (cumulative exposure). Computing aggregate and cumulative exposure requires the introduction of data about when the exposures occur and how much occurs simultaneously or within a given time frame for each substance. For example, in evaluating food exposures, ideally residues of all substances of interest will be measured in the same sample of food. Estimates of the decline in residues will be useful in circumstances where exposures do not begin and end at the same time. Typically, 'worst case' assumptions and models are too blunt to provide useful information about cumulative exposures. Therefore, data and algorithms that allow more realistic (if still conservative) assessment of aggregate and cumulative exposures are required. Several approaches, including Monte Carlo assessment methods are presented along with an evaluation of the strengths and limitations of each using a case study to illustrate the methodology and the data requirements. Understanding the major contributors to the estimated exposures is complicated and available tools and techniques will be demonstrated.

Petersen L.R. et al. Developing national epidemiologic capacity to meet the challenges of emerging infections in Germany. *Emerg Infect Dis.* 2000; 6(6): 576-84p. **Abstract:** In January 1996, the Robert Koch Institute, Germany's national public health institute, began strengthening its epidemiologic capacity to respond to emerging and other infectious diseases. Six integrated strategies were initiated: developing employee training, outbreak investigation, and epidemiologic research programs; strengthening surveillance systems; improving communications to program partners and constituents; and building international collaborations. By December 1999, five employees had completed a 2-year applied epidemiology training program, 186 health department personnel had completed a 2-week training course, 27 outbreak investigations had been completed, eight short-term research projects had been initiated, major surveillance and epidemiologic research efforts for foodborne and nosocomial infections had begun, and 16 scientific manuscripts had been published or were in press. The German experience indicates that, with a concerted effort, considerable progress can be achieved in a short time frame.

Petrone G. et al. Natural milk fatty acids affect survival and invasiveness of *Listeria monocytogenes*. *Lett Appl Microbiol.* 1998; 27(6): 362-8p. **Abstract:** The effects of 12 fatty acids, naturally occurring in milk from several mammalian species, on the survival and invasion ability of *Listeria monocytogenes*, a food-borne pathogen, were determined. The survival was tested in the presence of 200 micrograms ml-1 fatty acids suspended in brain heart infusion broth or in storage conditioning solution (NaCl 1%) of Mozzarella cheese, an Italian soft unripened cheese, at pH 7.0 or 5.0. Lauric (C12:0), linoleic (C18:2) and linolenic (C18:3) acids exerted the strongest bactericidal activity. The invasive efficiency of *L*. *monocytogenes*, determined in the Caco-2 enterocyte-like cell line, was strongly decreased in the presence of the fatty acids tested (from about 20 to 500-fold). This research suggests that naturally occurring fatty acids of milk, supplemented in milk derivatives, could affect both bacterial growth and invasiveness and consequently, could serve as barriers towards *L. monocytogenes* infection.


Pierre V. et al. [Prevention of *Listeria* infections]. *Bull Acad Natl Med.* 2000; 184(2): 295-302; discussion 302-3p. **Abstract:** Listeriosis is a rare but very serious foodborne disease. The non-contamination of food products is the best prevention of listeriosis. In spite of notable efforts to improve the microbiologic quality of food products through surveillance and control of food contaminations, the prevention has still to be based upon the information of consumers. This information can take different forms. When a food product is found to be contaminated with *Listeria monocytogenes*, if the withdrawal of this product does not occur as early as to prevent its commercialisation, a consumers alert is necessary to avoid any subsequent human case and to allow a rapid medical care of exposed persons in case of occurrence of symptoms of the disease. A specific information from health professionals to persons with risk factors of contracting listeriosis is a point of debate. Immunocompromised persons, for instance do not represent an easily defined group. On the other hand, pregnant women that are specially at risk of developing listeriosis, with potentially life threatening consequences for their foetus, represent a well identified population. They are medically monitored, and, because they feel concerned, most of them accept, during their pregnancy, to follow some simple rules that, sometimes, change their habits. At present, information is given to pregnant women by different ways: documents, leaflets, posters. The health authorities have decided to reinforce this information. They are also working on a special advisory meeting, specially targeted at foodborne diseases (including listeriosis), that could take place, for pregnant women, during the first months of their pregnancy.

Abstract: Traditionally, microbiological testing of meat products has involved isolating microorganisms and performing specific biochemical, and in some cases serological, tests to confirm the presence or absence of suspected food-borne pathogens. Given the public attention meat products have received as sources of food-borne disease, there has been considerable interest in the application of rapid detection techniques that require hours rather than days for completion. Theoretically, rapid detection methods could reduce the time from the initial sampling to confirmation so that conclusive results would be available by the time to process the meat product. Both direct gene probe hybridization as well as gene amplification methods show promise as rapid detection techniques. At present, direct gene probe hybridization are being commercially utilized to confirm the presence of a suspected pathogen. A number of gene amplification protocols for detecting food-borne bacterial pathogens have been published. However, many of these studies have utilized spiked samples rather than naturally contaminated samples and many of them have involved extended template extraction/purification methodologies. There is still only a very limited amount of information on the efficacies of the various protocols in detecting bacterial pathogens, especially toxigenic Escherichia coli, Salmonella spp., Campylobacter spp., and Listeria spp., in naturally contaminated food samples. In order to develop gene amplification protocols that have relevance to the meat industry, there must be a concerted effort to utilize naturally contaminated samples in the development and evaluation of protocols, as well as to initiate multilaboratory round robin evaluations of select protocols. Availability of multilaboratory tested methodologies would provide a means to design pathogen detection strategies at the quality control level rather than an end product confirmatory response to an already documented outbreak.

Pinner R.W. Addressing the challenges of emerging infectious disease. Am J Med Sci. 1996; 311(1) : 3-8p. Abstract: Through the recent examples of diphtheria in the former Soviet Union, plague in India, and trends in pneumonia mortality in the United States, the author, in this article, illustrates issues in emerging infectious diseases. The Centers for Disease Control's plan, Addressing Emerging Infectious Disease Threats: A Prevention Strategy for the United States, is summarized. Initial efforts to implement this plan are described, with particular focus on the development of Emerging Infections Programs, which are conducting epidemiologic and laboratory projects on several infectious diseases, including invasive bacterial diseases, unexplained deaths, foodborne diseases, and ehrlichiosis in four population-based sites in the United States.

Pohl H.R. et al. Breast-feeding exposure of infants to environmental contaminants—a public health risk assessment viewpoint: chlorinated dibenzodioxins and chlorinated dibenzofurans. Toxicol Ind Health. 1996; 12(5) : 593-611p. Abstract: Exposure of children to chlorinated dibenzodioxins and chlorinated dibenzofurans via breast-feeding has been well-documented in industrialized countries. Recent studies indicate a possible link between development of subtle health effects in children and their exposure to dioxin-like chemicals from maternal milk. Some samples of the effects are lower vitamin K levels, increased thyroxine levels, and mild changes in liver enzymes. The projected daily intakes of chlorinated dibenzodioxins and chlorinated dibenzofurans are compared with minimal risk levels for intermediate duration oral exposure (15-365 days) derived for these chemicals. Public health recommendations for future actions related to infant intake of chlorinated dibenzodioxin- and chlorinated dibenzofuran-contaminated breast milk are also addressed.

Poirier M.C. DNA adducts as exposure biomarkers and indicators of cancer risk. Environ Health Perspect. 1997; 105 Suppl 4 907-12p. Abstract: Quantitation of DNA adducts in human tissues has been achieved with highly sensitive techniques based on adduct radiolabeling, antisera specific for DNA adducts or modified DNA, and/or adduct structural characterization using chemical instrumentation. Combinations of these approaches now promise to elucidate specific adduct structures and provide concentration limits in the range of 1 adduct/10(9) nucleotides. Documentation of human exposure and biologically effective dose (i.e., chemical bound to DNA) has been achieved for a wide variety of chemical carcinogens, including polycyclic aromatic hydrocarbons (PAHs), aromatic amines, heterocyclic amines, aflatoxins, nitrosamines, cancer chemotherapeutic agents, styrene, and malondialdehyde. Due to difficulties in exposure documentation, dosimetry has not been precise with most environmental and occupational exposures, even though increases in human blood cell DNA adduct levels may correlate approximately with dose. Perhaps more significant are observations that lowering exposure results in decreasing DNA adduct levels. DNA adduct dosimetry for environmental agents has been achieved with dietary contaminants. For example, blood cell polycyclic aromatic hydrocarbon-DNA adduct levels were shown to correlate with frequency of charbroiled meat consumption in California firefighters. In addition, in China urinary excretion of the aflatoxin B1-N7-guanine (AFB1-N7-G) adduct was shown to increase linearly with the aflatoxin content of ingested food. Assessment of DNA adduct formation as an indicator of human cancer risk requires a prospective nested case-control study design. This has been achieved in one investigation of hepatocellular carcinoma and urinary aflatoxin adducts using subjects followed by a Shanghai liver cancer registry. Individuals who excreted the AFB1-N7-G adduct had a 9.1-fold adjusted increased relative risk of hepatocellular carcinoma compared to individuals with no adducts. Future advances in this field will be dependent on chemical characterization of specific DNA adducts formed in human tissues, more-precise molecular dosimetry, efforts to correlate DNA adducts with cancer risk, and elucidation of opportunities to reduce human DNA adduct levels.

Ponce R.A. et al. Twenty years of trace metal analyses of marine mammals in Alaska: evaluation and summation. Int J Circumpolar Health. 1998; 57 Suppl 1 576-81p. Abstract: The compilation of existing data on contaminants in the marine food chain is essential in addressing concerns regarding the magnitude of potential human exposures and in the evaluation of subsistence food safety. This paper presents a summary of studies on trace metals in tissues of Alaska marine mammals from the 1970s to the present, along with derived mean tissue trace metal concentrations. The derived mean can serve as a norm against which future monitoring results may be compared, and may be used to estimate human exposure to trace metals through the consumption of marine mammals. Additionally, the variation among studies in the reported mean tissue concentrations has been described through a derived standard deviation. Sufficient analytical and methodological details were available to derive means
consider the uncertainty regarding the burden of illness due to Escherichia coli O157:H7. The magnitude of uncertainty about the burden of food-related illness due to E. coli O157:H7 is substantial, ranging from less than 50,000 to more than 120,000 cases/year. This example underscores the importance of considering the uncertainty attendant to burden-of-illness estimates in comparing the public health impacts of different pathogens. Although some would argue that the expected value of the number of illnesses provides the "best estimate" for decision-making, this merely reflects a decision-making rule of convention and not a scientific truism.

Powell S.C. et al. An evaluation of epidemiological data in the control of foodborne viruses. Rev Environ Health. 1999; 14(1): 31-7p. Abstract: The Codex Committee on Food Hygiene has recommended the adoption of Hazard Analysis and Critical Control Point (HACCP) as the basis for food safety control. To provide an objective basis for the construction of HACCP systems, epidemiological data are required. The data should be accurate, up-to-date, and identify emerging pathogens, such as viruses. The number of laboratory reports of small, round-structured viruses in England and Wales has increased from 400 cases in 1990 to 2387 in 1996. Although a food vehicle is not essential for the spread of viral particles, food may be the primary unidentified vehicle. The Advisory Committee on the Microbiological Safety of Foods recommends the use of the Kaplan Criteria, which can give strong circumstantial evidence that an outbreak is attributable to small, round-structured viruses. The application of these criteria would give a more accurate reflection of the involvement of viruses in the incidence of foodborne disease. This review considers the use of epidemiological data to support HACCP and risk-assessment systems. It discusses the implications of focusing on traditional pathogens, for example Salmonella spp., as opposed to emerging pathogens, for the design of control systems. Recommendations are made for improving the system of data collection.

Pozio E. Current status of food-borne parasitic zoonoses in Mediterranean and African regions. Southeast Asian J Trop Med Public Health. 1991; 22 Suppl 85-7p. Abstract: Epidemiological data on food-borne parasitic zoonoses of Mediterranean and African regions are fragmentary. Several studies indicate that toxoplasmosis frequently occurs in Africa, but the epidemiological patterns in these countries are far from being complete. Serological investigations have been carried out with different methods and the results are
not always comparable. Food habits, presence or absence of domestic and/or synanthropic felines, and environmental characteristics (damp or dry areas) seem to influence the prevalence of infection in man from 15 to over 60%. There are few reports on Sarcocystis infection in man, while its presence in domestic and sylvatic animals is well evidenced. Cysticercosis infection in cattle is widespread in Africa with a prevalence ranging from 2 to 50% in relation to breeding and human habits. In European countries of the Mediterranean area, the prevalence of infection is below 2%. Cysticercosis infection in swine has almost disappeared in the Mediterranean area, while it is still present in some African countries. Human paragonimiasis is present in Western Africa with a prevalence ranging from 2 to 31%.

Heterophyasis in man is present in Egypt, Tunisia, and Middle East. Sylvatic trichinellosis is widespread in Mediterranean (Trichinella sp.3) and African (T. nelsoni, Trichinella T8) regions. Domestic trichinellosis (T. spiralis spiralis) is present in Spain, France, Yugoslavia, Egypt, Gambia, and Nigeria in domestic and/or sylvatic animals. In Africa human trichinellosis is rare, mostly from religious and food habits. Till now very few control projects against foodborne parasitic zoonoses have been developed in Africa.

Pronzczuk J. et al. Global perspectives in breast milk contamination: infectious and toxic hazards. Environ Health Perspect. 2002; 110(6): A349-51p. Abstract: Breast milk is the natural and optimal food for infants. In addition to meeting nutritional needs, breast milk provides numerous immunologic, developmental, psychologic, economic, and practical advantages. It is postulated that breast-feeding may also be related to the prevention of some adult health problems such as diabetes and coronary heart disease. Malnutrition among infants and young children, which remains one of the most severe global public health problems, is among the main reasons that the World Health Organization (WHO) so strongly supports breast-feeding. However, WHO recognizes the growing concern expressed by scientists, health professionals, environmentalists, and mothers about the potential risks posed by the presence of toxicants and infectious agents in breast milk. In this paper we review the main infectious hazards (tuberculosis, hepatitis B, and human immunodeficiency virus) and selected chemical hazards (tobacco, persistent contaminants) and the activities undertaken by WHO. We conclude that in cases where there is a high degree of pollution from chemical sources occurring simultaneously in a bacterially contaminated environment, the choice is not simply between polluted breast milk and risk-free substitutes. Rather, informed choice is based on assessing the known and unknown risks of artificial feeding versus the unknown, but potential, risks of chemical contamination of breast milk. Clearly, the possible toxicity of compounds requires further investigation. Of much greater importance, however, are effective measures to protect the environment for the entire population by controlling the use of these toxic products. Current scientific evidence does not support altering WHO's global public health recommendation of exclusive breast-feeding for 6 months followed by safe and appropriate complementary foods, with continued breast-feeding, up to 2 years of age or beyond.

Przybyska A. [Collective outbreaks of foodborne infections and intoxications in Poland in 1985-1999]. Przegl Epidemiol. 2001; 55(3): 261-73p. Abstract: In outbreaks of foodborne infections and intoxications in 1985-1999 in Poland among salmonellas S. Enteritidis amounted for 84.9% in 1986 and 97.8% in 1991-1992. In 1985-1999, among the total number of diseases in outbreaks most of the cases occurred after eating of the dishes made from eggs (over 50%). In 1987-1999, food prepared in private homes had the largest influence on the occurrence of the outbreaks (up to 65.4% of outbreaks). The private homes were also the most frequent places of the consumption of that food. Contamination of the ready-made dishes was found to be due to the raw materials, mainly eggs coming from private farms. In Poland and in neighboring countries Salmonella of animal's source determines the epidemiological situation of foodborne infections and intoxications.

Puohiniemi R. et al. Molecular epidemiology of two international sprout-borne Salmonella outbreaks. J Clin Microbiol. 1997; 35(10): 2487-91p. Abstract: Sprout-borne Salmonella outbreaks in Finland have increased during the last 10 years. The latest two were caused by Salmonella enterica serovar Bovismorbificans (antigenic structure 6,8:r:1,5) in 1994 and S. enterica serovar Stanley (4,5,12:d:1,2) in 1995. In this study, the restriction fragment length polymorphism of genomic DNA after pulsed-field gel electrophoresis (PFGE) and antimicrobial resistance profiles of the outbreak and nonoutbreak strains were compared. In each separate outbreak, the PFGE patterns of the outbreak strains (40 strains of S. enterica serovar Bovismorbificans and 28 strains of S. enterica serovar Stanley) after digestion of genomic DNA with restriction enzyme XbaI were indistinguishable from each other but differed clearly from those of the nonoutbreak strains (26 strains of S. enterica serovar Bovismorbificans and 40 strains of S. enterica serovar Stanley). The restriction enzyme Xhol did not differentiate the outbreak and nonoutbreak strains. The S. enterica serovar Stanley strains associated with the outbreak also had a unique antimicrobial resistance pattern, whereas all S. enterica serovar Bovismorbificans strains, both outbreak and nonoutbreak strains, were sensitive to all antimicrobial agents tested. Thus, the molecular typing confirmed that the S. enterica serovar Bovismorbificans outbreak isolates from humans and sprout salad were identical and strongly supported the epidemiological finding that S. enterica serovar Stanley outbreak isolates also originated from contaminated alfalfa seeds. It also confirmed that the sources of similar outbreaks in Sweden in 1994 caused by S. enterica serovar Bovismorbificans and in the United States in 1995 caused by S. enterica serovar Stanley and the source of the Finnish outbreaks were common.

Pusterla N. et al. Clinical findings in cows after experimental infection with Ehrlichia phagocytophila. Zentralbl Veterinarmed A. 1997; 44(7): 385-90p. Abstract: The goal of this study was to determine the clinical signs and course of disease in five lactating cows and in five dry cows after experimental infection with Ehrlichia phagocytophila. Ten clinically healthy Swiss Braunvieh cows, seronegative for E. phagocytophila, were injected with 50 ml of whole blood containing E. phagocytophila. The cows were examined daily for 21 days, and blood samples were collected for microscopic examination of leukocytes for the infective agent. All cows became ill with symptoms of tick-borne fever after an incubation period of 5 to 9 days. The most important clinical signs were pyrexia (40.2-41.7 degrees C), decreased milk production and mildly to moderately disturbed general condition. In addition, there were respiratory symptoms such as polypnea, nasal discharge,
cough and abnormal lung sounds. Clinical signs returned to normal in all cows without treatment after an average of 8 days. E. phagocytophila bodies were seen in leukocytes 5-8 days after infection and were present for 6-14 days. The course of disease was more severe in dry cows than in lactating cows. It can be concluded that experimental infection of cows with E. phagocytophila generally has a mild course. However, the associated decrease in milk production may be of economic importance.

Q

Qadri S.M. et al. Enterohemorrhagic Escherichia coli. A dangerous food-borne pathogen. Postgrad Med. 1998; 103(2): 179-80, 185-7p. Abstract: Since 1982, several outbreaks of hemorrhagic colitis due to EHEC, or E coli O157:H7, have occurred in the United States and other parts of the world. Contaminated, undercooked ground beef has been most frequently implicated in the outbreaks, although unpasteurized dairy products and other foods have also been the source of infection in sporadic cases. The most common clinical manifestation of EHEC infection is abdominal cramps and watery, bloody diarrhea. HUS secondary to the initial colitis develops in about 10% of patients under 10 years of age. Definitive diagnosis is made by isolation and identification of EHEC in stool samples. Treatment focuses on rehydration and supportive therapy. The use of antimicrobial agents, narcotics, or antimotility agents is not recommended, because they neither shorten the course of illness nor prevent the development of sequelae.

Quick R.E. et al. Diarrhoea prevention in Bolivia through point-of-use water treatment and safe storage: a promising new strategy. Epidemiol Infect. 1999; 122(1): 83-90p. Abstract: A novel water quality intervention that consists of point-of-use water disinfection, safe storage and community education was field tested in Bolivia. A total of 127 households in two periurban communities were randomized into intervention and control groups, surveyed and the intervention was distributed. Monthly water quality testing and weekly diarrhoea surveillance were conducted. Over a 5-month period, intervention households had 44% fewer diarrhoea episodes than control households (P = 0.002). Infants <1 year old (P = 0.05) and children 5-14 years old (P = 0.01) in intervention households had significantly less diarrhoea than control children. Campylobacter was less commonly isolated from intervention than control patients (P = 0.02). Stored water in intervention households was less contaminated with Escherichia coli than stored water in control households (P < 0.0001). Intervention households exhibited less E. coli contamination of stored water and less diarrhoea than control households. This promising new strategy may have broad applicability for waterborne disease prevention.

Quiroz E.S. et al. An outbreak of cryptosporidiosis linked to a foodhandler. J Infect Dis. 2000; 181(2): 695-700p. Abstract: In September and October 1998, a cryptosporidiosis outbreak occurred on a Washington, DC, university campus. In a case-control study of 88 case patients and 67 control subjects, eating in 1 of 2 cafeterias was associated with diarrheal illness (P<.001). Morbidity was associated with eating dinner on 22 September (odds ratio, 8.1; 95% confidence interval, 3.4-19.5); weaker associations were found for 6 other meals. Cryptosporidium parvum was detected in stool specimens of 16 (70%) of 23 ill students and 2 of 4 ill employees. One ill foodhandler with laboratory-confirmed C. parvum prepared raw produce on 20-22 September. All 25 Cryptosporidium isolates submitted for DNA analysis, including 3 from the ill foodhandler, were genotype 1. This outbreak illustrates the potential for cryptosporidiosis to cause foodborne illness. Epidemiologic and molecular evidence indicate that an ill foodhandler was the likely outbreak source.

R

Rainard P. et al. The kinetics of inflammation and phagocytosis during bovine mastitis induced by Streptococcus agalactiae bearing the protein X. Vet Res Commun. 1991; 15(3): 163-76p. Abstract: The protein X of Streptococcus agalactiae is a surface antigen borne by a high proportion of strains isolated from bovine mastitis. We have tested the capacity of two strains of X-bearing Streptococcus agalactiae to induce mastitis in dairy cows. The reference X-strain (411.07) produced an intramammary infection with local clinical signs in the three inoculated quarters. Another X-bearing strain (443.31) of bovine origin produced infection in all 11 quarters inoculated with only 25 or 85 colony-forming units. In naïve cows, strain 433.31 induced less exudation of plasma into the milk, shedding of bacteria, macroscopic alteration, and a lower somatic cell count (SCC) than did the reference strain. Only one quarter spontaneously eliminated the infection before antibiotic treatment 9 days after inoculation. The serum of all the cows contained naturally acquired or induced antibodies to the challenge strain (443.31) and possessed opsonic activity. Before inflammation occurred, the milk was almost devoid of antibody or opsonic activities. The early phase of infection was characterized by rapid multiplication of streptococci in the milk, followed by a sharp drop in bacterial counts concomitant with the onset of inflammation. Three cows immunized with protein X displayed higher SCC and bactericidal activity in milk from the inoculated quarter at the onset of inflammation than non-immunized cows. Two of the three immunized cows underwent an early and transient febrile episode and eliminated the infection.


Ralovich B. Problems of microbial zoonoses in Hungary. (A review). Acta Microbiol Immunol Hung. 1997; 44(3): 197-221p. Abstract: Hungarian data of 36 zoonotic diseases are summarized. These illnesses cause problems not only for health, public health and veterinary health services but for the society and their importance has increased. Changing character of an old pathogen (Salmonella enteritidis PT4) resulted in new epidemiological situation. The number of cases of food-borne zoonotic diseases has rapidly grown. The number of pets has elevated and in consequence the possibility of an infection of owners, breeders, sellers and other persons has also grown. Growing number of HIV positive patients as well as ill persons treated with immunosuppressive drugs increases the importance of opportunistic zoonotic pathogens (Cryptosporidium, Toxoplasma). The most effective and less expensive way to prevent an exposed population is the active immunization (BCG, tetanus, tick-borne encephalitis). Active immunization of animals can also reduce probability of human infections.
and economic losses (leptospirosis, rabies). In special cases it is advised to perform eradication programmes to get pathogenic-free domestic animals (brucellosis, bovine tuberculosis, salmonellosis, campylobacteriosis). Permanent surveillance is obligatory to recognize changing nature of pathogens, alteration of epidemiological situation and to identify areas for further research. Continuous education of population in general and special teaching of risky groups are very important for an effective prevention.

Reed B.A. et al. Controlling on-farm inventories of bulk-tank raw milk--an opportunity to protect public health. J Dairy Sci. 2000; 83(12) : 2988-91p. Abstract: Hazard Analysis Critical Control Point programs provide a systematic approach for the reduction of food safety problems through preventive measures. On-farm programs similar to Hazard Analysis Critical Control Point, which target pathogen reduction and screening can provide assurance to processors and consumers that on-farm food safety is a high priority. Additional voluntary oversight of farm practices, including monitoring of and controlled access to raw milk supplies on the farm could further contribute to public food safety. Off-farm sales of raw milk directly to the public have resulted in foodborne outbreaks of multidrug resistant salmonellosis in California and Washington when raw milk was used for unlicensed cheese production. If dairy producers in those cases had voluntary programs in place to inventory, monitor, and control access to raw milk supplies, the outbreaks probably could have been prevented.

Reiff F.M. et al. Low-cost safe water for the world: a practical interim solution. J Public Health Policy. 1996; 17(4) : 389-408p. Abstract: A very large segment of the world's population is without a microbiologically safe water supply. It is estimated that in Latin America more than 40% of the population is utilizing water of dubious quality for human consumption. This figure is probably even higher in Africa and areas of southeast Asia. Water used for drinking and food preparation can be an important route of transmission for many of the most widespread and debilitating of the diseases that afflict humans. The cholera pandemic which struck Latin America in January 1991, and has become endemic in many of the countries, continues to exemplify the public health significance of contaminated drinking water. Ideally, this neglected segment of the world's population should be served with piped water systems that provide a continuous supply of microbiologically safe water, but this would require such enormous investments of financial and human resources that it is not reasonable to expect that it will be accomplished. Interim practical measures to assure microbiologically safe water are necessary. The public health intervention to accomplish this is described in this paper and has an annual per family cost of which ranges between $1.50 and $4. It consists of providing individual households with one or preferably two suitable water containers in which to disinfect and store the essential quantities of water that need to be free of pathogens, with the containers of a design that will preclude recontamination of the contents and enable the production and distribution of the water disinfectants to be managed at the local level. It includes the necessary component of public education, promotion and involvement to establish the sustainability of the measures as a community-based endeavor. Investigation and demonstration projects are being carried out in II countries to determine and perfect and appropriate intervention, and it has been proven that it is economically, technically and socially feasible to assure microbiologically safe water for the world's population that is threatened by waterborne diseases. Carefully controlled microbiological analysis of the untreated and treated water shows that waterborne pathogens can be destroyed or inactivated, and carefully controlled epidemiological studies being carried out by the Centers for Disease Control and Prevention show that this intervention achieves considerable reduction in the incidence of waterborne disease. It is recommended that all developing countries initiate programs to replicate the health measure described in this paper in order to test its validity and to adapt it to their local conditions.

Rejmank L. et al. Impact of infecting dose on severity of disease in an outbreak of food-borne Salmonella enteritidis. Scand J Infect Dis. 1997; 29(1) : 37-40p. Abstract: We conducted a cross-sectional study 72 h after a private dinner party, at which 33/59 participants (attack rate 56%) became infected with Salmonella enteritidis, phage type 6. All were interviewed and stool samples were obtained from 55 persons (93%). Only 2/33 cases were asymptomatic (6%). The median incubation period was 21 h. 14 of the cases (42%) were admitted to hospital. A significant association was found between infection and 1 of the egg-containing dishes (kabab). Cross-contamination to other dishes was likely. As an indirect measure of infecting dose, all persons were divided into exposure groups according to self-reported amount of consumed kabab, which was associated with risk of becoming ill (p = 0.00002) and the risk of hospitalization (p = 0.0005). Among the symptoms experienced by the patients, only fever was significantly associated with the amount of consumed kabab (p = 0.008). The present data suggest an existence of a dose-effect relationship in infections with S. enteritidis, phage type 6.


Rieger M.A. et al. [Tick-borne encephalitis transmitted by raw milk--what is the significance of this route of infection? Studies in the epidemic region of South-West Germany]. Gesundheitswesen. 1998; 60(6) : 348-56p. Abstract: Despite the observation of TBE cases after consumption of raw milk from cows or goats, so far the proof of the alimentary route of human infection has not been possible. In the regions of southwestern Germany, where TBE is known to be endemic, milk-borne TBE infections have not yet been observed. To assess the significance of raw milk consumption for viral transmission, a cross-sectional study (114 forestry workers, 177 individuals exposed during their leisure-time activities, 170 non-exposed individuals) and a case-control study (50 TBE patients, 150 controls) were carried out. The results of the study show that both the time spent in the endemic region and also the professional exposure to ticks do influence TBE seroprevalence, whereas the consumption of raw milk (milk directly from the farmer) is no major risk factor for TBE infection or disease. Among leisure-time activities, only hunting has an effect comparable to the one of the professional exposure to ticks. Besides epidemiological data obtained in humans, serological investigations of cows were performed. Here it is shown that milk-producing
animals are involved in the natural transmission of TBE virus. Since former studies had shown that TBE-viremic animals excrete the virus with the milk—although over a short period and in low concentrations—the occurrence of milk-borne TBE infections cannot be excluded in the endemic regions of south-western Germany. However, from the epidemiological point of view, their significance may be neglected. Vaccination has proven the most reliable means of TBE prevention, irrespective of the route of infection.

Riemann H.P. et al. Microbial food borne pathogens. Escherichia coli O157:H7. Vet North Am Food Anim Pract. 1998; 14(1) : 41-8p. Abstract: Escherichia coli O157:H7 has emerged in the past 20 years as a pathogen of public health importance. Although most E. coli are normal flora in the colons of humans and other warm-blooded animals, several strains are capable of causing disease in humans. In recent years, E. coli O157:H7 and other shiga-like toxin-producing strains have been transmitted via foods and caused disease ranging from bloody diarrhea, and in more severe cases, hemolytic uremic syndrome and thrombocytopenic purpura. The reservoir appears to be cattle and, perhaps, other ruminants. Control is difficult in nonheated foods due to the organism’s tolerance to low pH. Only supportive, symptomatic treatment is available for affected humans, and means to eliminate carriage in livestock are not presently available.

Ritter L. et al. Sources, pathways, and relative risks of contaminants in surface water and groundwater: a perspective prepared for the Walkerton inquiry. J Toxicol Environ Health A. 2002; 65(1) : 1-142p. Abstract: On a global scale, pathogenic contamination of drinking water poses the most significant health risk to humans, and there have been countless numbers of disease outbreaks and poisonings throughout history resulting from exposure to untreated or poorly treated drinking water. However, significant risks to human health may also result from exposure to nonpathogenic, toxic contaminants that are often globally ubiquitous in waters from which drinking water is derived. With this latter point in mind, the objective of this commission paper is to discuss the primary sources of toxic contaminants in surface waters and groundwater, the pathways through which they move in aquatic environments, factors that affect their concentration and structure along the many transport flow paths, and the relative risks that these contaminants pose to human and environmental health. In assessing the relative risk of toxic contaminants in drinking water to humans, we have organized our discussion to follow the classical risk assessment paradigm, with emphasis placed on risk characterization. In doing so, we have focused predominantly on toxic contaminants that have had a demonstrated or potential effect on human health via exposure through drinking water. In the risk assessment process, understanding the sources and pathways for contaminants in the environment is a crucial step in addressing (and reducing) uncertainty associated with estimating the likelihood of exposure to contaminants in drinking water. More importantly, understanding the sources and pathways of contaminants strengthens our ability to quantify effects through accurate measurement and testing, or to predict the likelihood of effects based on empirical models. Understanding the sources, fate, and concentrations of chemicals in water, in conjunction with assessment of effects, not only forms the basis of risk characterization, but also provides critical information required to render decisions regarding regulatory initiatives, remediation, monitoring, and management. Our discussion is divided into two primary themes. First we discuss the major sources of contaminants from anthropogenic activities to aquatic surface and groundwater and the pathways along which these contaminants move to become incorporated into drinking water supplies. Second, we assess the health significance of the contaminants reported and identify uncertainties associated with exposures and potential effects. Loading of contaminants to surface waters, groundwater, sediments, and drinking water occurs via two primary routes: (1) point-source pollution and (2) non-point-source pollution. Point-source pollution originates from discrete sources whose inputs into aquatic systems can often be defined in a spatially explicit manner. Examples of point-source pollution include industrial effluents (pulp and paper mills, steel plants, food processing plants), municipal sewage treatment plants and combined sewage-storm-water overflows, resource extraction (mining), and land disposal sites (landfill sites, industrial impoundments). Non-point-source pollution, in contrast, originates from poorly defined, diffuse sources that typically occur over broad geographical scales. Examples of non-point-source pollution include agricultural runoff (pesticides, pathogens, and fertilizers), storm-water and urban runoff, and atmospheric deposition (wet and dry deposition of persistent organic pollutants such as polychlorinated biphenyls [PCBs] and mercury). Within each source, we identify the most important contaminants that have either been demonstrated to pose significant risks to human health and/or aquatic ecosystem integrity, or which are suspected of posing such risks. Examples include nutrients, metals, pesticides, persistent organic pollutants (POPs), chlorination by-products, and pharmaceuticals. Due to the significant number of toxic contaminants in the environment, we have necessarily restricted our discussion to those chemicals that pose risks to human health via exposure through drinking water. A comprehensive and judicious consideration of the full range of contaminants that occur in surface waters, sediments, and drinking water would be a large undertaking and clearly beyond the scope of this article. However, where available, we have provided references to relevant literature to assist the reader in undertaking a detailed investigation of their own. The information collected on specific chemicals within major contaminant classes was used to determine their relative risk using the hazard quotient (HQ) approach. Hazard quotients are the most widely used method of assessing risk in which the exposure concentration of a stressor, either measured or estimated.

Riviera L. et al. Listeria monocytogenes infections: the organism, its pathogenicity and antimicrobial drugs susceptibility. New Microbiol. 1993; 16(2) : 189-203p. Abstract: L. monocytogenes can induce serious, life-threatening infections. Multiple clinical manifestations of the disease include neonatal and perinatal listeriosis, infections in adult immunocompromised patients as well as in normal hosts, with the CNS as the more frequent site involved. Many outbreaks are believed to be food-borne in origin, but there can be other means of transmission. The susceptibility of L. monocytogenes to different antimicrobial drugs is reviewed. Many drugs that are highly effective in vitro show only a moderate activity in vivo, due either to their poor ability to enter the phagocytes and destroy the engulfed bacteria, as with the beta-lactams, ampicillin and amoxicillin, or to their bacteriostatic rather than bactericidal activity, as with the fluoroquinolones, or their affinity for a serum glycoprotein.
Robles P. et al. Ultrastructural and temporal observations of the potyvirus cylindrical inclusions (CIs) show that the CI protein acts transiently in aiding virus movement. *Virology.* 1998; 245(1): 173-81p. Abstract: A systematic ultrastructural study across the edge of an advancing infection in pea seed-borne mosaic potyvirus-infected pea cotyledons showed the cylindrical inclusion (CI) protein to exist in transient functional states. Initially, the characteristic CI pinwheel inclusion bodies were positioned centrally over the plasmodesmal apertures (including those of plasmodesmata connected to the previously infected cell), in agreement with a proposed role in virus movement (Carrington et al., 1998, Plant J., 13, in press). The viral coat protein was associated with these structures and was seen within the modified plasmodesma, most notably in a continuous channel that passed along the axis of the pinwheel and through the plasmodesma. The CI protein was not detected within the plasmodesmal cavities. Later in the infection (i.e., behind the zone of active virus replication) the CI was no longer associated with cell walls, or with coat protein, and showed signs of structural degeneration. In contrast, the coat protein remained within plasmodesmal cavities. The role of the CI in assisting virus movement is not known but the presence of the CI was linked with an apparent transient reduction in callose in the vicinity of the plasmodesmata.

Roberts I.M. et al. The socio-economic impact of human Salmonella enteritidis infection. *Int J Food Microbiol.* 1994; 21(1-2): 117-29p. Abstract: Recent government and public concern about the recorded increase in human salmonellosis in the UK and abroad has stimulated investigations of both the causes and consequences of these infections. This paper discusses the framework for economic analysis of food-borne disease and problems associated with the estimation of costs. A brief review of the literature in this area is given and the results of a national study of the costs of salmonellosis in the UK and abroad has stimulated investigations of both the causes and consequences of these infections. We present the common occurring persistent pesticides and industrial chemicals in breast milk. These chemicals are dichlorodiphenyl trichloroethane as dichlorodiphenyl dichloroethene, chlordane as oxychlordane, heptachlor, polychlorinated biphenyls, polychlorinated dibenzo-dioxid, and polychlorinated dibenzod浔eins. We present a worked example of the kinds of pharmacokinetic assumptions and calculations necessary for setting regulatory limits of contaminants in the food supply, calculating dose of chemical contaminants to the nursed infant, estimating risks from lifetime exposure in laboratory animals to risks for short-term exposure in humans, and estimating the excess cancer risk to the infant.


Roblot P. et al. Retrospective study of 108 cases of botulism in Pottiers, France. *J Med Microbiol.* 1994; 40(6): 379-84p. Abstract: Botulism, a food-borne toxin-mediated disease caused by Clostridium botulinum is still a common disease, which is most frequent in the rural environment; 108 cases, 66 males and 42 females, average age 32 years, were recorded from 1965 to 1990 in the infectious disease department of the University Hospital of Pottiers (France). In 83% of patients, the food responsible was home-cured ham. Mean incubation time was 3.4 days; digestive symptoms were observed in 93% of cases, ocular symptoms in 92% and urinary tract dysfunction in 22%. A scale of severity was used to classify the patients into those suffering from severe (6), intermediate (50) and mild (52) forms of the disease. Botulinum toxin type B was found in 36 (52%) of 69 blood samples and in 41 (51%) of 81 samples of the suspected food. From 1965 to 1976, 44 patients were treated with both toxoid and heterologous equine serotherapy. Since 1976, 29 patients have been treated with guanidine hydrochloride (35 mg/kg daily) and 35 patients with guanidine hydrochloride plus heterologous serotherapy. All 108 patients recovered without any sequelae.

Rocourt J. et al. Epidemiology of human listeriosis and seafoods. *Int J Food Microbiol.* 2000; 62(3): 197-209p. Abstract: While rarely diagnosed prior to 1960, more than 10,000 cases of listeriosis were recorded in the medical literature between 1960 and 1982, and thousands more have been reported annually worldwide [Rocourt J., 1991. Human listeriosis, 1989. WHO/HPF/FOS/91.3, World Health Organization, Geneva, Switzerland; Rocourt, J., Brosch, R., 1992. Human listeriosis, 1990. WHO/HPF/FOS/92.3, World Health Organization, Geneva, Switzerland; Rocourt, J., Jacquet, Ch., Bille, J., 1997. Human listeriosis, 1991/1992. WHO/FNU/FOS/97.1, World Health Organization, Geneva, Switzerland]. This widespread increase in reporting is most likely due to demographic trends and changes in food production, processing and storage, especially the extended cold food chain and the ability of Listeria monocytogenes to grow at low temperatures: L. monocytogenes is a bacterium responsible for opportunistic infections, preferentially affecting individuals whose immune system is perturbed, including pregnant women, newborns, people over 65 years, immunocompromised patients, such as cancer victims, transplant recipients, people on hemodialysis and AIDS patients. Thus, the increasing lifespan and medical progress allowing immunodeficient individuals to survive, partially explains the increasing incidence of listeriosis. Moreover, L. monocytogenes is ubiquitous and can grow at temperatures as low as 0 degrees C. At this temperature growth is very slow. The expansion of the agro-food industry, the widespread use of systems of cold storage and changes in consumers demands tend to lead to a large increase in the pool of Listeria that can cause foodborne infections.

Rogan W.J. et al. Chemical contaminants, pharmacokinetics, and the lactating mother. *Environ Health Perspect.* 1994; 102 Suppl 11 89-95p. Abstract: We review the commonly occurring persistent pesticides and industrial chemicals in breast milk. These chemicals are dichlorodiphenyl trichloroethane as dichlorodiphenyl dichloroethene, chlordane as oxychlordane, heptachlor, polychlorinated biphenyls, polychlorinated dibenzo-furan, and polychlorinated dibenzod浔eins. We present a worked example of the kinds of pharmacokinetic assumptions and calculations necessary for setting regulatory limits of contaminants in the food supply, calculating dose of chemical contaminants to the nursed infant, considering risks from lifetime exposure in laboratory animals to risks for short-term exposure in humans, and estimating the excess cancer risk to the infant.

Rohner P. et al. Etiological agents of infectious diarrhea: implications for requests for microbial culture. *J Clin Microbiol.* 1997; 35(6): 1427-32p. Abstract: Gastrointestinal infections remain a frequent disease worldwide. In order to increase our knowledge of the epidemiology for our patient population, we retrospectively analyzed the results obtained for stool samples received at the clinical microbiology laboratory of the University Hospital of Geneva during a 4-year period. A total of 13,965 specimens...
from 7,124 patients (1.96 specimens per patient) were cultured, yielding 369 (2.6%) Salmonella spp., 408 (2.9%) Campylobacter spp., and 79 (0.6%) Shigella spp. The cumulative positivity rate of 6.1% decreased to 2.7% when patients received antimicrobial agents (P < 0.001). The positivity rate for 5,912 specimens obtained from patients hospitalized for < or = 3 days was 12.6%, whereas it dropped to 1.4% for patients hospitalized for > 3 days (P < 0.001). Of 3,837 stool samples originating from pediatric patients, 8.8% were positive, and 5.1% of 10,128 samples from adults were positive (P < 0.001). The cytotoxin of Clostridium difficile was detected in 379 of 3,723 samples analyzed (10.2%), and rotaviruses were detected in 190 of 1,601 samples (11.9%). We recommend that the use of cultures for enteric bacterial pathogens be restricted to patients hospitalized for < or = 3 days, with the exceptions of follow-up samples, specimens from immunocompromised patients, and patients whose first sample was culture negative or in the rare event of nosocomial food-borne outbreaks. For patients under antimicrobial therapy, testing for cytotoxin of C. difficile should primarily be requested; this analysis should also be accepted for samples from patients not receiving antimicrobial agents at the time of specimen collection. By applying these restrictions, we could have saved at least $5,000 annually.

Rohwer R.G. Analysis of risk to biomedical products developed from animal sources (with special emphasis on the spongiform encephalopathy agents, scrapie and BSE). Dev Biol Stand. 1996; 88 247-56p. Abstract: Factors that must be considered in estimations of risk from exposure to adventitious contaminants of animal derived biologicals include: (i) the use of the product; (ii) the routes of administration and exposure to potential pathogens; (iii) the source of animal(s) and their history and maintenance; (iv) the tissue(s) used in the product and their likelihood of harbouring or being contaminated by an agent; (v) the methods by which the animal is slaughtered and the tissue(s) collected; (vi) the production process including steps that remove an agent either by inactivation or physical separation; (vii) the disposal of an agent that is sequestered but not inactivated; (viii) flow control, barriers, and between-batch cleaning; (ix) batch size; and (x) validations and quality assurance monitoring. The transmissible spongiform encephalopathy (TSE) agents, scrapie and bovine spongiform encephalopathy (BSE) are among the most difficult to detect and remove from animal tissues. As such they constitute an especially stringent challenge for viral clearance.

Rojas-Molina N. et al. Gnathostomiasis, an emerging foodborne zoonotic disease in Acapulco, Mexico. Emerg Infect Dis. 1999; 5(2) : 264-6p. Abstract: Between 1993 and 1997, 98 gnathostomiasis cases were clinically identified in Acapulco, Mexico. Intermittent cutaneous migratory swellings were the commonest manifestation. Larvae were identified in 26 cases, while in 72, final diagnosis was made on the basis of epidemiologic data, food habits, and positive enzyme-linked immunosorbent assay and Western blot results.

Rouveaux O. et al. A Campylobacter coli foodborne outbreak in Belgium. Acta Clin Belg. 2000; 55(6) : 307-11p. Abstract: In May 1995, the Scientific Institute of Public Health was informed of an outbreak of gastrointestinal illness in a congregational school in the Brussels area. The field investigation identified 24 cases with mild to severe gastrointestinal and general symptoms of acute bacterial enterocolitis. Campylobacter coli was detected in the stools of 5 patients. A retrospective cohort study suggested that a mixed salad (containing ham and feta cheese) was the probable source of infection, but the route of contamination remained unknown. The rapid investigation of such episodes of collective foodborne infections is essential for the implementation of adequate control measures.

Ropkins K. et al. Controlling organic chemical hazards in food manufacturing: a hazard analysis critical control points (HACCP) approach. Nahrung. 2002; 46(4) : 258-69p. Abstract: Hazard analysis by critical control points (HACCP) is a systematic approach to the identification, assessment and control of hazards. Effective HACCP requires the consideration of all hazards, i.e., chemical, microbiological and physical. However, to-date most ‘in-place’ HACCP procedures have tended to focus on the control of microbiological and physical food hazards. In general, the chemical component of HACCP procedures is either ignored or limited to applied chemicals, e.g., food additives and pesticides. In this paper we discuss the application of HACCP to a broader range of chemical hazards, using organic chemical contaminants as examples, and the problems that are likely to arise in the food manufacturing sector. Chemical HACCP procedures are likely to result in many of the advantages previously identified for microbiological HACCP procedures: more effective, efficient and economical than conventional end-point-testing methods. However, the high costs of analytical monitoring of chemical contaminants and a limited understanding of formulation and process optimisation as means of controlling chemical contamination of foods are likely to prevent chemical HACCP becoming as effective as microbiological HACCP.

Rose J.B. et al. Climate variability and change in the United States: potential impacts on water- and foodborne diseases caused by microbiologic agents. Environ Health Perspect. 2001; 109 Suppl 2 211-21p. Abstract: Exposure to waterborne and foodborne pathogens can occur via drinking water (associated with fecal contamination), seafood (due to natural microbial hazards, toxins, or wastewater disposal) or fresh produce (irrigated or processed with contaminated water). Weather influences the transport and dissemination of these microbial agents via rainfall and runoff and the survival and/or growth through such factors as temperature. Federal and state laws and regulatory programs protect much of the U.S. population from waterborne disease; however, if climate variability increases, current and future deficiencies in areas such as watershed protection, infrastructure, and storm drainage systems will probably increase the risk of contamination events. Knowledge about transport processes and the fate of microbial pollutants associated with rainfall and snowmelt is key to predicting risks from a change in weather variability. Although recent studies identified links between climate variability and occurrence of microbial agents in water, the relationships need further quantification in the context of other stresses. In the marine environment as well, there are few studies that adequately address the potential health effects of climate variability in combination with other stresses such as overfishing, introduced species, and rise in sea level. Advances in monitoring are necessary to enhance early-warning and prevention capabilities. Application of existing technologies, such as molecular fingerprinting to track contaminant sources or satellite remote sensing to detect coastal algal blooms, could be expanded.
This assessment recommends incorporating a range of future scenarios of improvement plans for current deficiencies in the public health infrastructure to achieve more realistic risk assessments.


Abstract: Broiler-chicken are often Salmonella carriers. However, these bacteria are responsible for major food-borne human infection, in which poultry- meat products are frequently implicated. In order to prevent Salmonella spread during the slaughtering process, control measures should be implemented at the farm level to reduce the prevalence before slaughtering. The objective of this study was to identify the risk factors for Salmonella contamination in French commercial broiler flocks at the end of the rearing period. A prospective study was carried out in 1996 and 1997 on 86 broiler flocks located in western France. The Salmonella status of the flocks was assessed by means of litter swabs and dust samples analyzed with classical bacteriological methods. Sixty flocks (70%) had at least one contaminated environmental sample and were classified as Salmonella-contaminated flocks. Logistic regression was used to assess association of managerial practices, general hygiene and results of environmental Salmonella recovery, with the odds that the flock itself would be Salmonella-contaminated at the end of the rearing period. Salmonella contamination of the house before placing day-old chicks and the Salmonella contamination of day-old chicks were significantly related to Salmonella contamination of the flock at the end of the rearing period. The risk for Salmonella contamination of the flock was increased when feed trucks parked near the entrance of the change room and when feed meal, instead of small pellets, was provided at the start.


Abstract: Catching and eating fish is usually viewed as a fun, healthy and safe activity. However, with continuing increases in fish consumption advisories due to the contamination of our environment, anglers have to decide whether or not to eat the fish they catch. The Clinch River arm of Watts Bar Reservoir is under a fish consumption advisory because of elevated PCB concentrations in striped bass (Morone saxatilis), catfish (Ictalurus spp.) and sauger (Stizostedion canadense) due in part from contaminants released from the US Department of Energy’s (USDOE’s) Oak Ridge Reservation (ORR) in East Tennessee. To obtain information about the demographics, fishing behavior, knowledge, fish consumption and risk perception of anglers, a survey was conducted of 202 people actively fishing either on land or by boat along the Clinch River arm of Watts Bar Reservoir adjacent to the ORR from Melton Hill Dam to the Poplar Creek confluence or on Poplar Creek within ORR boundaries from mid-March to early November 2001. Even though 81% of people interviewed knew about the fish consumption advisories for the study area, 48% of them thought the fish were safe to eat, while 38% ate the fish that they caught from the study area. Approximately 36% of anglers who had knowledge of the fish consumption warnings ate fish from the study area. Providing confirmation that people fish for many reasons, 35% of anglers interviewed did not eat fish at all. The majority of anglers interviewed knew about the fish consumption advisories because of the signs posted throughout the study area. However, few people knew the correct fish advisories. Significantly fewer blacks had knowledge of the fish consumption warnings than whites. Information resulting from this study could be used to design a program with the objective of reaching the people who may be most at risk from eating fish caught from the Clinch River arm of Watts Bar Reservoir.


Abstract: Hepatitis A continues to pose a preventable threat to modern day military forces. We describe a food-borne outbreak of hepatitis A during a field training exercise resulting in 22 ill soldiers and over 300 lost work days. Among the population at risk, the secondary attack rate was 19.6%. Faced with epidemic disease occurrence, epidemiologic investigation of potential cases and aggressive use of post-exposure prophylaxis is recommended in a field setting. Although immune serum globulin is likely to reduce transmission, not all cases of acute hepatitis A will be prevented by this action.


Abstract: Products of animal origin may contain a variety of substances regarded as 'residues': traces of veterinary drugs and their metabolites, environmental contaminants, traces of compounds having injurious effects, which have their origin in the manufacturing process, and mycotoxins. Some of these substances are carcinogenic, others may impair the functions of organs or cause disturbances of hormonal balance. Antibacterial substances may induce resistance of pathogenic agents and, finally, a number of substances give rise to sensitivity reactions. Standards for permissible amounts are required in several cases; a number of substances should be completely omitted so that their use should be prohibited; adopting the concept of 'zero tolerance', however, may present problems. Extensive analysis is only practicable so far in a few cases. Rapid screening procedures will have to be developed in the future, in which immunochemical methods may play a particularly important role.


Abstract: Infections with Salmonella enteritidis and S. typhimurium are frequent causes of food-borne diseases in man and are responsible for considerable economic losses in the poultry industry (Fantasia et al., 1991; Pohl et al., 1991). Methods for the more careful differentiation and typing of these two serotypes are necessary for the investigation of the spread and transmission of the infection. Conventional methods of Salmonella differentiation (bioassays, phage-typing, resistance to antibiotics) often lack the necessary resolution potential (Wray et al., 1987). Plasmid profile analysis and restriction analysis of chromosomal DNA, based on restriction fragment length polymorphism (RFLP) have been used for the differentiation of Salmonellae (Wray et al., 1987; Nastasi et al., 1988; Franklin et al., 1990; Helmuth von et al., 1990; Martinetti and Altweg, 1990). Rapid and unsophisticated analysis of the content of plasmid DNA tends to be preferred. However, some strains lack plasmids or may lose them during laboratory passages (Nastasi et al., 1988; Hartstein et al., 1991). On the other hand, restriction analysis
of chromosomal DNA yields more constant and reliable information on bacterial strains (Tveten et al., 1991). The aim of this study was to compare 18 field strains of S. enteritis and 12 strains of S. typhimurium on the basis of plasmid profile analysis and restriction endonuclease analysis of chromosomal DNA. Plasmid DNA content was determined and chromosomal DNA, isolated from bacterial cells immobilized in low-melting agarose, was digested with restriction endonucleases PsI in 18 and 12 field strains of S. enteritis and S. typhimurium, respectively. The resulting fragments were separated by pulse-field electrophoresis in agarose gel. (ABSTRACT TRUNCATED AT 250 WORDS).

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Sabota J.M. et al. A new variant of food poisoning: enteroinvasive Klebsiella pneumoniae and Escherichia coli sepsis from a contaminated hamburger. Am J Gastroenterol. 1998; 93(1): 118-9p. Abstract: For the first time, we report Klebsiella pneumoniae as an enteroinvasive food-borne pathogen transmitted from a hamburger. A 28-year-old previously healthy African-American male ingested a portion of a hamburger from a fast food chain. Symptoms of gastroenteritis rapidly deteriorated to multiorgan failure. Blood and hamburger cultures grew Escherichia coli and Klebsiella pneumoniae. Since Klebsiella had not previously been reported as enteroinvasive, the isolates were compared. Full biochemical profiles, antimicrobial sensitivity, plasmid profile, and toxin assay by DNA hybridization probe were completely concordant. The patient survived the episode of food-borne sepsis. Deliberate or inadvertent employee contamination of food products with feces may be a potential source of life-threatening food-borne illness.

Safe S.H. Development validation and problems with the toxic equivalency factor approach for risk assessment of dioxins and related compounds. J Anim Sci. 1998; 76(1): 134-41p. Abstract: Polychlorinated dibenzo-p-dioxins (PCDD), dibenzofurans (PCDF), and biphenyls (PCB) are industrial compounds or by-products that have been widely identified as environmental contaminants, and residues have been detected in fish, wildlife, and humans. 2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD; dioxin) is the most toxic member of this class of halogenated aromatic hydrocarbons (HAH); mechanistic studies indicate that the toxic and biochemical effects associated with exposure to TCDD are mediated via initial binding to the cytosolic aryl hydrocarbon (Ah) receptor protein present in target tissues and organs. Several other 2,3,7,8-substituted PCDD and PCDF and non-ortho substituted PCB also bind to the Ah receptor and induce toxic responses similar to those for TCDD. Moreover, for these HAH there is a rank order correlation between their structure-Ah receptor binding and organ toxicity, and this supports a role for the Ah receptor in mediating these responses. Thus, the toxic equivalency factor (TEF) approach for HAH is based on the common mechanism of action for TCDD and related compounds in which a TEF value for a "dioxin-like" congener is defined as the potency of the individual (i) congener relative to TCDD ([EC50 [TCDD]/EC50 [test compound])]. The toxic or dioxin equivalent (TEQ) for a mixture of HAH is defined by the following equation: TEQ = sigma [PCDDi] x TEFI + sigma [PCDFi] x TEFI. Industrial emissions and environmental and food residues contain complex mixtures of HAH (exodioxins) and the TEF/TEQ approach is used to regulate emissions and estimate the potential exposure and possible adverse health effects of exodioxins. The TEF approach for risk assessment of exodioxins makes a number of assumptions, including response additivity for individual compounds in a mixture of HAH. This review documents some of the following problems and limitations of the TEF approach: 1) environmental and food residues of HAH contain "non-dioxin-like" PCB that exhibit "antidioxin" activity for some responses; 2) the human diet contains endogenous Ah receptor ligands (endodioxins) such as polynuclear aromatic hydrocarbons (PAH), aromatic amines in cooked foods, indole-3-carbinol (I3C), and related hetero-PAH in cruciferous vegetables. Mass balance and mass potency estimates for human dietary intakes suggest that for some responses the effects of natural or endodioxins may be greater than those of exodioxins; and 3) I3C, a weak Ah receptor agonist, also exhibits Ah receptor antagonist activity, and interactions between I3C and endodioxins may inhibit or inactivate some toxic responses and decrease TEQ (Exodioxin).

Sainz T. et al. Survival and characterization of Escherichia coli strains in a typical Mexican acid-fermented food. Int J Food Microbiol. 2001; 71(2-3): 169-76p. Abstract: In this study, the presence and pathogenic characteristics of Escherichia coli strains in pozol, an acid-fermented maize beverage consumed in South-eastern Mexico, were determined. Seventy-three E. coli strains were isolated at early and late times (6 and 48 h) during the pozol fermentation process, when pH values of the doughs were 6.7-4.7 (6 h) and 4.7-3.7 (48 h). Serotypes that belong to diarrheagenic E. coli serogroups O18, O88, O8, O11, O20, O173 were identified. HEP-2 cell adherence in vitro assays showed localized, diffuse and aggregative adherence patterns among some of these strains. A DNA colony hybridization analysis with different probes showed the presence of virulence genes related to diarrheal pathogenesis. Thirty-three percent of the E. coli strains were tetracycline-resistant and 95% had a 20 kb plasmid. The presence and survival of potentially pathogenic E. coli in acid-fermented pozol suggest that such foods may be a potential source of foodborne outbreaks.

Sair A.I. et al. Improved detection of human enteric viruses in foods by RT-PCR. J Virol Methods. 2002; 100(1-2): 57-69p. Abstract: Human enteric viruses (including hepatitis A virus (HAV) and Norwalk-like viruses (NLVs)) are now recognized as common causes of foodborne disease. While methods to detect these agents in clinical specimens have improved significantly over the last 10 years, applications to food samples have progressed more slowly. In an effort to improve the sensitivity and speed of virus detection from non-shellfish food commodities by reverse transcription-polymerase chain reaction (RT-PCR), we (i) evaluated multiple RNA extraction methods; (ii) compared alternative NLV primer sets; and (iii) developed a one-step RT-PCR method. Hamburger and lettuce samples, processed for virus concentration using a previously reported filtration-extraction-precipitation procedure, were inoculated with HAV or NV. Several RNA extraction methods (guanidinium isothiocyanate, microspin column, QIAshredder Homogenizer, and TRizol) and primer pairs were compared for overall RNA yield (microg/ml), purity (A260/A280), and RT-PCR limits of detection. The use of TRizol with the QIAshredder Homogenizer (TRizol/Shred) yielded the best
RT-PCR detection limits (<1 RT-PCR amplifiable units/reaction for NV), and the NVp110/NVp36 primer set was the most efficient for detecting NV from seeded food samples. A one-step RT-PCR protocol using the TRIZol/Shred extraction method and the NVp110/NVp36 or HAV3/HAV5 primer sets demonstrated improved sensitivity (>10-fold) over the routinely used two-step method. HAV RNA was detected by RT-PCR at initial inoculum levels corresponding to <10 and <100 PFU per 300 microl sample concentrate (corresponding to 6 g food sample) for hamburger and lettuce, respectively. NV RNA was detected by RT-PCR at initial inoculum levels <5 and <50 RT-PCR amplifiable units per 300 microl concentrate (corresponding to 6 g food sample) for hamburger and lettuce, respectively. Residual RT-PCR inhibitors were effectively removed as evidenced by the ability to detect viral RNA in food concentrates without prior dilution. The methods reported here show promise for rapid, sensitive detection of human enteric viruses in foods.

Salamina G. et al. A foodborne outbreak of gastroenteritis involving Listeria monocytogenes. Epidemiol Infect. 1996; 117(3): 429-36p. Abstract: An outbreak of gastroenteritis occurred in Italy among 39 persons who had attended a private supper. All guests were previously healthy, young, non-pregnant adults; 18 (46%) had symptoms, mostly gastrointestinal (78%), with a short incubation period. Four were hospitalized with acute febrile gastroenteritis, two of whom had blood cultures positive for Listeria monocytogenes. No other microorganisms were recovered from the hospitalized patients' specimens. Epidemiological investigation identified rice salad as the most likely vehicle of the food-borne outbreak. L. monocytogenes was isolated from three leftover foods, the kitchen freezer and blender. Isolates from the patients, the foods and the freezer were indistinguishable: serotype 1/2b, same phage type and multilocus enzyme electrophoretic type. Eight (36%) of 22 guests tested were found to have antibodies against L. monocytogenes, compared with none of 11 controls from the general population. This point source outbreak was probably caused by infection with L. monocytogenes. Unusual features included the high attack rate among immunocompetent adults and the predominance of gastrointestinal symptoms.

Samadpour M. Molecular epidemiology of Escherichia coli O157:H7 by restriction fragment length polymorphism using Shiga-like toxin genes. J Clin Microbiol. 1995; 33(8): 2150-4p. Abstract: The purpose of this study was to assess a simplified method for interstrain differentiation of Escherichia coli O157:H7 and other Shiga-like toxin-producing E. coli (SLTEC) strains. A method based on the use of nucleic acid probes from Shiga-like toxin (SLT) I and II structural genes was used to generate restriction fragment length polymorphism (RFLP) patterns of SLTEC strains. Although the use of each of the enzymes separately provided the desired sensitivity for such studies, the combination of patterns generated by two restriction enzymes (EcoRI and PvuII, used separately) provided the desired sensitivity for such studies. The results clearly demonstrate the usefulness of the method for studying the molecular epidemiology of E. coli O157:H7. The method is also suitable for establishing an epidemiological database, in terms of both sensitivity and ease of compilation and interpretation of results.

Samuel M.C. et al. Complaints of foodborne illness in San Francisco, California, 1998. J Food Prot. 2001; 64(8): 1261-4p. Abstract: Foodborne diseases are an important public problem affecting millions of Americans each year and resulting in substantial morbidity and mortality. Many foodborne infections occur in outbreak settings. Outbreaks are often detected by complaints from the public to health authorities. This report reviews complaints received by the San Francisco Department of Public Health involving suspected foodborne illness in 1998. Although such foodborne complaints are commonly received by health officials, we provide the first review of population-based data describing such complaints. We use a broad definition of a foodborne disease outbreak. We judged a complaint to be a "likely foodborne disease outbreak" if it involved more than one person and more than one family; no other common meals were shared recently by ill persons; diarrhea, vomiting, or both was reported; and the incubation period was more than one hour. In 1998, 326 complaints of foodborne illness, involving a total of 599 ill people, were received by the Communicable Disease Control Unit in San Francisco. The complaints involved from 1 to 36 ill persons, with 61% involving one ill person and 25% involving two ill persons. Of the 126 reports involving illness in more than one person, 77 (61%) were judged to be likely foodborne disease outbreaks. Three of these 77 outbreaks had been investigated prior to our review. This project confirms that more foodborne disease outbreaks occur than are reported to state and national outbreak surveillance systems. Our review of the San Francisco system highlights opportunities for gleaming valuable information from the foodborne disease complaint systems in place in most jurisdictions.

Sarker M.R. et al. Inactivation of the gene (cpe) encoding Clostridium perfringens enterotoxin eliminates the ability of two cpe-positive C. perfringens type A human gastrointestinal disease isolates to affect rabbit ileal loops. Mol Microbiol. 1999; 33(5): 946-58p. Abstract: Previous epidemiological studies have implicated Clostridium perfringens enterotoxin (CPE) as a virulence factor in the pathogenesis of several gastrointestinal (GI) illnesses caused by C. perfringens type A isolates, including C. perfringens type A food poisoning and non-food-borne GI illnesses, such as antibiotic-associated diarrhea and sporadic diarrhoea. To further evaluate the importance of CPE in the pathogenesis of these GI diseases, allelic exchange was used to construct cpe knock-out mutants in both SM101 (a derivative of a C. perfringens type A food poisoning isolate carrying a chromosomal cpe gene) and F4969 (a C. perfringens type A non-food-borne GI disease isolate carrying a plasmid-borne cpe gene). Western blot analyses confirmed that neither cpe knock-out mutant could express CPE during either sporulation or vegetative growth, and that this lack of CPE expression could be complemented by transforming these
Sauerborn R. et al. The economic costs of illness for rural households in Burkina Faso. *Trop Med Parasitol.* 1995; 46(1): 54-60. Abstract: Analyses of the health costs in developing countries have mainly dealt with provider costs. This is in spite of the fact that the bulk of illness related costs is borne by households. Where studied, household time and financial costs have not been treated in a comprehensive way. However, an incomplete cost assessment will lead to an underestimation of household costs. Using data from a household interview survey in a rural area of Burkina Faso, the authors carried out an exhaustive assessment of the economic cost of illness that households incur. Financial costs included out-of-pocket expenditures for drugs, fees, transport to the treatment site, lodging and food for accompanying household members. Time costs, in turn, were comprised of production foregone both by the sick person and by healthy household members, who tended to the sick. Time costs amounted to by far the largest proportion (73%) of total household costs. Of the total amount of illness related time loss of the average household, 45% was due to the fact that healthy household members tended to or accompanied their sick kin. Of the financial cost items, expenditures for drugs or traditional products represented 62%. When Western type services were sought, expenditures for transport, food etc., exceeded those for treatment fees. Total cost of illness was 4,002 F CFA/month for the average household. This amounted to 3.7% of household income and to 6.2% of household expenditures in the reference month. The authors discuss policy measures aimed to reduce household time costs.(ABSTRACT TRUNCATED AT 250 WORDS).

Schach B. et al. Molecular methods for the analysis of Clostridium perfringens relevant to food hygiene. *FEMS Immunol Med Microbiol.* 1999; 24(3): 281-6p. Abstract: Clostridium perfringens continues to be a common cause of food-borne disease. It produces an enterotoxin (CPE) which is released upon lysis of the vegetative cell during sporulation in the intestinal tract. Catering premises with insufficient cooling and reheating devices often seem to be the cause of outbreaks of C. perfringens food poisoning. Typing of C. perfringens is of great importance for investigating sources of food poisoning cases and for studying the epidemiology of this microorganism. This report describes the examination of 155 C. perfringens isolates by molecular methods. Isolates with a recombinant plasmid carrying the wild-type cpe gene. When the virulence of the wild-type, mutant and complementing strains were compared in a rabbit ileal loop model, sporulating (but not vegetative) culture lysates of the wild-type isolates induced significant ileal loop fluid accumulation and intestinal histopathological damage, but neither sporulating nor vegetative culture lysates of the cpe knock-out mutants induced these intestinal effects. However, full sporulation-associated virulence could be restored by complementing these cpe knock-out mutants with a recombinant plasmid carrying the wild-type cpe gene, which confirms that the observed loss of virulence for the cpe knock-out mutants results from the specific inactivation of the cpe gene and the resultant loss of CPE expression. Therefore, in vivo analysis of our isogenic cpe mutants indicates that CPE expression is necessary for these two cpe-positive C. perfringens type A human disease isolates to cause GI effects in the culture lysate:ileal loop model system, a finding that supports CPE as an important virulence factor in GI diseases involving cpe-positive C. perfringens type A isolates.

Schantz P.M. et al. Current status of food-borne parasitic zoonoses in the United States. *Southeast Asian J Trop Med Public Health.* 1991; 22 Suppl 65-71p. Abstract: Although not a major public health problem, food-borne parasitic zoonoses in the United States are the cause of numerous diseases that occur widely in the population. The most common food-borne parasitic diseases in the United States are trichinosis, toxoplasmosis, taeniasis/cysticercosis, diphyllobothriasis, and anisakiasis. Since 1947, when the US Public Health Service began to record statistics on trichinosis cases in humans, the numbers of reported cases in the United States have declined markedly, from an average of about 400 with 10-15 deaths reported each year in the late 1940s, to an average of 57 per year with three deaths overall in the 5 years 1982-1986. Each year throughout the world, Toxoplasma gondii infects millions of persons, who contract it either by eating raw or poorly cooked meat from infected animals such as hogs or sheep or by ingesting soil contaminated with cat feces. In the United States between 400 and 10,000 infants are born each year with congenital toxoplasmosis. Toxoplasmic encephalitis, marked by dementia and seizures, has become the most commonly recognized cause of central nervous system opportunistic infection in AIDS patients. Intestinal taenid tapeworm infection acquired in the United States is almost entirely caused by Taenia saginata, the beef tapeworm. Neurocysticercosis, caused by larvae of the pork tapeworm Taenia solium, is diagnosed in hundreds of persons in the United States every year. Nearly all patients are immigrants or travelers from Mexico and other disease-endemic areas. Diphyllobothriasis and anisakiasis both have increased in recent years in association with increasing popularity of raw fish dishes. Adequate prevention and control of food-borne parasitic zoonoses require continued and improved programs to educate consumers, producers and medical practitioners.

Schlech W.F. 3d et al. A model of food-borne Listeria monocytogenes infection in the Sprague-Dawley rat using gastric inoculation: development and effect of gastric acidity on infective dose. *Int J Food Microbiol.* 1993; 18(1): 15-24p. Abstract: Recent epidemiological evidence suggests that Listeria monocytogenes (LM) is a food-borne pathogen in humans. A model of LM infection was developed using the Sprague-Dawley (SD) rat to study the interaction of LM with gastrointestinal epithelium as the first step in the pathogenesis of invasive listeriosis. Conventionally raised, juvenile female SD rats were given 10(2)-10(9) virulent L. monocytogenes, serotype 4b or nonpathogenic Listeria species. Only rats given virulent LM developed dose-dependent invasive infection of the liver and spleen. Light and electron microscopic studies suggested attachment to and invasion of the gastrointestinal mucosa by virulent LM. Because the development of invasive listeriosis in humans has been epidemiologically associated with a decrease in
gastric acidity, the effect of decreasing gastric acidity on dose-dependent infection was studied. Rats were pretreated with cimetidine (50 mg/kg) by intraperitoneal injection prior to oral inoculation of 10(2)-10(9) virulent L. monocytogenes. Cimetidine significantly lowered the infective dose of virulent L. monocytogenes (P < 0.05). This oral model should allow further study of host and organism-specific virulence factors mediating the gastrointestinal phase of invasive LM infection, an increasingly important public health problem.

Schluendt J. Emerging food-borne pathogens. *Biomed Environ Sci.* 2001; 14(1-2): 44-52p. **Abstract:** The epidemiology of foodborne diseases is changing. While in many developing nations the efficient treatment of diarrheal diseases through oral rehydration has probably led to the prevention of many food related deaths, the underlying problems have not been solved. In these countries, the disease incidence of food- and waterborne disease is still increasing, and now data from other parts of the world indicate that new foodborne pathogens have emerged as important public health problems. Over the last two decades, bacterial infections caused by Campylobacter and enterohaemorrhagic Escherichia coli have emerged, well-recognized pathogens, such as Salmonella enteritidis, have increased dramatically in disease incidence and important foodborne pathogens have become increasingly resistant to antimicrobial agents. The future strategy for prevention of foodborne disease should be founded in scientifically based evaluations of the whole food production chain 'from farm to table', including a description of the most important (risk) factors. Epidemiological studies of outbreaks as well as sporadic cases should be aimed at a better understanding of these factors. In terms of public health importance of the problem, the focus should be on the size of the problem, and the potential for improvement. The indications are that both in developed and developing countries there is significant potential for an improvement of the situation. With this aim in mind, international effort should focus on scientific assessments of the potential for risk reduction under different regional conditions.

Schumann K. et al. The impact of food contaminants on the bioavailability of trace metals. *J Trace Elem Med Biol.* 2002; 16(3): 139-44p. **Abstract:** Organic solvents, detergents, organochloric compounds, pesticides, mycotoxins, residues of veterinary drugs and metals are examples for food contaminants; they are usually present at very low concentrations. Their impact on absorption and distribution kinetics of essential trace metals, if there is any, can be mediated by three types of mechanisms: 1. In animal experiments, contaminants like T-2 mycotoxins or 2,3,7,8 tetrachlorodibenzodioxin inhibited absorptive or excretory mechanisms at high concentrations which, however, are usually not found in food. 2. Food contaminants with metal binding properties can interact with essential metals in the intestinal lumen or during transfer through the intestinal mucosa and affect their absorption according to the rules of complex chemistry. To balance the effect of endogenous metal-binding food constituents, they should be present in comparably high quantities. Usually, however, the concentration of contaminants is approx. 6 orders of magnitude lower than that of endogenous food ligands. 3. Contaminating metals may interfere with the regulated absorption, distribution, and excretion kinetics of essential metals. Such mechanisms may be amplified by vicious cycles. In general, however, food contaminations with metals are too low to have an impact on the bioavailability of essential metals.

Scott E. Relationship between cross-contamination and the transmission of foodborne pathogens in the home. *Pediatr Infect Dis J.* 2000; 19(10 Suppl): S111-3p. **Abstract:** Environmental microbiologists have accumulated a substantial amount of information about the relationship between cross-contamination and the transmission of foodborne pathogens in the home. This information can be translated into guidelines for safe, effective hygienic practices in the home. Such guidelines cannot be mandated but should be strongly promoted via health and hygiene agencies to the general public. Establishing consensus-based, effective hygiene guidelines will benefit the community by reducing the risk of home-based infections such as foodborne disease and by lowering the associated healthcare costs.

Scott T.W. et al. A fitness advantage for Aedes aegypti and the viruses it transmits when females feed only on human blood. *Am J Trop Med Hyg.* 1997; 57(2): 235-9p. **Abstract:** Literature on arthropod-borne diseases has traditionally supported the notion that mosquito vectors maintain a feeding duality that includes vertebrate blood meals for egg development and sugar meals from plants for the synthesis of flight and survival energy reserves. Aedes aegypti was found to deviate from that feeding pattern by obtaining a reproductive advantage when feeding only on human blood. Female mosquitoes fed human blood alone had a greater net replacement rate and intrinsic rate of growth during all phases of their reproductive life than conspecifics fed human blood plus sucrose. Feeding frequently on human hosts during each gonotrophic cycle is necessary to avoid death due to starvation and increases exponentially the spread of Ae. aegypti borne disease. Our results help explain why Ae. aegypti is such an unusually efficient vector of human disease; frequent biting of humans results in a high reproductive rate for vectors as well as the viruses they transmit.

Schumann K. et al. The impact of food contaminants on the bioavailability of trace metals. *J Trace Elem Med Biol.* 2002; 16(3): 139-44p. **Abstract:** Organic solvents, detergents, organochloric compounds, pesticides, mycotoxins, residues of veterinary drugs and metals are examples for food contaminants; they are usually present at very low concentrations. Their impact on absorption and distribution kinetics of essential trace metals, if there is any, can be mediated by three types of mechanisms: 1. In animal experiments, contaminants like T-2 mycotoxins or 2,3,7,8 tetrachlorodibenzodioxin inhibited absorptive or excretory mechanisms at high concentrations which, however, are usually not found in food. 2. Food contaminants with metal binding properties can interact with essential metals in the intestinal lumen or during transfer through the intestinal mucosa and affect their absorption according to the rules of complex chemistry. To balance the effect of endogenous metal-binding food constituents, they should be present in comparably high quantities. Usually, however, the concentration of contaminants is approx. 6 orders of magnitude lower than that of endogenous food ligands. 3. Contaminating metals may interfere with the regulated absorption, distribution, and excretion kinetics of essential metals. Such mechanisms may be amplified by vicious cycles. In general, however, food contaminations with metals are too low to have an impact on the bioavailability of essential metals.

Scott W.G. et al. Economic cost to New Zealand of foodborne infectious disease. *N Z Med J.* 2000; 113(1113): 281-4p. **Abstract:** AIMS: To estimate the annual economic cost to New Zealand of foodborne infectious disease. METHODS: Annual incidence rates were combined with unit cost data to derive estimates of the annual economic cost to society of each foodborne infectious disease. Market prices and wages were used as proxies for the unit costs of resource utilisations. A decision analytic model was developed to estimate the costs of each disease and to undertake sensitivity analysis. RESULTS: There are an estimated 119 320 episodes of foodborne infectious disease per year in New Zealand (3241 per 100 000 population). The total cost of these cases was $55.1 million ($462 per case) made up of direct medical costs of $2.1 million, direct non-medical costs of $0.2 million, indirect cost of lost productivity of $48.1 million, and intangible cost of loss of life of $4.7 million. Campylobacteriosis generated most of the costs. Lost productivity was the major cost component for all diseases. The total cost of potentially foodborne infectious disease was estimated to be $88.8 million. Broad estimates of additional costs due to cases of infectious intestinal diseases caused by non-foodborne pathogens or for which no pathogen is identified could raise the cost to $215.7 million. CONCLUSION: The findings imply that resources of $55 million could be devoted to prevention of foodborne
infectious disease. Efforts should focus on lowering the incidence of campylobacteriosis as this disease accounts for most of foodborne illness costs.

Seifalian A.M. et al. Measurement of liver blood flow: a review. HPB Surg. 1991; 4(3) : 171-86p. Abstract: The study of hepatic haemodynamics is of importance in understanding both hepatic physiology and disease processes as well as assessing the effects of portosystemic shunting and liver transplantation. The liver has the most complicated circulation of any organ and many physiological and pathological processes can affect it. This review surveys the methods available for assessing liver blood flow, examines the different parameters being measured and outlines problems of applicability and interpretation for each technique. The classification of these techniques is to some extent arbitrary and several so called "different" methods may share certain common principles. The methods reviewed have been classified into two groups (Table 1): those primarily reflecting flow through discrete vessels or to the whole organ and those used to assess local microcirculatory blood flow. All techniques have their advantages and disadvantages and in some situations a combination may provide the most information. In addition, because of the many factors affecting liver blood flow and sinusoidal perfusion, readings in a single subject may vary depending on positioning, recent food intake, anxiety, anaesthesia and drug therapy. This must be borne in mind if different studies are to be meaningfully compared.

Sethi D. et al. A study of infectious intestinal disease in England: plan and methods of data collection. Commun Dis Public Health. 1999; 2(2) : 101-7p. Abstract: The Committee on the Microbiological Safety of Food, set up in 1989 by the Department of Health in response to national epidemics of foodborne infection, considered the available evidence and commissioned a study of infectious intestinal disease (IID) in England. Seventy practices (with 489,500 patients overall) recruited from the Medical Research Council's General Practice Research Framework between August 1993 and January 1995 collected data for one year. The practice populations were representative of practices in England by area and urban/rural location, but with fewer small and affluent practices. There were five main components. i) A population cohort of 9776 (40% of those eligible) were enrolled to estimate the incidence and aetiology of IID in the community, and a large proportion were followed up. A median of 10% of patients on practice age-sex registers had moved away or died. ii) A nested case control component based on cases ascertained in the cohort was used to identify risk factors for IID in the community. iii) In a case control component used to identify risk factors and to estimate the incidence and aetiology of IID presenting in 34 general practices 70% of the 4026 cases returned risk factor questionnaires, 75% submitted stools, and matched controls were found for 75% of cases. iv) An enumeration component was used to estimate the incidence of IID presenting to general practitioners (GPs) in 36 practices and the proportion of specimens sent routinely for microbiological examination. v) In a socioeconomic costs component used to estimate the burden of illness of IID in the community and presenting to GPs 63% of those who returned a risk factor questionnaire also returned a socioeconomic questionnaire and were representative by age, sex, and social class. Despite variable enrolment and compliance the study sample had sufficient power for the multivariable analysis. The characteristics associated with low enrollment and compliance must be considered in the interpretation of the main study results.

Sewell A.M. et al. Foodborne outbreaks in Canada linked to produce. J Food Prot. 2001; 64(11) : 1863-77p. Abstract: Examples of foodborne outbreaks traced to fresh fruits and vegetables can be found worldwide. The quantity of produce eaten per capita has been increasing steadily over the past two decades, creating a heightened potential for produce-related foodborne disease. A number of outbreaks identified during this time period were reviewed, with particular emphasis placed on incidents that have occurred in Canada. The collective information highlights the diversity of infectious agents and produce items involved, with a view to the prevention of fresh produce-related foodborne disease in the future.

Shaffer N. et al. Botulism among Alaska Natives. The role of changing food preparation and consumption practices. West J Med. 1990; 153(4) : 390-3p. Abstract: Alaska Natives have one of the highest rates of food-borne botulism worldwide. All outbreaks have been associated with the consumption of native foods, but in recent years outbreaks have occurred in previously unaffected areas and have involved new food items. Five botulism outbreaks occurred between 1975 and 1985 in an area of southwestern Alaska without previous confirmed outbreaks and among one ethnic group, the Yupik Eskimo. Of the 5 outbreaks, 3 were associated with fermented beaver tail, a nontraditional native food recently introduced into the region. Preparation techniques vary widely within villages and among ethnic groups. Traditional fermentation techniques have changed over the past 50 years; current preparation methods used by some families and ethnic groups may be more favorable for Clostridium botulinum growth. Prevention efforts should be targeted at high-risk subgroups of Alaska Natives who appear to have modified traditional practices and increased their risk of food-borne botulism.

Shapiro R. et al. Salmonella Thompson associated with improper handling of roast beef at a restaurant in Sioux Falls, South Dakota. J Food Prot. 1999; 62(2) : 118-22p. Abstract: In October 1996, we investigated an outbreak of Salmonella serotype Thompson infections associated with Restaurant A in Sioux Falls, South Dakota, and conducted two cohort studies among persons who ate at luncheons catered by Restaurant A. Fifty-two Salmonella Thompson infections were identified between 29 September and 14 October 1996. Infections occurred among employees and patrons at Restaurant A and among attendees at three luncheons catered by the restaurant on 7 October. Roast beef cooked at Restaurant A was the only food item significantly associated with illness. Cooking times and storage temperatures for roast beef were inadequate to prevent multiplication of Salmonella, and the chefs were unaware of proper cooking and storage temperatures. We conclude that improper handling of roast beef probably caused this outbreak of Salmonella Thompson infections. Better knowledge of food safety practices by the cooking staff at Restaurant A, through required food safety education, might have prevented the outbreak.

the epidemiology and antimicrobial susceptibility patterns of enteric bacterial pathogens are limited. Between May 1997 and April 1998, a clinic-based surveillance for diarrheal disease was conducted in Asembo, a rural area in western Kenya. In total, 729 diarrheal specimens were collected, and 244 (33%) yielded > or =1 bacterial pathogen, as determined by standard culture techniques; 107 (44%) Shigella isolates, 73 (30%) Campylobacter isolates, 45 (18%) Vibrio cholerae O1 isolates, and 33 (14%) Salmonella isolates were identified. Shigella dysenteriae type 1 accounted for 22 (21%) of the Shigella isolates. Among 112 patients empirically treated with an antimicrobial agent and whose stool specimens yielded isolates on which resistance testing was done, 57 (51%) had isolates that were not susceptible to their antimicrobial treatment. Empiric treatment strategies for diarrheal disease in western Kenya need to be reevaluated to improve clinical care.

Shapiro R.L. et al. Transmission of epidemic Vibrio cholerae O1 in rural western Kenya associated with drinking water from Lake Victoria: an environmental reservoir for cholera? *Am J Trop Med Hyg.* 1999; 60(2) : 271-6p. Abstract: Sub-Saharan Africa has the highest reported cholera incidence and mortality rates in the world. In 1997, a cholera epidemic occurred in western Kenya. Between June 1997 and March 1998, 14,275 cholera admissions to hospitals in Nyanza Province in western Kenya were reported. There were 547 deaths (case fatality rate = 4%). Of 31 Vibrio cholerae O1 isolates tested, all but one were sensitive to tetracycline. We performed a case-control study among 61 cholera patients and age-, sex-, and clinic-matched controls. Multivariate analysis showed that risk factors for cholera were drinking water from Lake Victoria or from a stream, sharing food with a person with watery diarrhea, and attending funeral feasts. Compared with other diarrheal pathogens, cholera was more common among persons living in a village bordering Lake Victoria. Cholera has become an important public health concern in western Kenya, and may become an endemic pathogen in the region.

Shea K.M. Technical report: irradiation of food. Committee on Environmental Health. *Pediatrics.* 2000; 106(6) : 1505-10p. Abstract: Recent well-publicized outbreaks of foodborne illness have heightened general interest in food safety. Food irradiation is a technology that has been approved for use in selected foods in the United States since 1963. Widespread use of irradiation remains controversial, however, because of public concern regarding the safety of the technology and the wholesomeness of irradiated foods. In this report, we describe the technology, review safety and wholesomeness issues, and give a historical perspective of the public controversy regarding food irradiation.

Shears P. Shigella infections. *Ann Trop Med Parasitol.* 1996; 90(2) : 105-14p. Abstract: Shigella dysentery is a major public-health problem in many tropical areas. Despite improvements in water supplies and sanitation, it continues to be a disease of poor rural and urban communities and in populations affected by migration and crowding following disasters. Pathogenesis is due to colonic invasion, endotoxin, and, in Shigella dysenteriae 1, shiga toxin. As well as the local manifestations of dysentery, systemic complications include convulsions, haemolytic-uraemic syndrome, hyponatraemia and hypoglycaemia. The spread of shigella infection is most commonly person-person, although water and food-borne outbreaks have been reported. Since 1970, multiple antimicrobial resistance, particularly in Sh. dysenteriae 1, has complicated strategies for management. Multiply resistant strains have occurred in Latin America, Central Africa and southern and south-eastern Asia. No vaccines are currently available, and prevention and control will depend on public-health improvements and improved case management.

Shih N.J. et al. Sporulation-promoting ability of Clostridium perfringens culture fluids. *Appl Environ Microbiol.* 1996; 62(4) : 1441-3p. Abstract: The culture supernatant fluids (CSFs) of 12 strains of Clostridium perfringens types A, B, C, and D stimulated sporulation of test strains NCTC 8238 and NCTC 8449 of this organism. The sporulation-promoting ability was present in vegetative and sporulating CSFs of both enterotoxin-positive (Ent+) and Ent- strains. The sporulation factor possessed a molecular weight between 1,000 and 5,000 and was heat and acid stable. This study suggests a potential role for Ent- strains in food-borne disease outbreaks caused by Ent+ strains of C. perfringens type A.

Shryock T.R. Relationship between usage of antibiotics in food-producing animals and the appearance of antibiotic resistant bacteria. *Int J Antimicrob Agents.* 1999; 12(4) : 275-8p. Abstract: Many studies and meeting reports have suggested that the use of some antibiotics in food animals can compromise the treatment of some infectious diseases in humans. Although the studies and reports are timely and important, it is difficult to assess the relative value of the conclusions in relationship to the overall situation concerning antibiotic resistant foodborne bacteria because the data used in the analyses are often of disparate origin. The studies have attempted to establish a cause and effect relationship between the use ('consumption') of antibiotics in food animals and treatment failures in human disease on the basis of [1] antibiotic usage data; [2] in vitro determinations of antibiotic susceptibility of animal and human isolates, [3] results obtained from controlled animal experiments or [4] epidemiological data. Each approach has sought to associate bacterial antibiotic resistance data with it's own immediate focus area of investigation. However, a true assessment of the degree of contribution to human antibiotic resistance problems from animal use can only be facilitated by comprehensively organizing these different approaches into a concerted, coordinated effort. Concurrently, the implementation of a multinational programme aimed at monitoring antibiotic usage in food animals and resistance in specific bacteria associated with those animals should be instituted. In parallel with this endeavour is the implementation of new prudent use guidelines for antibiotic use by veterinarians. Through the use of science-based approaches like these, the development and spread of antibiotic resistant bacteria associated with food animals could be minimized and contained.

Siegman-Igra Y. et al. Listeria monocytogenes infection in Israel and review of cases worldwide. *Emerg Infect Dis.* 2002; 8(3) : 305-10p. Abstract: Listeria monocytogenes, an uncommon foodborne pathogen, is increasingly recognized as a cause of life-threatening disease. A marked increase in reported cases of listeriosis during 1998 motivated a retrospective nationwide survey of the infection in Israel. From 1995 to 1999, 161 cases were identified; 70 (43%) were perinatal infections, with a fetal mortality rate of 45%. Most (74%) of the 91 nonperinatal infections involved immunocompromised patients with malignancies, chronic
liver disease, chronic renal failure, or diabetes mellitus. The common clinical syndromes in these patients were primary bacteremia (47%) and meningitis (28%). The crude case-fatality rate in this group was 38%, with a higher death rate in immunocompromised patients.

Simcock P.R. et al. Neuro-ophthalmic findings in botulism type B. Eye. 1994; 8 (Pt 6) 646-8p. Abstract: In June 1989, the largest recorded outbreak of food-borne botulism occurred in the United Kingdom. Twenty-seven patients were affected during the outbreak with type B botulism. A case note review of 14 patients admitted with this condition was performed and the neuro-ophthalmic findings are presented. Patients with severe disease presented with a combination of ocular and bulbar symptoms; in mild cases dysphagia was noted first and visual disturbance followed within 24 hours. Clustering of cases and bilaterality of cranial nerve signs aided in the diagnosis. Accommodative paresis and sixth cranial nerve palsy were frequent early signs. When there was respiratory paralysis and ventilatory failure, it occurred within 12 hours of the onset of a third cranial nerve palsy.

Singh M. et al. Current status of food-borne parasitic zoonoses in Singapore. Southeast Asian J Trop Med Public Health. 1991; 22 Suppl 27-30p. Abstract: Parasitic infections adopt a rather low profile in the highly urbanized setting in Singapore. Very few food-borne parasitic infections are encountered. Apart from a few reports of infections with Clonorchis/Oipstorchis, Taenia spp. and hydatid disease, there are no other citations of such helminthic infections. Seroprevalence surveys have shown the presence of toxoplasmosis in local meat animals (sheep, pigs and cattle) and Toxoplasma strains have been isolated from the pig, tree shrew (Tupaia glis), slow loris (Nycticebus coucang) and guinea pigs. Human toxoplasmosis is prevalent in Singapore. Anti-Toxoplasma antibodies are found in the normal population as well as in clinical cases (cervical lymphadenopathy, ocular disease and congenital toxoplasmosis). Carcasses/organs from meat animals (sheep, pigs, cattle) slaughtered at local abattoirs were examined for parasites. The main parasites found were Ascaris suum, Dictyocaulus, Metastrongylus, Cysticercus ovis, Fasciola hepatica and Sarcocystis spp. Pigs were also examined for trichinosis and, thus far, these have all been negative.

Smith A.G. et al. Organochlorine chemicals in seafood: occurrence and health concerns. Food Chem Toxicol. 2002; 40(6): 767-79p. Abstract: The cheap availability of chlorine gas, together with the development of industrial chlorinating procedures in the 20th century, led to the production of a wide range of organochlorine compounds many with a variety of commercial applications, including usage as insecticides and defoliants and polychlorinated biphenyls (PCBs) used as coolants in electricity supply transformers. However, it was soon found that many of these technologically valuable chemicals suffered from a major disadvantage in that they resisted biodegradation and that the continued use of these compounds would lead to their persistence and accumulation in the environment and thus enter the human food chain. Despite regulatory bans or strict limits on usage being imposed on organochlorine pesticides in most countries, these compounds continue to be detected in measurable amounts in the eco-system including marine life. In general, organochlorine levels in fish intended for human consumption are low and probably below levels likely to adversely affect human health. Populations at higher risk than most people are those subsisting largely on fish and other marine life. Additionally, fish oils obtained from contaminated fish, if consumed in substantial quantities by infants and young children, might present potential health problems if levels are not continually regulated. Behavioral and neurological effects have been reported in children and ascribed to the consumption of PCB contaminated diet including fish. Another current major human health concern, yet to be resolved, about organochlorine contaminants in the human diet relates to the potential ability of many of these chemicals at low doses to act as "endocrine disruptors".

Smith G.C. et al. Intake estimation of polychlorinated dibenzop-dioxins, dibenzofurans (PCDD/Fs) and polychlorinated biphenyls (PCBs) in salmon: the inclusion of uncertainty. Food Addit Contam. 2002; 19(8): 770-8p. Abstract: Dioxins and dioxin-like PCBs are given toxic equivalence factors (TEFs) in order to calculate the combined toxic equivalence (TEQ) of these contaminants in a sample of food. This study calculates the probability of an average consumer exceeding the recommended tolerable daily intake of 1-4 pg WHO-TEQ kg(-1) bw day(-1) as the amount of salmon in the diet is increased. Probabilistic risk analysis is used to account for the known uncertainties in this calculation. When the TEF uncertainty was excluded with no salmon consumption, the background dietary intake ranged from 1.36 to 1.78 pg TEQ kg(-1) bw day(-1). A weekly consumption of three standard salmon portions resulted in a 36% chance of exceeding the upper limit of the TDI. Inclusion of the TEF uncertainty increased the background dietary intake range from 2.1 to 4.4 pg TEQ kg(-1) bw day(-1), and the weekly consumption of one salmon portion resulted in a 79% chance of the average consumer exceeding the upper TDI. The most important factors contributing to the uncertainty in these results were, in order of magnitude, the TEF for PCB 126 and the sampling uncertainty (sample size) followed by the measurement uncertainty of PCB 126. We recommend that it is more important to increase sample size and produce more precise estimates in the TEF than to improve analytical accuracy.

Smith G.W. et al. Effects of fumonisin-containing culture material on pulmonary clearance in swine. Am J Vet Res. 1996; 57(8): 1233-48p. Abstract: OBJECTIVE: To determine the potential effects of feeding fumonisin-containing culture material on the pulmonary clearance of blood-borne particulates and bacteria in swine. ANIMALS: 21 healthy male pigs randomly assigned to control and treated groups. PROCEDURE: Control pigs were fed a standard grower ration while culture material containing fumonisins (20 mg of hydrolyzed fumonisin B1/kg of body weight/d) was added to the feed of treated pigs for 7 days. On day 8, pigs were anesthetized with halothane and cathereterized, using a sterile cut-down procedure. 18 hours after recovery from anesthesia, Monastral Blue or Pseudomonas aeruginosa was infused into the right atrium of treated and control pigs for 30 minutes and pulmonary clearance was determined. RESULTS: Pigs that were fed fumonisin-containing culture material had a significantly (P < 0.05) decreased ability to clear Monastral Blue and P aeruginosa. Ultrastructural examination of the lung indicated that uptake of copper pigment by pulmonary intravascular macrophages was decreased in treated pigs. CONCLUSIONS AND CLINICAL RELEVANCE: Fumonisins, even when fed to pigs at sub-lethal concentrations, can inhibit pulmonary intravascular macrophages from removing particulate matter.
and bacteria from the circulation, thus potentially predisposing swine to infectious disease.

Smith J.L. Foodborne infections during pregnancy. J Food Prot. 1999; 62(7) : 818-29p. Abstract: The consequences of foodborne illness can be particularly devastating during pregnancy because both the woman and her fetus are at risk. Escalated production of progesterone during pregnancy leads to down-regulation of cellular (cell-mediated) immune functions. Many foodborne pathogens (and other pathogens) are intracellular pathogens, and infections caused by these pathogens are controlled by cell-mediated immunity. The pregnancy-induced decrease in cell-mediated immune functions leads to increased susceptibility of the pregnant woman to certain infections. Hepatitis E virus, Coxiella burnetti, Listeria monocytogenes, and Toxoplasma gondii are intracellular pathogens that have a predilection for the maternal-fetal unit and may induce serious disease in the mother and/or fetus. In the United States, T. gondii and L. monocytogenes are the most important foodborne pathogens in pregnancy, and these organisms can induce death or grave disease in the fetus and newborn. The pregnant woman, in order to protect herself and her fetus from the consequences of foodborne illness, must practice a high standard of food hygiene and personal cleanliness.

Smith K.E. et al. Behavior of sewage sludge-derived PAHs on pasture. Environ Sci Technol. 2001; 35(11) : 2141-50p. Abstract: A field experiment was set up to investigate the retention of PAHs by pasture grass following sludge application. In addition to information on compound-specific loss rates, the influence of meteorological variables and sludge-pasture contact time on the weathering process were investigated. The rates of loss were compound specific with half-lives ranging from < 1 to 10 d. The lighter PAHs were rapidly lost from the grass surface primarily by volatilization. For the intermediate and heavier PAHs, loss was slower with rain playing an important role in the weathering process. Growth dilution was also important in reducing the contaminant levels in the grass. The effect of sludge-pasture contact time prior to weathering by rain on the residual levels remains unclear. In terms of risk of exposure, there is the potential for persistent organic contaminants to be introduced into the grazing animal food chain if sewage sludge is applied to pasture land.

Sobel J. et al. The pandemic of Salmonella enteritidis phage type 4 reaches Utah: a complex investigation confirms the need for continuing rigorous control measures. Epidemiol Infect. 2000; 125(1) : 1-8p. Abstract: In 1995, Salmonella Enteritidis (SE) cases in the state of Utah increased fivefold. Isolates were identified as phage type 4 (PT4). Risk factors and sources of infection were investigated in two case-control studies, a traceback of implicated foods, and environmental testing. Forty-three patients with sporadic infections and 86 controls were included in a case-control study of risk factors for infection. A follow-up case-control study of 25 case and 19 control restaurants patronized by case and control patients examined risks associated with restaurant practices. In the first case-control study, restaurant dining was associated with illness (P = 0.002). In the follow-up case-control study, case restaurants were likelier to use > 2000 eggs per week (P < 0.02), to pool eggs (P < 0.05), and to use eggs from cooperative ‘A’ (P < 0.009). Eggs implicated in separately investigated SE PT4 outbreaks were traced to cooperative ‘A’, and SE PT4 was cultured from one of the cooperative's five local farms. We conclude that SE PT4 transmitted by infected eggs from a single farm caused a fivefold increase in human infections in Utah.

Sobel J. et al. Threat of a biological terrorist attack on the US food supply: the CDC perspective. Lancet. 2002; 359(9309) : 874-80p. Abstract: Deliberate contamination of food with biological agents has already been perpetrated in the USA. The US food supply is increasingly characterised by centralised production and wide distribution of products. Deliberate contamination of a commercial food product could cause an outbreak of disease, with many illnesses dispersed over wide geographical areas. Dependent on the biological agent and contaminated food, such an outbreak could either present as a slow, diffuse, and initially unremarkable increase in sporadic cases, or as an explosive epidemic suddenly producing many illnesses. Preparedness for a bioterrorist event affecting the food supply, therefore, entails augmentation of the traditional public-health infrastructure to enhance disease surveillance, accelerate capacity of laboratory detection, rapidly investigate and control outbreaks, and develop capacity for response to mass-casualty disasters.


Sokett D.C. Johne's disease eradication and control: regulatory implications. Vet Clin North Am Food Anim Pract. 1996; 12(2) : 431-40p. Abstract: The time has come for the livestock industry and the veterinary profession to take Johne's disease seriously in the United States. The continued spread of the disease with accompanying economic hardship to infected herds and the possibility that M. paratuberculosis may be a food-borne pathogen makes inaction a costly proposition. Efforts have started at the national level with NJWG to have guidelines written for a national control program for Johne's disease. A national control program is desirable because it would provide uniformity to control efforts. Veterinarians and livestock owners should be aware of the effort and let their views be known. In addition, national program guidelines already have been written (see the appendix) to certify test-negative herds for paratuberculosis. States that do not offer the certification program should consider it. A list of test-negative herds for Johne's disease that livestock owners could use to buy low risk animals would be a significant step forward in our efforts to control Johne's disease. Federal regulations concerning Johne's disease are outdated and should be changed to facilitate participation by the livestock industry in a Johne's disease control and eradication program.


DESIGN/METHODS: Productively infected cells in colostrum and milk of HIV-1-seropositive mothers were identified by in situ hybridization and immunocytochemistry. Additionally, normal cells from mature milk were infected in vitro to determine which cell types were capable of supporting productive HIV-1 infection. Cellular interactions and transfer of HIV-1 in saliva-milk mixtures were studied to monitor the viability of milk cells and the potential for transfer of infectious virus during ingestion of milk.

RESULTS: Colostrum and early milk from HIV-1-seropositive mothers contained 0.1% to 1% productivity infected macrophages and T cells. Macrophages and epithelial cells from mature milk were susceptible to productive HIV infection in vitro. When milk was mixed with saliva, milk cells became disrupted or were bound and endocytized by salivary epithelial cells. CONCLUSIONS: Productively infected milk cells may contribute directly to transmission of HIV infectivity in breastfed infants during both early and late lactation. Macrophages are the principal cellular carriers of productive HIV-1 infection in milk. Cellular complexes produced during milk-saliva interactions may play a key role in oral transmission of HIV.

Staes C.J. et al. Sources of infection among persons with acute hepatitis A and no identified risk factors during a sustained community-wide outbreak. Pediatrics. 2000; 106(4) : E54p. Abstract: CONTEXT: Hepatitis A is a common vaccine-preventable disease in the United States. Most cases occur during community-wide outbreaks, which can be difficult to control. Many case-patients have no identified source. OBJECTIVE: To identify foodborne and household sources of hepatitis A during a community-wide outbreak. DESIGN: Serologic and descriptive survey. SETTING: Salt Lake County, Utah. PARTICIPANTS: A total of 355 household contacts of 170 persons reported with hepatitis A during May 1996 to December 1996, who had no identified source of infection; and 730 food handlers working in establishments where case-patients had eaten. MAIN OUTCOME MEASURE: Prevalence of immunoglobulin M antibodies to hepatitis A virus (IgM anti-HAV) among household and food service contacts. RESULTS: Overall, 70 household contacts (20%) were IgM anti-HAV-positive, including 52% of children 3 to 5 years old and 30% of children <3 years old. In multivariate analysis, the presence of a child <3 years old (odds ratio [OR]: 8.8; 95% confidence limit [CL]: 2.1,36) and a delay of >/=14 days between illness onset and reporting (OR: 7.9; 95% CL: 1.7,38) were associated with household transmission. Of 18 clusters of infections linked by transmission between households, 13 (72%) involved unrecognized infection among children <6 years old. No food handlers were IgM anti-HAV-positive.

CONCLUSION: During a community-wide outbreak, HAV infection among children was common, was frequently unrecognized, and may have been an important source of transmission within and between households. Transmission from commercial food establishments was uncommon. Ongoing vaccination of children may prevent future outbreaks.

Standaert S.M. et al. Nosocomial transmission of Salmonella gastroenteritis to laundry workers in a nursing home. Infect Control Hosp Epidemiol. 1994; 15(1) : 22-6p. Abstract: BACKGROUND: Outbreaks of salmonella gastroenteritis in nursing homes are common. Person-to-person transmission to nursing home personnel occurs occasionally, but infection of laundry staff as a result of handling soiled linen rarely has been reported. OBJECTIVE: To examine the nosocomial transmission of infection to laundry staff during an outbreak of salmonellosis in a nursing home. SETTING: A 250-bed nursing home in a rural Tennessee county. METHODS: Residents and staff of the nursing home were interviewed and cultures of stool samples examined for enteric pathogens. RESULTS: Stool cultures from 32 residents and 8 employees were positive for Salmonella hadar. Infection among the residents was food-borne, but infection among employees likely represented secondary transmission, as none of the employees ate food prepared in the kitchen and their onset of symptoms occurred seven to 10 days after that of ill residents. Three laundry personnel who had no contact with residents were infected. Most of the ill residents (81%) were incontinent, which led to an increase in both the degree of fecal soiling and the amount of soiled linen received by the laundry during the outbreak. Laundry personnel regularly ate in the laundry room, did not wear protective clothing, and did not wear gloves consistently while handling soiled laundry. CONCLUSIONS: This investigation implicates linen soiled with feces as the source of nosocomial S hadar infection in laundry workers and underscores the importance of using appropriate precautions when handling linen.
Steel N. et al. An outbreak of viral gastro-enteritis at a charity function. *Commun Dis Public Health.* 2001; 4(1): 68-70p. **Abstract:** One hundred and thirty-eight people of 431 who attended a charity function fell ill with gastro-enteritis mainly between 12 and 72 hours later. Three people were ill at the event, and a further three became ill within two hours of the event. A cohort study undertaken using a postal questionnaire showed that illness was statistically associated with having eaten cream, mints, or profiteroles. The duration of illness ranged from two to 120 hours, with a median of 48 hours. Twenty-three of the cases sent a stool sample to the laboratory. Six of these were taken to the laboratory within three days of the onset of illness and examined for bacteria before being sent for virological examination by electron microscopy (EM) and polymerase chain reaction (PCR). All six were positive for small round structured virus (SRSV) on PCR, and negative on EM. The illness was likely to have been transmitted both by foodborne transmission and person to person spread at the event.

Steinberg E.B. et al. Cholera in the United States, 1995-2000: trends at the end of the twentieth century. *J Infect Dis.* 2001; 184(6) : 799-802p. **Abstract:** To evaluate recent trends in cholera in the United States, surveillance data from all cases of laboratory-confirmed toxigenic *Vibrio cholerae* O1 and O139 infection reported to the Centers for Disease Control and Prevention between 1995 and 2000 were reviewed. Sixty-one cases of cholera, all caused by *V. cholerae* O1, were reported. There was 1 death, and 35 (57%) of the patients were hospitalized. Thirty-seven (61%) infections were acquired outside the United States; 14 (23%) were acquired through undercooked seafood consumed in the United States, 2 (3%) were acquired through sliced cantaloupe contaminated by an asymptomatic infected food handler, and no source was identified for 8 (13%) infections. The proportion of travel-associated infections resistant to trimethoprim-sulfamethoxazole, sulfisoxazole, streptomycin, and furazolidone increased from 7 (8%) of 88 in 1990-1994 to 11 (31%) of 35 in 1995-2000. Foreign travel and undercooked seafood continued to account for most US cholera cases. Antimicrobial resistance has increased among *V. cholerae* O1 strains isolated from ill travelers.

Sterling C.R. et al. Cyclospora: an enigma worth unraveling. *Emerg Infect Dis.* 1999; 5(1) : 48-53p. **Abstract:** In part, Cyclospora cayetanensis owes its recognition as an emerging pathogen to the increased use of staining methods for detecting enteric parasites such as Cryptosporidium. First reported in patients in New Guinea in 1977 but thought to be a coccidian parasite of the genus Isospora, C. cayetanensis received little attention until it was again described in 1985 in New York and Peru. In the early 1990s, human infection associated with waterborne transmission of C. cayetanensis was suspected; foodborne transmission was likewise suggested in early studies. The parasite was associated with several disease outbreaks in the United States during 1996 and 1997. This article reviews current knowledge about C. cayetanensis (including its association with waterborne and foodborne transmission), unresolved issues, and research needs.

Stone A. et al. Salmonella poona infection and surveillance in a neonatal nursery. *Am J Infect Control.* 1993; 21(5) : 270-3p. **Abstract:** BACKGROUND: This article reports the first known outbreak of Salmonella poona infection in a neonatal unit. Three babies had stool cultures positive for the organism. At the same time, S. poona was the cause of a nationwide food-borne outbreak associated with contaminated cantaloupe. To minimize the neonatal outbreak, surveys were performed and control measures were instituted. METHODS: Epidemiologic surveillance included the culture of rectal swabs collected from 48 employees, 18 babies, and four family members of the babies. Control measures used included the placement in cohorts and isolation of infected babies, strict adherence to universal precautions, and the restriction of visitation in the nursery. RESULTS: A total of three babies and one employee in the surveillance were found to have Salmonella sp. An additional two hospitalized adult patients had S. poona. Of all the people included in the surveillance, only the three babies were found to have S. poona. The hospital employee had S. enteritidis. CONCLUSIONS: Timely culture results, rapid cohort placement of infected babies, and strict adherence to universal precautions led to the successful eradication of the organism.

Stypulkowska-Misieriewicz H. et al. [Dysentery in 1998]. *Przegl Epidemiol.* 2000; 4(1) : 68-70p. **Abstract:** Since the year 1992 a dramatic decrease of dysentery cases notified every year has been observed in Poland. In 1994 the microbiological examination of diarrhoea stool specimens stopped to be free of charge. Dysentery started to be recognised only in the cases suspected as foodborne disease outbreak investigated for epidemiological reason. This practise influenced the change in the epidemiological feature of dysentery in 1998: increase of cases due to S. flexneri infection (all together 36% of cases) mostly serological type 4a, and decrease of cases due to S. sonnei infection (from 90% to 60%). There were no more summer-autumn seasonal increase in number of monthly registered dysentery cases in July-September but spring increase March-May was observed that is rather unusual in Poland. We suggest that free of charge microbiological examination of diarrhoea stool specimens should be reintroduced due to epidemiological interest--surveillance of infectious diseases.

Su C. et al. *Escherichia coli O157:H7* infection in humans. *Ann Intern Med.* 1995; 123(9) : 698-714p. **Abstract:** OBJECTIVE: To review the clinical relevance of *Escherichia coli O157:H7* infection, including the epidemiology of the infection and its clinical presentations, pathogenesis, microbiology, diagnosis, treatment, and prevention. DATA SOURCES: Articles on E. coli O157:H7 were identified through MEDLINE and the bibliographies of relevant articles. STUDY SELECTION: All articles and case reports describing E. coli O157:H7 and its infection were selected. DATA EXTRACTION: The data were abstracted without judgments about study design. Data quality and validity were assessed by independent author reviews. DATA
SYNTHESIS: Infection with E. coli O157:H7 presents with a wide spectrum of clinical manifestations, including asymptomatic carriage, nonbloody diarrhea, hemorrhagic colitis, the hemolytic-uremic syndrome, and thrombotic thrombocytopenic purpura. Not only is E. coli O157:H7 an important agent for hemorrhagic colitis, it is also one of the leading causes of bacterial diarrhea. Patients at extremes of age have an increased risk for infection and associated complications. Transmission of E. coli O157:H7 is primarily food-borne. Undercooked meat is the most common culprit, and secondary person-to-person spread is also important. The organism produces at least two Shiga-like toxins that differ antigenically, physicochemically, immunologically, and in their biological effects. These toxins are thought to have direct pathogenic significance in E. coli O157:H7 infection. This infection is usually diagnosed from a positive stool culture, from the presence of Shiga-like toxins, or both. Timely collection (within 7 days of illness onset) of a stool sample for culture is imperative for a high recovery rate. Treatment is primarily supportive and includes the management of complications as necessary. Antibiotic therapy has not been proved beneficial. Important public health measures include educating the public on the danger of eating undercooked meat, increasing physician awareness of E. coli O157:H7 infection, and mandating case reporting.

CONCLUSIONS: Infection with E. coli O157:H7 presents with many clinical manifestations and should be included in the differential diagnosis for any patient with new-onset bloody diarrhea. Development of the hemolytic-uremic syndrome or thrombotic thrombocytopenic purpura should raise strong suspicion of E. coli O157:H7 infection and should lead to prompt evaluation. If infection is confirmed, it should be reported to public health officials.

Suljagic V. et al. [Reliability of plasmid profile analysis in the identification of epidemic strains of bacteria causing an outbreak of intestinal infections]. Vojnosanit Pregl. 2001; 58(6) : 615-20p. Abstract: The aim of the study was to determine the plasmid profile of isolates originated from the outbreaks of gastrointestinal tract infection in the attempt to identify the outbreak strains. Plasmid profile analysis was performed on 163 isolates; 82 isolates originated from foodborne outbreaks and 81 isolates originated from waterborne outbreaks or outbreaks spread by contact. Outbreak strain was identified in 1 (10%) of 10 foodborne outbreaks and in 7 (70%) of 10 waterborne outbreaks or outbreaks spread by contact. According to the obtained results, the method of plasmid profile analysis was more reliable in the investigation of outbreaks of gastrointestinal tract infection spread by water or contact compared to the outbreaks spread by food.

Suss J. et al. Viral zoonosis from the viewpoint of their epidemiological surveillance: tick-borne encephalitis as a model. Arch Virol Suppl. 1997; 13 229-43p. Abstract: Tick-borne encephalitis (TBE) is a vector borne and, more rarely, a food (milk, milk products) borne disease of humans. For further characterization of the virus activity in natural foci of TBE more than 32,000 unengorged wild ticks were caught in low and high virus active foci in Germany (Mecklenburg-Western Pomerania, Saxony, Brandenburg, Thuringia, Bavaria, Baden-Wurttemberg, Saarland). The ticks were examined by RT-PCR and Southern blot hybridization as well as by classical virological methods. The dynamics of such natural foci of TBE in the last 35 years were discussed. Also nucleotide sequence data of parts of the virus genome (5'-non coding region) of 16 European and some Far East subtype strains were compared.

Suzuki Y. et al. Restriction fragment length polymorphisms analysis by pulsed-field gel electrophoresis for discrimination of Staphylococcus aureus isolates from foodborne outbreaks. Int J Food Microbiol. 1999; 46(3) : 271-4p. Abstract: A number of outbreaks of disease due to Staphylococcus aureus occurring in Aichi-ken, Japan, have provided the opportunity to investigate aspects of the molecular epidemiology of this and related organisms. Coagulase types, enterotoxin types, phage types, and restriction fragment length polymorphisms (RFLPs) as assessed by pulsed-field gel electrophoresis (PFGE) was performed for S. aureus infections diagnosed in the area of Aichi-ken. Among the 56 isolates of S. aureus from 30 outbreaks, 15 distinctive RFLP types were found by digestion with the restriction enzyme, SmaI. A total of 32 isolates from patients, foodstuffs and cooks on six occasions had the same RFLP types, coagulase types, enterotoxin types and phage types in the same outbreaks. Moreover, the coagulase and phage types could be separated in terms of RFLP. In one outbreak, ten isolates, which were derived from six patients, two foodstuffs and two cooks, had the same coagulase type, enterotoxin type, phage type, and RFLP type. This PFGE method may therefore prove useful for subclassifying S. aureus and differentiating isolates of the same coagulase types and phage types derived from sporadic cases and those derived from foodborne outbreaks.

Svensson L. Diagnosis of foodborne viral infections in patients. Int J Food Microbiol. 2000; 59(1-2) : 117-26p. Abstract: A significant global problem is the microbiological contamination of foods and water. The microorganisms associated with about half of the foodborne disease outbreaks still go unrecognized, primarily as a result of inadequate diagnostic methods and sampling. A significant amount of food- and waterborne diseases are associated with viruses, information that has been obtained only in recent years. Improved diagnostic methods have established that calciviruses are the most important non-bacterial pathogens associated with food- and waterborne outbreaks, and are the major cause of seafood-associated gastroenteritis.

Swaddiwudhipong W. et al. Foodborne botulism outbreaks following consumption of home-canned bamboo shoots in Northern Thailand. J Med Assoc Thai. 2000; 83(9) : 1021-5p. Abstract: We report epidemiological investigations of 2 outbreaks of foodborne botulism following consumption of home-canned bamboo shoots in northern Thailand. The first outbreak affecting 4 female and 2 male cases occurred in Mae Sot District, Tak Province, in December 1997. All 6 cases were hospitalized, 4 of whom required mechanical ventilation. All cases experienced neurological features and 4 had gastrointestinal symptoms. One case died, giving a case-fatality rate of 16.7 per cent. A case-control study revealed a significant association (p < 0.01) between the disease and consumption of home-canned bamboo shoots purchased from the same foodshop in the village. The second outbreak of a similar clinical syndrome occurred in Thawangpha District, Nan Province, in April 1998. A total of 13 cases were identified, 9 (69.2%) of whom were female. Nine cases (69.2%) were hospitalized, 4 (30.8%) of whom required mechanical ventilation. Two early hospitalized cases died due to ventilatory failure, giving a case-fatality rate of 15.4 per cent. A case-control study indicated that home-canned bamboo shoots prepared by a local foodshop served as the
Many lines of evidence link antimicrobial-resistant human infections to foodborne pathogens of animal origin. Types of evidence reviewed include: (1) direct epidemiologic studies; (2) temporal evidence; (3) additional circumstantial evidence; (4) trends in antimicrobial resistance among Salmonella isolates; and (5) trends in antimicrobial resistance among other pathogens, such as Campylobacter jejuni. Commensal microorganisms in animals and humans may contribute to antimicrobial resistance among pathogens that cause disease among humans. For instance, enterococci of food-animal origin, particularly strains that are vancomycin-resistant, have been linked to strains found in the human gastrointestinal tract. The latent period between the introduction of a given antimicrobial and emergence of resistance varies considerably, but once the prevalence in a population reaches a certain level, control becomes extremely difficult.

Swords K.M. et al. Spontaneous and induced mutations in a single open reading frame alter both virulence and avirulence in Xanthomonas campestris pv. vesicatoria avrBs2. J Bacteriol. 1996; 178(15) : 4661-9p. Abstract: Molecular characterization of the avrBs2 locus from Xanthomonas campestris pv. vesicatoria has revealed that expression of this gene triggers disease resistance in Bs2 pepper (Capsicum annum) plants and contributes to virulence of the pathogen. Deletion analysis and site-directed mutagenesis established the avrBs2 gene as a 2,190-bp open reading frame encoding a putative 80.1-kDa protein. Two classes of Xanthomonas pathogens evading Bs2 host resistance and displaying reduced fitness were found to be specifically mutated in avrBs2. Members of one class contained a 5-bp insertion, while the second class was distinguished by a divergent 3' region of avrBs2; both mutant classes were complemented in trans by a plasmid-borne copy of avrBs2. A divergent avrBs2 homolog was cloned from the Brassica pathogen X. campestris pv. campestris. The predicted AvrBs2 proteins of the two Xanthomonas pathovars were strongly conserved and had predicted sequence similarity with both Agrobacterium tumefaciens agrocinopine synthase and Escherichia coli UgpQ, two enzymes involved in the synthesis or hydrolysis of phosphodiester linkages. On the basis of homology with agrocinopine synthase and UgpQ and the dual phenotype of avirulence and virulence, several models for the function of AvrBs2 are proposed.


Tanabe S. Contamination and toxic effects of persistent endocrine disrupters in marine mammals and birds. Mar Pollut Bull. 2002; 45(1-2) : 69-77p. Abstract: In recent years, several species of marine mammals and birds have been affected by uncommon diseases and unusual mortalities. While several possible causative factors have been attributed for these events, a prominent suspect is exposure to man-made toxic contaminants. Particularly, some of these man-made chemicals can disrupt normal endocrine physiology in animals. At CMES, our studies focus on exposure and toxic effects of endocrine disrupting chemicals, particularly organochlorines, in higher trophic level wildlife. Endocrine disrupting chemicals, such as organochlorine insecticides, polychlorinated biphenyls, organotins etc. are found in tissues of a wide variety of wildlife. Extremely high concentrations have been found in animals afflicted with diseases and/or victims of mass mortalities. Elevated contamination by organochlorines has been found in open sea animals such as cetaceans and albatrosses, which seemed to be attributable to their low capacity to metabolize toxic persistent contaminants. Significant correlations between biochemical parameters (serum hormone concentrations and cytochrome P450 enzyme activities) and residues of endocrine disrupting chemicals were found in some species of marine animals, which indicates that these chemicals may impose toxic effects in animals even at the current levels of exposure. In general, water birds and marine mammals accumulated the dioxin-like compounds with much higher concentrations than humans, implying higher risk from exposure in wildlife. The future issues of endocrine disrupting chemicals in humans and wildlife will have to be focused in developing countries.

Tangrongchitr A. et al. Eating habits associated with Echinostoma malayanum infections in the Philippines. Southeast Asian J Trop Med Public Health. 1991; 22 Suppl 212-6p. Abstract: A survey of 61 residents belonging to 12 pre-selected families (having at least one member positive for echinostomiasis malayanum) from Barangay Malibago, Echague, Isabela (northern Luzon) suggested that infections with Echinostoma malayanum follow a "familial trend". The parasite is endemic because the raw ingestion of Lymnaea (Bullastra) cunningiana, the second intermediate host in the Philippines, is a learned habit passed down from one generation to the next. A questionnaire on eating habits revealed that Lymnaea (Bullastra) cunningiana or "birabid" was usually prepared raw or half-cooked after treatment with salt or "bagoong" (salted fish paste). It was abundant in rice fields during the wet months of the year, thus implying a seasonal infection pattern since eating frequency was affected by availability. Those who ate this snack reported a long duration of indulgence with this habit. In contrast, Pila luzonica or "kuhol", the second intermediate host of E. ilocanum, is subjected to similar eating practices but is rarely ingested raw or "half-cooked". Other than snails, shrimps, fish (Tilapia sp.) and meat are also eaten raw. This suggests that the local population is potentially susceptible to other food-borne helminthiases. Extensive use of mass media and public health education is necessary to awaken the awareness of the people to the potential hazards associated with their traditional eating habits.

seed sprouts have occurred in several countries. Subjective evaluations indicate that pathogens can exceed 107 per gram of sprouts produced from inoculated seeds during sprout production without adversely affecting appearance. Treating seeds and sprouts with chlorinated water or other disinfectants fails to eliminate the pathogens. A comprehensive approach based on good manufacturing practices and principles of hazard analysis and critical control points can reduce the risk of sprout-associated disease. Until effective measures to prevent sprout-associated illness are identified, persons who wish to reduce their risk of foodborne illness from raw sprouts are advised not to eat them; in particular, persons at high risk for severe complications of infections with Salmonella or E. coli O157:H7, such as the elderly, children, and those with compromised immune systems, should not eat raw sprouts.

Tappero J.W. et al. Reduction in the incidence of human listeriosis in the United States. Effectiveness of prevention efforts? The Listeriosis Study Group. JAMA. 1995; 273(14) : 1118-22p. Abstract: BACKGROUND--Foodborne transmission is now recognized as a major cause of human listeriosis. OBJECTIVE--To assess the impact of prevention efforts, listeriosis rates before interventions were initiated in 1989 were compared with more recent rates (1990 through 1993). DESIGN--From 1989 through 1993, multistate, laboratory-based active surveillance was conducted to identify all cases in which Listeria monocytogenes was isolated from cultures or ordinarily sterile sites in an aggregate population of more than 19 million. SETTING--All laboratories serving acute care hospitals in up to nine surveillance areas in the United States. INTERVENTIONS--In 1989, a well-publicized case report of listeriosis linked to processed poultry led US regulatory agencies to enforce aggressive food monitoring policies and prompted industry to invest in cleanup efforts. In May 1992, consumer guidelines for listeriosis prevention were disseminated. OUTCOME MEASURES--Cases of perinatal and nonperinatal listeriosis. RESULTS--The rate of listeriosis decreased in all surveillance areas. Projection of these rates to the US population suggests an estimated 1965 cases and 481 deaths occurred in 1989 compared with an estimated 1092 cases and 248 deaths in 1993 (P = .003). Three serotypes (1/2a, 1/2b, and 4b) of L monocytogenes accounted for more than 96% of cases during each year of the study (1989 through 1993). CONCLUSIONS--The incidence of listeriosis in the United States. Effectiveness of prevention efforts, listeriosis rates before interventions were initiated in 1989 were compared with more recent rates (1990 through 1993). DESIGN--From 1989 through 1993, multistate, laboratory-based active surveillance was conducted to identify all cases in which Listeria monocytogenes was isolated from cultures or ordinarily sterile sites in an aggregate population of more than 19 million. SETTING--All laboratories serving acute care hospitals in up to nine surveillance areas in the United States. INTERVENTIONS--In 1989, a well-publicized case report of listeriosis linked to processed poultry led US regulatory agencies to enforce aggressive food monitoring policies and prompted industry to invest in cleanup efforts. In May 1992, consumer guidelines for listeriosis prevention were disseminated. OUTCOME MEASURES--Cases of perinatal and nonperinatal listeriosis. RESULTS--The rate of listeriosis decreased in all surveillance areas. Projection of these rates to the US population suggests an estimated 1965 cases and 481 deaths occurred in 1989 compared with an estimated 1092 cases and 248 deaths in 1993 (P = .003). Three serotypes (1/2a, 1/2b, and 4b) of L monocytogenes accounted for more than 96% of cases during each year of the study (1989 through 1993). CONCLUSIONS--The incidence of listeriosis in study areas was substantially lower in 1993 than in 1989. The temporal association of this reduction with industry, regulatory, and educational efforts suggests these measures were effective.


Tellier V. et al. [Ambulatory management of moderately and severely malnourished children in the rural health district of Kapalowe in Shaba (Zaire)]. Sante. 1996; 64(4) : 213-9p. Abstract: In Kapalowe rural health district, hospitalisation of malnourished children is restricted to complicated cases; once the complication is under control or eliminated, the child's treatment is continued at home, based on a 13 weeks contract, between parents and health centre. The parents commit themselves to feed their child four times a day (two porridge and two family dish portions), to consult once a week at the health centre and to welcome a weekly home visit. The objective of this visit is to support the parents, to detect possible problems and to reach the roots for this particular child. During the contract period, cost of medical treatment and recommended soya flour, is borne by the parents through a lump sum contribution. In this article, data concerning the first 95 children home rehabilitated (1989-1991) in Kapalowe are analysed. Characteristics of these children are classical regarding malnutrition; for example, age distribution is similar to that of weaning and of defunction of children at the hospital during the same year. Approximately half of them are still breastfed at the beginning of the contract. Most of them are correctly immunized and have been seen at the health centre at least two times in the last six months. Seventy-four children finished the contract; there were 17 abandons and 4 deaths. Weight gain is inferior to that observed in specialized feeding centres which do benefit from external resources, which is not the case here. It was not possible to show a significant catch up for the height for age indicator after the three months contract. These anthropometrical results are less important than the global and subjective improvement in the child's general health status observed at the end of the contract. None of the children reached the target weight after 13 weeks but important changes were observed in their behaviour, in their resistance to infection and in the attitude of their parents. The parents generally followed the instructions quite well. The middle of the contract seems to be a key period when either significative changes happen or when the attention is released. Treatment instructions have been amended to avoid monotony and overload, and to stimulate staff creativity and self-satisfaction. Payment was not a problem for the parents as malnutrition is not linked to extreme poverty. Mother's attitude and confidence and child initial weight for height status are two important contract success determinants. Abandons are more frequent when the mother is pessimistic and in case of kwashiorkor. Despite this, most of these children had gained more than one kilo before the contract was interrupted. Some didn't fulfill the W/H inclusion criteria (-2 standard deviations) and should probably not have been under contract. The four deaths were linked to insufficient treatment instructions for usually banal diseases that have another meaning in case of malnutrition, such as diarrhoea, fever, etc. An evaluation performed three months after the end of the contract in 26 children show 13 further improvements, 8 statu quo, 4 relapses and 2 new deaths. Conclusions are that home nutritional rehabilitation is possible where a health district is fully operational, that anthropometric data are useful to monitor rehabilitation but not to be pursued only as sole and ultimate objectives, and that adequate follow up after the first intensive stage is essential. The paper also shows how such a research result can have direct consequences on the organization of health activities.

Thackway S.V. et al. Monitoring acute diseases during the Sydney 2000 Olympic and Paralympic Games. Med J Aust. 2000; 173(6) : 318-21p. Abstract: The Sydney 2000 Olympic Games (the XXVII Olympiad) will be the biggest peacetime event ever held in Australia. During the Games, all public health decisions will be centralised, with daily briefing sessions held to review emerging public health issues and
facilitate responses. Infectious diseases will be monitored and reported through the Olympic Surveillance System, with particular attention to foodborne diseases and conditions spread via the respiratory route. This system relies heavily on the cooperation of key notifiers such as emergency departments, laboratories and general practitioners. The lessons learned during the Games, and the new and enhanced systems and linkages that have been developed to support it, will strengthen future disease surveillance in NSW.

Tham W. et al. Lessons from an outbreak of listeriosis related to vacuum-packed gravad and cold-smoked fish. *Int J Food Microbiol.* 2000; 62(3): 173-5p. Abstract: The first lesson learned from this outbreak was that vacuum-packed rainbow trout is not only an excellent medium for the growth of Listeria monocytogenes, but may also cause human listeriosis. Another lesson is that one single fish processing plant may spread multiple clonal types of *L.* monocytogenes by selling contaminated products to consumers. Thus, when investigating fish-borne outbreaks of listeriosis one should identify and type several isolates of *L.* monocytogenes from each food and environmental sample, since multiple clonal types might be present. The outbreak described in this paper involved at least eight human cases, three clonal types of *L.* monocytogenes, and lasted for 11 months. During the outbreak investigation, *L.* monocytogenes was also isolated from another brand of rainbow trout found in the refrigerator of one of the patients. These latter isolates belonged to a clonal type not associated with the outbreak. However, this clonal type is of considerable interest since it has been associated with foodborne outbreaks of listeriosis in several countries, and is also the second most common clonal type among human clinical isolates of *L.* monocytogenes in Sweden. Besides the described outbreak, it is likely that vacuum-packed, cold-smoked and gravad rainbow trout have been involved in additional cases of foodborne listeriosis in Sweden.

Thomson J. et al. Australia's notifiable diseases status, 1998. Annual report of the National Notifiable Diseases Surveillance System. *Commun Dis Intell.* 1999; 23(11): 277-305p. Abstract: In 1998 there were 85,096 notifications to the National Notifiable Diseases Surveillance System; slightly lower than in 1997 (89,579). The number of measles cases remained low, and well below the number reported in the outbreak years of 1993 and 1994. Rubella notifications further decreased and remained low in 1998. The Measles Control Campaign from August to November 1998, did not impact significantly on the number of measles or rubella cases reported for 1998. Notifications of Haemophilus influenzae type b reached a record low since surveillance began in 1991, and appeared to have stabilised at a low rate since the introduction of the conjugated vaccine in 1992. The previously reported outbreak of pertussis in 1997 tapered off in early 1998. Food-borne disease, or detection of disease, appeared to be on the rise with an increase in notification rates of campylobacteriosis and salmonellosis. Notifications of hepatitis A decreased, correcting the previous high number of notifications in 1997. Sexually transmissible diseases (STDs) increased. Notifications for chlamydial infection were the highest for all sexually transmitted diseases and third highest for all notifiable diseases. Notifications of gonococcal infection also continued to rise and have doubled since 1991, whilst notifications for syphilis increased slightly after falling steadily over recent years. Arbovirus infections of concern in 1998 were dengue outbreaks in Far North Queensland and the first case of Japanese Encephalitis for mainland Australia, highlighting the importance of surveillance of arboviruses and vectors for their detection and management.

Thurm V. et al. Identification of infant food as a vehicle in a nosocomial outbreak of Citrobacter freundii: epidemiological subtyping by alloverse, whole-cell protein and antibiotic resistance. *J Appl Bacteriol.* 1994; 76(6): 553-8p. Abstract: A total of 38 Citrobacter freundii strains was isolated from patients and their environment at a neonatal intensive care unit of a large hospital where colonization and clinical diseases due to the agent had been observed. Epidemiological investigations were carried out by subtyping, for which a combination of alloverse, whole-cell protein and resistance pattern analysis was used. Infant formula was identified as a vehicle of nosocomial spread. This shows that the role of foods in the transmission of hospital infections should not be underestimated. The combination of methods applied, in particular a limited enzyme set, is recommended also for epidemiological investigations of food-borne infections and establishment of their causes.

Tilden J. et al. Health advisories for consumers of Great Lakes sport fish: is the message being received? *Environ Health Perspect.* 1997; 105(12): 1360-5p. Abstract: Nationwide, 45 states issue health advisories for sport fish consumers. Chemical contaminants in some Great Lakes (GL) sport fish include compounds suspected of causing adverse reproductive and developmental effects. Although advisories to reduce consumption of contaminated fish, especially by women, have been issued by GL states (i.e., Illinois, Indiana, Michigan, Minnesota, New York, Ohio, Pennsylvania, and Wisconsin) since the mid-1970s, little is known about advisory awareness and GL sport fish consumption in the general population. To estimate the prevalence of GL sport fish consumption and health advisory awareness, we conducted a population-based telephone survey of 8,306 adult residents of the eight GL states. We gathered information concerning respondents’ demographic characteristics, fish consumption during the preceding year, and sport fish consumption advisory awareness. The survey response rate was 69%. GL sport fish were eaten during the preceding year by 8.4% -95% confidence interval (CI), 7.6-9.2- of adults in the GL states, approximately 4.7 million persons. Women accounted for 43.9% (CI, 39.4-48.4) of consumers. Although 49.9% of GL sport fish consumers were aware of a health advisory, awareness varied significantly by sex: 58.2% (CI, 51.7-64.7) of males and 39.1% (CI, 32.6-45.6) of females were aware. Using logistic regression, we found awareness associated with male sex -odds ratio (OR) = 2.3; CI, 1.5-3.5), white race (OR = 4.2; CI, 1.9-9.1), college degree (OR = 3.1; CI, 1.3-7.6), and consuming >=24 GL sport fish meals/year (OR = 2.4; CI, 1.4-4.3). Only half of GL sport fish consumers reported awareness of a health advisory concerning eating GL sport fish. Awareness was especially low among women, suggesting the need of targeted risk communication programs for female consumers.


Tkachuk M.V. et al. [Listeria monocytogenes: a dangerous pathogen used as a vector for the new generation of
Abstract: Listeria monocytogenes (LM) has become a major pathogen of human foodborne illnesses eliciting menigitis, peritonitis, and abortions with a mortality rate of about 30%
During the course of the disease, LM infects a variety of tissues and cell types due to its capacity to induce its own phagocytosis even into non-phagocytic cells. For over 35 years LM continues to serve as a model to define general paradigms of immunology In this review we focus on the clinical characteristics of listeriosis, on the risk factors involved in the pathogenesis, and discuss the currently accepted approaches to prophylaxis and treatment. We report on novel strategies in vaccine development based on the LM-dependent delivering machinery for immune recognition and induction of immunological memory against desired antigens.


Tollefson L. et al. Public health aspects of antibiotic resistance monitoring in the USA. Acta Vet Scand Suppl. 1999; 92 67-75p. Abstract: Treatment of food-producing animals with antimicrobial agents that are important in human therapy may present a public health risk by the transfer of resistant zoonotic pathogens or resistant genes from animals to humans via consumption of contaminated food. Resistant bacteria can diminish the effectiveness of antibiotics and demand the use of more expensive or less safe alternatives. In 1996, the U. S. Food and Drug Administration (FDA), the Centers for Disease Control and Prevention (CDC), and the Department of Agriculture (USDA) established the National Antimicrobial Resistance Monitoring Program to prospectively monitor changes in antimicrobial susceptibilities of zoonotic enteric pathogens from human and animal clinical specimens, from healthy farm animals, and from carcasses of food-producing animals at slaughter plants. Data resulting from the monitoring program will be used to redirect antimicrobial drug use, primarily through educational initiatives directed at health practitioners, in order to diminish the development and spread of resistance. Veterinary testing is conducted at USDA's Agricultural Research Service and CDC's Foodborne Disease Laboratory is testing human isolates under contract to FDA. Both the CDC and USDA laboratories are using a semi-automated system (Sensititre, Accumed, Westlake, Ohio) for testing susceptibilities of the isolates to 17 antimicrobial agents on a minimum inhibitory concentration plate. Comparable methods for isolate handling are used in both laboratories. This paper describes the development, implementation, and objectives of the National Antimicrobial Resistance Monitoring Program, presents initial data generated by the program, and discusses future plans.

Tomy G.T. et al. Environmental chemistry and toxicology of polychlorinated n-alkanes. Rev Environ Contam Toxicol. 1998; 158 53-128p. Abstract: Polychlorinated-n-alkanes (PCAs) or chlorinated paraffins consist of C10 to C30 n-alkanes with chlorine content from 30% to 70% by mass. PCAs are used as high-temperature lubricants, plasticizers, flame retardants, and additives in adhesives, paints, rubber, and sealants. This review presents the existing data on the environmental chemistry and toxicology of PCAs and a preliminary exposure and risk assessment. There is limited information on the levels, fate, or biological effects of PCAs in the environment. This results both from the difficulty associated with quantifying PCAs, because of the complexity inherent to commercial formulations, and from the limited knowledge of their physicochemical properties and biodegradation rates. There are indications that PCAs are widespread environmental contaminants at ng/L levels in surface waters and ng/g (wt wt) levels in biota. However, environmental measurements of PCAs are very limited in the U.S. and Canada, and are only slightly more detailed in western Europe. Assuming that reported water concentrations are mainly caused by the short chain (C10-C13) compounds, aquatic organisms may be at risk from exposure to PCAs. Fugacity level II modeling for two representative PCAs, using the best available physicochemical property data and estimated degradation rates, suggested that C16C24Cl10 would achieve higher concentrations in biota, sediment, and soil than C12H20Cl6 because of slower degradation rates and lower water solubility. Environmental residence time of C16H24Cl10 is estimated to be 520 d compared to 210 d for C12H20Cl6. Future studies will require better analytical methods and reference materials certified for PCA content. Additional data are needed to evaluate exposure of biota to PCAs in the environment, particularly in light of their continued production and usage around the globe.

Travis C.C. et al. Validation of a terrestrial food chain model. J Expo Anal Environ Epidemiol. 1992; 2(2) : 221-39p. Abstract: An increasingly important topic in risk assessment is the estimation of human exposure to environmental pollutants through pathways other than inhalation. The Environmental Protection Agency (EPA) has recently developed a computerized methodology (EPA, 1990) to estimate indirect exposure to toxic pollutants from Municipal Waste Combuster emissions. This methodology estimates health risks from exposure to toxic pollutants from the terrestrial food chain (TFC), soil ingestion, drinking water ingestion, fish ingestion, and dermal absorption via soil and water. Of these, one of the most difficult to estimate is exposure through the food chain. This paper estimates the accuracy of the EPA methodology for estimating food chain contamination. To our knowledge, no data exist on measured concentrations of pollutants in food grown around Municipal Waste Incinerators, and few field-scale studies have been performed on the uptake of pollutants in the food chain. Therefore, to evaluate the EPA methodology, we compare actual measurements of background contaminant levels in food with estimates made using EPA's computerized methodology. Background levels of contaminants in air, water, and soil were used as input to the EPA food chain model to predict background levels of contaminants in food. These predicted values were then compared with the measured background contaminant levels. Comparisons were performed for dioxin, pentachlorophenol, polychlorinated biphenyls, benzene, benzo(a)pyrene, mercury, and lead.

Tremolieres F. [Food poisoning-infections in metropolitan France]. Rev Prat. 1996; 46(2) : 158-65p. Abstract: Food-borne diseases result from ingestion of contaminated foods, especially with pathogenic bacteria. It is considered as an outbreak as soon as 2 cases are diagnosed following a common food exposure; in France, declaration to health authorities is mandatory. Salmonella is the most frequently identified aetiologic agent. The incidence of Campylobacter induced food-borne infection is understated. Infections due to Staphylococcus or Clostridium perfringens represent almost 30% of all outbreaks. Listeriosis has to be included in food-
borne disease because of its severity, and since it determines outbreaks for which mandatory epidemiological survey is especially important.

Troillet N. et al. [Epidemic of type B botulism: Sion, December 1993-January 1994]. Schweiz Med Wochenschr. 1995; 125(39) : 1805-12p. Abstract: 12 cases of food-borne botulism were registered in Sion, Switzerland, between 31 December, 1993 and 12 January, 1994. A type B toxin was isolated from the serum of one patient and from the incriminated ham. Clinical data of 10 male patients aged 21 to 54 years and some epidemiologic data are reported. The clinical course was mild to moderate with predominant autonomic and gastro-intestinal symptoms and signs: blurred vision (10 patients of 10), dry mouth with dysphagia (9/10), asthma (7/10), diarrhea and/or constipation (7/10), nausea and vomiting (6/10), abdominal cramps (5/10), impaired sexual function (5/10), dilated pupils (4/10). Some discomfort (mainly blurred vision, asthenia and impaired sexual function) persisted for several months in most patients. Neuromuscular involvement was never the reason for seeking medical assistance and had often disappeared at the time of the first visit. Two patients were hospitalized, one for transient ileus of unknown origin and the second (first suspected case) for monitoring and infusion of trivalent equine botulinum antitoxin. This treatment was administered on day eight after intoxication and had no effect on this patient's outcome when compared with others. No patient died. Epidemiology, diagnosis, treatment and prognosis of botulism are discussed.

Tsutsumi T. et al. Update of daily intake of PCDDs, PCDFs, and dioxin-like PCBs from food in Japan. Chemosphere. 2001; 45(8) : 1129-37p. Abstract: Total diet study (TDS) samples of 14 food groups from 16 locations in Japan, collected in 1999 and 2000, were analyzed for polychlorinated dibenzo-p-dioxins (PCDDs), dibenzofurans (PCDFs), and dioxin-like polychlorinated biphenyls (dioxin-like PCBs) to estimate the update of daily intake of these contaminants from food. The mean daily intake of toxic equivalency (TEQ) for an adult weighing 50 kg, calculated at non-detected isomer concentrations equal to zero (ND = 0), was estimated to be 2.25 pg TEQ/kg b.w./day. When non-detected isomer concentrations are assumed to be equal to half of the limits of detection (ND = 1/2 LOD), the mean daily intake was estimated to be 3.22 pg TEQ/kg b.w./day. These values were below the tolerable daily intake (TDI) of 4 pg TEQ/kg b.w. for PCDD/Fs and dioxin-like PCBs set in Japan. In both the estimates, the mean daily intakes were highest from fish and shellfish (76.9% at ND = 0 and 53.9% at ND = 1/2 LOD of the total TEQs), followed by those from meat and eggs (15.5% at ND = 0 and 11.7% at ND = 1/2 LOD of the total TEQs). Congener specific data revealed that these total TEQ levels were dominated by 1,2,3,7,8-PeCDD, 2,3,4,7,8-PeCDF and 3,3',4,4',5-PeCB in each case (71.7% at ND = 0 and 63.1% at ND = 1/2 LOD of the total TEQs). The dioxin-like PCBs (non-ortho and mono-ortho PCBs) accounted for about 50% of these total TEQs. These data will be very useful in the risk assessment of PCDD/Fs and dioxin-like PCBs from food in Japan.

Tuttle J. et al. Lessons from a large outbreak of Escherichia coli O157:H7 infections: insights into the infectious dose and method of widespread contamination of hamburger patties. Epidemiol Infect. 1999; 122(2) : 185-92p. Abstract: Between November 1992 and February 1993, a large outbreak of Escherichia coli O157:H7 infections occurred in the western USA and was associated with eating ground beef patties at restaurants of one fast-food chain. Restaurants that were epidemiologically linked with cases served patties produced on two consecutive dates; cultures of recalled ground beef patties produced on those dates yielded E. coli O157:H7 strains indistinguishable from those isolated from patients, confirming the vehicle of illness. Seventy-six ground beef Patty samples were cultured quantitatively for E. coli O157:H7. The median most probable number of organisms was 1.5 per gram (range, < 0.3-15) or 67.5 organisms per patty (range, < 13.5-675). Correlation of the presence of E. coli O157:H7 with other bacterial indicators yielded a significant association between coliform count and the presence of E. coli O157:H7 (P = 0.04). A meat traceback to investigate possible sources of contamination revealed cattle were probably initially colonized with E. coli O157:H7, and that their slaughter caused surface contamination of meat, which once combined with meat from other sources, resulted in a large number of contaminated ground beef patties. Microbiological testing of meat from lots consumed by persons who became ill was suggestive of an infectious dose for E. coli O157:H7 of fewer than 700 organisms. These findings present a strong argument for enforcing zero tolerance for this organism in processed food and for markedly decreasing contamination of raw ground beef. Process controls that incorporate microbiological testing of meat may assist these efforts.

van der Valk H.C. Community structure and dynamics in desert ecosystems: potential implications for insecticide risk assessment. Arch Environ Contam Toxicol. 1997; 32(1) : 11-21p. Abstract: Insecticides are increasingly being used in hot arid ecosystems. The evaluation of the ecological risk these insecticides may pose, however, is based largely on data derived from temperate organisms and ecosystems. The major differences in the composition, structure, and functioning of desert animal communities when compared to temperate terrestrial ecosystems are discussed. Desert communities are characterized by a high fraction of ectotherms (both vertebrates and invertebrates); rodents and insectivores appear to dominate the mammalian fauna; and detritivores make up a very large part of the arthropod fauna. Presently available toxicity data cover these groups only to a very limited extent. It is not known if the ranges of insecticide susceptibility observed in temperate species are representative of those in arid organisms. Thus, it is not certain that ecotoxicological assessments based on such data sets adequately protect desert animal communities. It is shown that food web connectance is higher in desert ecosystems than in temperate grasslands or forests. This may to a large extent be due to the high degree of omnivory among desert organisms. Population regulation between predators and prey appears to be weaker in deserts. The same is often, though not always, the case for competition among desert organisms. It is argued that such characteristics will reduce the chance that strong indirect effects of insecticide perturbations will occur. In spite of the fact that many desert organisms are well adapted to cope with high temporal and spatial environmental variability, there is no reason to believe that they will always recover more rapidly from population perturbations caused by insecticides. The relatively large physiological and life-history plasticity encountered in many
van Leeuwen F.X. et al. Dioxins: WHO's tolerable daily intake (TDI) revisited. Chemosphere. 2000; 40(9-11): 1095-101p. Abstract: In December 1990, the World Health Organization (WHO) established a tolerable daily intake (TDI) of 10 pg/kg b.w. (body weight) for TCDD, based on liver toxicity, reproductive effects and immunotoxicity in experimental animals, and making use of kinetic data in humans and experimental animals. Since then new epidemiological and toxicological data have emerged, in particular with respect to neurodevelopmental and endocrine effects of dioxin. Therefore, the European Centre for Environment and Health of the World Health Organization (WHO-ECEH) and the International Programme on Chemical Safety (IPCS) jointly organized a consultation on the "Assessment of the health risk of dioxins: re-evaluation of the TDI", May 1998, Geneva, Switzerland. The participants discussed the health risks for infants, cancer and non-cancer endpoints in humans and animals, mechanistic aspects, kinetic behaviour, modelling, exposure, and the applicability of the toxic equivalency (TEQ) concept. For the health risk assessment of dioxin-like compounds, the WHO Consultation focused on the most sensitive effects that are considered adverse (hormonal, reproductive and developmental effects) seen at low doses in animal studies (rats and monkeys). Human daily intakes corresponding with body burdens similar to those associated with adverse effects in animals could be estimated to be in the range of 14-37 pg/kg b.w./day. To arrive at a TDI expressed as TEQ, a composite uncertainty factor of 10 was recommended. By applying this uncertainty factor a TDI range of 1-4 pg TEQs/kg body weight was established. An extensive executive summary of the results of this WHO Consultation with all the underlying background documents will be published in Food Additives and Contaminants (in press).

Van Loock F. et al. Analysis of foodborne disease in Belgium in 1997. Acta Clin Belg. 2000; 55(6): 300-6p. Abstract: Foodborne disease represents a major problem for public health in industrialized countries, albeit with a low lethality. Foodborne diseases are defined as a group of viral, bacterial or parasitic gastrointestinal infections transmitted by means of food. Proper food-hygiene practices and surveillance of individual diseases and in particular outbreaks are the first steps in targeting their prevention. The incidence of this illness is difficult to estimate. In the Netherlands a yearly incidence of gastrointestinal infections of 500 per 1,000 inhabitants is estimated, of which most are foodborne. To set up priorities in the actions to undertake, to establish the most frequent risks, to develop preventive efforts and to answer to international requirements, accurate data on foodborne disease from Belgium are required. In order to co-ordinate the initiatives in the Belgian context, a working group was set up in 1995. In 1997 a total of 2,013 persons with foodborne disease were identified as part of 140 outbreaks, 22 of which occurred with 10 cases or more. Salmonella Enteritidis (88 outbreaks) was identified as the main pathogen in foodborne disease, followed by S. Typhimurium (11), S. Hadar (4). Eggs and meat products were identified as the main food-items involved, although it remains difficult to obtain proper intervention studies allowing to identify the specific cause(s). In 1997, a total of 12,732 human Salmonella isolates and 5,617 Campylobacter isolates were identified by the respective national reference laboratories. Salmonella isolates from Belgium accounted in 1997 for more than a fifth of all Salmonella isolates in the EU. The final objective of the working group is the implementation of a surveillance system for all risk factors concerned with the development of food-related illness, including an early warning system and an efficient analysis of microbiological criteria relating to human health, food and food production, including livestock. An essential element of this surveillance is the documentation of the results, risks and measures for prevention between all the departments, institutions and public health authorities concerned.

Van Looveren M. et al. Antimicrobial susceptibility of nontyphoidal Salmonella isolated from humans in Belgium. Acta Clin Belg. 2001; 56(3): 180-6p. Abstract: Human nontyphoidal Salmonella infections are the primary cause of foodborne disease in developed countries, resulting in considerable morbidity and occasionally death, especially in immunocompromised patients. Strains of Salmonella that are resistant to antimicrobial agents have become a world-wide health problem. Fluoroquinolones are drugs of choice for treatment of human invasive salmonellosis, and have been useful for the treatment of infections caused by multi-resistant strains. However, strains resistant to ciprofloxacin have been noted. A random sample of 378 Salmonella strains of human origin was collected during 1998. Their susceptibility to 11 antimicrobial agents was determined by the agar dilution method according to NCCLS standards. In total, 38 serotypes were represented of which S. Enteritidis (20.4%), S. Typhimurium (20.4%), S. Hadar (9.0%), S. Brandenburg (7.9%), S. Infantis (7.7%), and S. Virchow (5.3%) were the most common. All strains were susceptible to ceftriaxone and ciprofloxacin. For nalidixic acid the rate of resistance was 19.0%. Of the 72 strains resistant to nalidixic acid, 31 were S. Hadar, and thus 91.2% (31/34) of the S. Hadar isolates showed resistance to nalidixic acid. Most of the S. Hadar strains were also resistant to ampicillin, tetracycline and sulphanmethoxazole, and an elevated MIC50 (0.25 microgram/ml) and MIC90 (1 microgram/ml) was observed for ciprofloxacin. The high rate of resistance to nalidixic acid can be a first step towards the development of resistance to ciprofloxacin.

Van Oostdam J. et al. Human health implications of environmental contaminants in Arctic Canada: a review. Sci Total Environ. 1999; 230(1-3): 1-82p. Abstract: This paper assesses the impact on human health of exposure to current levels of environmental contaminants in the Canadian Arctic, and identifies the data gaps that need to be filled by future human health research and monitoring. The concept of health in indigenous groups of the Arctic includes social, cultural, and spiritual dimensions. The harvesting, sharing and consumption of traditional foods are an integral component to good health among Aboriginal people influencing both physical health and social well-being. Traditional foods are also an economic necessity in many communities. Consequently, the contamination of country food raises problems which go far beyond the usual confines of public health and cannot be resolved by health advisories or food substitutions alone. The primary exposure pathway for the contaminants considered in this paper is through the traditional northern diet. For the Inuit, the OCs of primary concern at this time from the point of view of exposure are chlordane, toxaphene, and PCBs. Exposures are higher in the
eastern than in the western region of the North. For Dene/Metis, exposure to OCs is in general below a level of concern. However, estimated intake of chlordane and toxaphene has been found to be elevated for certain groups and is a cause for concern if exposures are elevated on a regular basis. The developing foetus and breast-fed infant are likely to be more sensitive to the effects of OCs and metals than individual adults and are the age groups at greatest risk in the Arctic. Extensive sampling of human tissues in the Canadian north indicate that a significant proportion of Dene, Cree and Inuit had mean maternal hair mercury levels within the 5% risk-range proposed by the WHO for neonatal neurological damage. Based on current levels, lead does not appear to pose a health threat while cadmium is likely only a neurological damage. Based on current levels, lead does not appear to pose a health threat while cadmium is likely only a major risk factor for heavy smokers or consumers of large amounts of organ meats. Consumers of traditional foods are exposed to an approximately seven-fold higher radiation dose than non-consumers of traditional foods due predominantly to the bioaccumulation of natural radionuclides in the food chain. Risk determination for contaminants in country food involves a consideration of the type and amounts of food consumed and the sociocultural, nutritional, economic, and spiritual benefits associated with country foods. Risk management options that minimize the extent to which nutritional and sociocultural aspects of Aboriginal societies are compromised must always be considered.

van Wijnen J.H. et al. Health risk assessment of residents living on harbour sludge. Int Arch Occup Environ Health. 1988; 61(1-2) : 77-87p. Abstract: A modelled approach for the assessment of exposure and health risks in a case of soil pollution with an unknown but probably large number of potential contaminants is presented. In 1983 the Steendijkpolder, a housing estate of about 800 houses, an agglomeration of schools and a tennis hall was built directly on a 4-m-thick layer of harbour sludge. The sludge originated from around 20 harbour basins in Rotterdam and the industrial area around the Nieuwe Waterweg. In the soil organic solvents, PAH's, aldrin, dieldrin, isodrin, telodrin and several heavy metals were found to be present as contaminants. Not all contaminants, including a number of halogenated compounds, were identified. The investigation of the other relevant environmental compartments in this situation, e.g. drinking-water, indoor-air and home grown vegetables showed that soil ingestion was the predominant route of intake of contaminants. Therefore the exposure of infants (age: 2-3 years) was calculated. The calculated intake of PAH by soil ingestion was around half the average intake of PAH in the daily diet. The extra exposure to drins (a group of cyclodiene insecticides) due to soil ingestion and inhaled contaminated indoor air was calculated to exceed twice the Acceptable Daily Intake (ADI) of dieldrin. The calculated maximal intake of Pb by soil ingestion exceeded the average intake of Pb in the daily diet by around 1.4 times. The maximal intake by soil ingestion of the other identified contaminants was relatively low. It was concluded that with the present knowledge the calculated exposure would not result in observable health damage.

Vazquez-Boland J.A. et al. Listeria pathogenesis and molecular virulence determinants. Clin Microbiol Rev. 2001; 14(3) : 584-640p. Abstract: The gram-positive bacterium Listeria monocytogenes is the causative agent of listeriosis, a highly fatal opportunistic foodborne infection. Pregnant women, neonates, the elderly, and debilitated or immunocompromised patients in general are predominantly affected, although the disease can also develop in normal individuals. Clinical manifestations of invasive listeriosis are usually severe and include abortion, sepsis, and meningoencephalitis. Listeriosis can also manifest as a febrile gastroenteritis syndrome. In addition to humans, L. monocytogenes affects many vertebrate species, including birds. Listeria ivanovii, a second pathogenic species of the genus, is specific for ruminants. Our current view of the pathophysiology of listeriosis derives largely from studies with the mouse infection model. Pathogenic listeriae enter the host primarily through the intestine. The liver is thought to be their first target organ after intestinal translocation. In the liver, listeriae actively multiply until the infection is controlled by a cell-mediated immune response. This initial, subclinical step of listeriosis is thought to be common due to the frequent presence of pathogenic L. monocytogenes in food. In normal individuals, the continual exposure to listerial antigens probably contributes to the maintenance of anti-Listeria memory T cells. However, in debilitated and immunocompromised patients, the unrestricted proliferation of listeriae in the liver may result in prolonged low-level bacteremia, leading to invasion of the preferred secondary target organs (the brain and the gravid uterus) and to overt clinical disease. L. monocytogenes and L. ivanovii are facultative intracellular parasites able to survive in macrophages and to invade a variety of normally nonphagocytic cells, such as epithelial cells, hepatocytes, and endothelial cells. In all these cell types, pathogenic listeriae go through an intracellular life cycle involving early escape from the phagocytic vacuole, rapid intracytoplasmic multiplication, bacterially induced actin-based motility, and direct spread to neighboring cells, in which they reinitiate the cycle. In this way, listeriae disseminate in host tissues sheltered from the humoral arm of the immune system. Over the last 15 years, a number of virulence factors involved in key steps of this intracellular life cycle have been identified. This review describes in detail the molecular determinants of Listeria virulence and their mechanism of action and summarizes the current knowledge on the pathophysiology of listeriosis and the cell biology and host cell responses to Listeria infection. This article provides an updated perspective of the development of our understanding of Listeria pathogenesis from the first molecular genetic analyses of virulence mechanisms reported in 1985 until the start of the genomic era of Listeria research.

Vereta L.A. et al. [The transmission of the tick-borne encephalitis virus via cow's milk]. Med Parazitol (Mosk). 1991; (3) : 54-6p. Abstract: A case of group infection with tick-borne encephalitis (TBE) in Bikin, Khabarovsk Territory is reviewed. The disease developed as a result of drinking raw cow milk, bought from one owner, and eating sour-milk products made of that milk. 5 persons from 3 families were ill, in three cases the outcome was lethal. Data of clinical, epidemiological, viral and serological examinations confirm the diagnosis of TBE. Various antibodies to TBE virus have been determined in the blood of cows. The presence of complement-fixing antibodies may indicate fresh infection. The characteristics of TBE viral strain, isolated from the brain of dead Z. N. F. is presented on white mice. The data obtained confirm the previous suggestion on possible transmission of TBE virus with cow milk.

Verger P. [Importance of the evaluation of food consumption in the risk of exceeding the permissible daily doses for poisons potentially contained in food]. Bull Acad Natl Med. 1997; 181(1) : 127-35; discussion 135-8p. Abstract: The Codex
Alimentarius in its General Principles committee proposes the definitions of risk assessment and risk management linked to ingestion of food additives and food contaminants. Moreover, three European directives imply for all member states an evaluation of food additives intakes by general population and by possible "at risk groups of consumers". This work is conducted in the general case of European Scientific Cooperation and is coordinated by United-Kingdom. This paper describes the French approach, using a step-by-step procedure to evaluate food additives consumption. It emphasizes the importance of scientific works in this field of research to obtain french data about french consumptions.

Vijayanand G.K. et al. Method for health risk assessment of chemicals: are they relevant for alcohol? Alcohol Clin Exp Res. 1998; 22(7 Suppl) : 270S-276Sp. Abstract: A description is given of the principles used for toxicological risk assessment of food additives and environmental contaminants. The terminology is not generally accepted. Hazard identification is to identify whether a substance may cause toxic effects in man. Dose-response assessment is to understand the relationship between exposure and various toxic effects. The shape of dose-response curves is discussed. For most effects (including nongenotoxic carcinogens), a threshold is assumed, under which there is no risk. For genotoxic compounds, no such threshold is assumed. For substances with a threshold, an uncertainty factor is applied to the no-observed-adverse-effect level or the lowest-observed-adverse-effect level, to arrive at an acceptable or tolerable daily intake. In the case of ethanol, some of these principles of toxicological risk assessment may be used and based on epidemiological dose-response data. The critical effects are liver effects, fetal damage, and cancer. All of these effects may be assumed to have thresholds. Possible uncertainty factors are discussed. However, because of the decreased risk of cardiovascular effects at low/moderate intakes and the fact that alcohol intake is a lifestyle factor, it is doubtful whether the application of a no-observed-adverse-effect level/uncertainty factor approach--as used for food additives and environmental pollutants, to which there is unavoidable exposure--is really applicable or meaningful for ethanol.

Villar R.G. et al. Investigation of multidrug-resistant Salmonella serotype typhimurium DT104 infections linked to raw-milk cheese in Washington State. JAMA. 1999; 281(19) : 1811-6p. Abstract: CONTEXT: Multidrug-resistant Salmonella Typhimurium DT104 has recently emerged as a cause of human and animal illness in Europe and North America. In early 1997, health officials in Yakima County, Washington, noted a 5-fold increase in salmonellosis among the county's Hispanic population. OBJECTIVES: To characterize bacterial strains and identify risk factors for infection with Salmonella Typhimurium in Yakima County. DESIGN: Laboratory, case-control, and environmental investigations. SETTING AND PARTICIPANTS: Patients with culture-confirmed Salmonella Typhimurium infection living in Yakima County and age- and neighborhood-matched control subjects. MAIN OUTCOME MEASURES: Food vehicle implication based on case-control study and outbreak control. RESULTS: Between January 1 and May 5, 1997, 54 culture-confirmed cases of Salmonella Typhimurium were reported. The median age of patients was 4 years and 91% were Hispanic. Patients reported diarrhea (100%), abdominal cramps (93%), fever (93%), bloody stools (72%), and vomiting (53%); 5 patients (9%) were hospitalized. Twenty-two patients and 61 control subjects were enrolled in the case-control study. Seventeen case patients (77%) reported eating unpasteurized Mexican-style soft cheese in the 7 days before onset of illness compared with 17 control subjects (28%) (matched odds ratio, 32.3; 95% confidence interval, 3.0-874.6). All case-patient isolates were phage definitive type 104 (DT104) (n = 10) or DT104b (n = 12), and 20 (91%) were resistant to ampicillin, chloramphenicol, streptomycin, sulfamethoxazole, and tetracycline. The cheese produced and eaten by 2 unrelated patients was made with raw milk traced to the same local farm. Milk samples from nearby dairies yielded Salmonella Typhimurium DT104. The incidence of Salmonella Typhimurium infections in Yakima County returned to pre-1992 levels following interventions based on these findings. CONCLUSIONS: Multidrug-resistant Salmonella Typhimurium DT104 emerged as a cause of salmonellosis in Yakima County, and Mexican-style soft cheese made with unpasteurized milk is an important vehicle for Salmonella Typhimurium DT104 transmission. We postulate that recent increases in human salmonellosis reflect the emergence of Salmonella Typhimurium DT104 among dairy cows in the region. Continued efforts are needed to discourage consumption of raw milk products, promote healthier alternatives, and study the ecology of multidrug-resistant Salmonella Typhimurium.

Villar R.G. et al. Outbreak of type A botulism and development of a botulism surveillance and antitoxin release system in Argentina. JAMA. 1999; 281(14) : 1334-8, 1340p. Abstract: CONTEXT: Botulism is an important public health problem in Argentina, but obtaining antitoxin rapidly has been difficult because global supplies are limited. In January 1998, a botulism outbreak occurred in Buenos Aires. OBJECTIVES: To determine the source of the outbreak, improve botulism surveillance, and establish an antitoxin supply and release system in Argentina. DESIGN, SETTING, AND PARTICIPANTS: Cohort study in January 1998 of 21 drivers of a specific bus route in urban Buenos Aires. MAIN OUTCOME MEASURE: Occurrence of botulism and implication of a particular food as the vehicle causing this outbreak.
outbreak. RESULTS: Nine (43%) of 21 bus drivers developed botulism, presenting with gastroenteritis, symptoms of acute cranial nerve dysfunction including ptosis, dysphagia, blurred vision, and motor weakness. One driver experienced respiratory failure. Type A toxin was detected from 3 of 9 patients’ serum samples. All drivers received botulism antitoxin; there were no fatalities. Consumption of matambre (Argentine meat roll) was significantly associated with illness. Among 11 persons who ate matambre, 9 developed illness, compared with none of those who did not eat it (P<0.001). The matambre had been cooked in water at 78 degrees C to 80 degrees C for 4 hours, sealed in heat-shrunk plastic wrap, and stored in refrigerators that did not cool adequately. Subsequently, a botulism surveillance and antitoxin release system was established. CONCLUSIONS: Insufficient cooking time and temperatures, storage in heat-shrunk plastic wrap, and inadequate refrigeration likely contributed to Clostridium botulinum spore survival, germination, and toxin production. A rapid-response botulism surveillance and antitoxin release system in Argentina should provide more timely distribution of antitoxin to patients and may serve as a model for other nations.

von Stackelberg K. et al. The use of spatial modeling in an aquatic food web to estimate exposure and risk. Sci Total Environ. 2002; 288(1-2): 97-110p. Abstract: This paper quantitatively evaluates interactions among foraging behavior, habitat preferences, site characteristics and the spatial distribution of contaminants in estimating PCB exposure concentrations for winter flounder at a hypothetical open water dredged material disposal site in the coastal waters of New York and New Jersey (NY-NJ). The models implemented in this study include a spatial submodel to account for spatial and temporal characteristics of fish exposure and a probabilistic adaptation of the Gobas bioaccumulation model to account for temporal variation in concentrations of polychlorinated biphenyls (PCBs) in sediment and water. We estimated the geographic distribution of an offshore winter flounder subpopulation based on species biology, including such variables as foraging area, habitat size, disposal site size and migration characteristics. We incorporated these variables together with an estimate of differential attraction to a management site within a spatially explicit model to assess the range of expected PCB exposures to a winter flounder population. The output of this modeling effort, flounder PCB tissue concentrations, provides exposure point concentrations for estimates of human health risk through ingestion of locally caught flounder. The risks obtained for the spatially non-explicit case are as much as one order of magnitude higher than those obtained after incorporating spatial and temporal characteristics of winter flounder foraging and seasonal migration. Incorporating spatial and temporal variables in food chain models can help support sediment management decisions by providing a quantitative expression of the confidence in risk estimates.

von Stackelberg K.E. et al. Importance of uncertainty and variability to predicted risks from trophic transfer of PCBs in dredged sediments. Risk Anal. 2002; 22(3): 499-512p. Abstract: Biomagnification of organochlorine and other persistent organic contaminants by higher trophic level organisms represents one of the most significant sources of uncertainty and variability in evaluating potential risks associated with disposal of dredged materials. While it is important to distinguish between population variability (e.g., true population heterogeneity in fish weight, and lipid content) and uncertainty (e.g., measurement error), they can be operationally difficult to define separately in probabilistic estimates of human health and ecological risk. We propose a disaggregation of uncertain and variable parameters based on: (1) availability of supporting data; (2) the specific management and regulatory context (in this case, of the U.S. Army Corps of Engineers/U.S. Environmental Protection Agency tiered approach to dredged material management); and (3) professional judgment and experience in conducting probabilistic risk assessments. We describe and quantitatively evaluate several sources of uncertainty and variability in estimating risk to human health from trophic transfer of polychlorinated biphenyls (PCBs) using a case study of sediments obtained from the New York-New Jersey Harbor and being evaluated for disposal at an open water offshore disposal site within the northeast region. The estimates of PCB concentrations in fish and dietary doses of PCBs to humans ingesting fish are expressed as distributions of values, of which the arithmetic mean or mode represents a particular fractile. The distribution of risk values is obtained using a food chain biomagnification model developed by Gobas by specifying distributions for input parameters disaggregated to represent either uncertainty or variability. Only those sources of uncertainty that could be quantified were included in the analysis. Results for several different two-dimensional Latin Hypercube analyses are provided to evaluate the influence of the uncertain versus variable disaggregation of model parameters. The analysis suggests that variability in human exposure parameters is greater than the uncertainty bounds on any particular fractile, given the described assumptions.

Voss S. Costs to affected individuals following an outbreak of food poisoning: a pilot study. Public Health. 1993; 107(5): 337-41p. Abstract: This small pilot study surveyed the victims of an outbreak of food poisoning, in order to investigate the personal consequences which they suffered so as to identify costs, which are often ignored in economic analyses. A response rate of 88% was achieved. The results showed that an average of 10.5 days of illness was suffered by the affected individuals and there was a marked variation in the number of days of work missed. Housewives were identified as a group whose personal consequences are often omitted from economic studies and a variety of other costs were identified. The results should be borne in mind when undertaking future economic studies of food poisoning.

Wada A. et al. Nosocomial diarrhoea in the elderly due to enterotoxigenic Clostridium perfringens. Microbiol Immunol. 1996; 40(10): 767-71p. Abstract: To diagnose sporadic diarrhoea due to Clostridium perfringens infection, faecal specimens from elderly patients were examined directly for C. perfringens enterotoxin using reverse passive latex agglutination assay, and then cultured for this organism. C. perfringens isolates from those samples were grouped by slide agglutination and by pulsed-field gel electrophoresis (PFGE). Fifty of the 60 isolates agglutinated with newly raised antiserum WX2 and 38 shared the same genomic PFGE pattern. Characteristics of the epidemics and experimental data suggest that the diarrhoea was caused by a nosocomial spread of C. perfringens, and not by a food-borne outbreak.
Wadolkowski E.A. et al. Acute renal tubular necrosis and death of mice orally infected with Escherichia coli strains that produce Shiga-like toxin type II. *Infect Immun.* 1990; 58(12) : 3959-65p. Abstract: Escherichia coli O157:H7 strains have been implicated as etiologic agents in food-borne outbreaks of hemorrhagic colitis and the hemolytic-uremic syndrome. A prototype E. coli O157:H7 strain, designated 933, produces Shiga-like toxin I (SLT-I) and SLT-II and harbors a 60-MDa plasmid. In a previous study, streptomycin-treated mice were fed 933 together with a derivative cured of the 60-MDa plasmid (designated 933cu). Strain 933cu colonized poorly, but in approximately one-third of the animals, an isolate of 933cu was obtained from the feces that had regained the ability to colonize well. This isolate, designated 933cu-rev, killed all of the animals when fed alone to mice. In this investigation, two types of experiments were done to assess whether SLT-I, SLT-II, or both contributed to the death of mice fed 933cu-rev. (i) Mice were pretreated with monoclonal antibodies to SLT-I, SLT-II, and cholera toxin (as a control) before infection with 933cu-rev. (ii) Mice were fed either an E. coli K-12 strain carrying cloned SLT-I genes or the same K-12 strain carrying cloned SLT-II genes. The results of both types of experiments indicated that the deaths of the orally infected mice were due solely to SLT-II. Extensive histological and selected electron microscopic examinations of various tissues from the infected animals suggested that death was due to acute renal cortical tubular necrosis consistent with toxic renal damage. These data indicate a critical role for SLT-II, but not SLT-I, in renal damage associated with E. coli O157:H7 infection of streptomycin-treated mice.

Walker R. A temporal extension to the parsimonious covering theory. *Artif Intell Med.* 1997; 10(3) : 235-55p. Abstract: In this paper, parsimonious covering theory is extended in such a way that temporal knowledge can be accommodated. In addition to causally associating possible manifestations with disorders, temporal relationships about duration and the time elapsed before a manifestation comes into existence can be represented by a graph. Precise definitions of the solution of a temporal diagnostic problem as well as algorithms to compute the solutions are provided. The medical suitability of the extended parsimonious cover theory is studied in the domain of food-borne disease.


Wallace B.J. et al. Seafood-associated disease outbreaks in New York, 1980-1994. *Am J Prev Med.* 1999; 17(1) : 48-54p. Abstract: BACKGROUND: Seafood-associated disease outbreaks in New York were examined to describe their epidemiology and to identify areas for prevention and control efforts. METHODS: We reviewed reports submitted to the New York State Department of Health (NYSDOH) of seafood-associated outbreaks occurring from January 1, 1980, through December 31, 1994. RESULTS: During 1980-1994, 339 seafood-associated outbreaks were reported, resulting in 3959 illnesses, 76 hospitalizations, and 4 deaths. During this period, seafood-associated outbreaks accounted for 19% of all reported foodborne outbreaks and 10% of foodborne illnesses. Shellfish, the most frequently implicated seafood item, accounted for 64% of seafood outbreaks, followed by finfish (31% of outbreaks). Of the 148 seafood-associated outbreaks with a confirmed etiologic agent, Norwalk virus and scombrotoxin were the most frequently identified agents: Norwalk virus accounted for 42% of outbreaks and 42% of illnesses, and scombrotoxin accounted for 44% of outbreaks and 19% of illnesses. Three of the 4 seafood-associated deaths were caused by Clostridium botulinum; the remaining death was caused by Vibrio vulnificus. CONCLUSIONS: Reducing the number of seafood outbreaks will require continued and coordinated efforts by many different agencies, including those involved with water quality; disease surveillance; consumer education; and seafood harvesting, processing, and marketing. New York's foodborne disease surveillance data highlight potential areas on which to focus prevention efforts, including: (1) commodities and associated pathogens causing the largest number of seafood-associated outbreaks and illnesses, namely shellfish-associated viral gastroenteritis and finfish-associated scombrotoxin fish poisoning, and (2) venues at which seafood were most frequently consumed in reported outbreaks, such as commercial food establishments and catered events.

Wallace D.J. et al. Incidence of foodborne illnesses reported by the foodborne diseases active surveillance network (FoodNet)-1997. *FoodNet Working Group. J Food Prot.* 2000; 63(6) : 807-9p. Abstract: In 1997, the Foodborne Diseases Active Surveillance Program (FoodNet) conducted active surveillance for culture-confirmed cases of Campylobacter, Escherichia coli O157, Listeria, Salmonella, Shigella, Vibrio, Yersinia, Cyclospora, and Cryptosporidium in five Emerging Infections Program sites. FoodNet is a collaborative effort of the Centers for Disease Control and
knowledge of vector species and species complexes is needed. Vector ecology may be more difficult to detect. Detailed changes in disease patterns and distribution of the Anopheles gambiae and Simulium 1997 demonstrate that while there are regional and seasonal shigellosis, 468 cases of cryptosporidiosis, 340 of E. coli surveillance for foodborne infections was approximately 16.1 percent. More data over more years are needed to assess if observed variations in incidence reflect yearly fluctuations or true changes in the burden of foodborne illness.

Walsh J.F. et al. Deforestation: effects on vector-borne disease. *Parasitology*. 1993; 106 Suppl S55-75p. Abstract: This review addresses changes in the ecology of vectors and epidemiology of vector-borne diseases which result from deforestation. Selected examples are considered from viral and parasitic infections (arboviruses, malaria, the leishmaniasis, filariasis, Chagas Disease and schistosomiasis) where disease patterns have been directly or indirectly influenced by loss of natural tropical forests. A wide range of activities have resulted in deforestation. These include colonisation and settlement, transmigrant programmes, logging, agricultural activities to provide for cash crops, mining, hydropower development and fuelwood collection. Each activity influences the prevalence, incidence and distribution of vector-borne disease. Three main regions are considered—South America, West & Central Africa and South-East Asia. In each, documented changes in vector ecology and behaviour and disease pattern have occurred. Such changes result from human activity at the forest interface and within the forest. They include both deforestation and reafforestation programmes. Deforestation, or activities associated with it, have produced new habitats for Anopheles darlingi mosquitoes and have caused malaria epidemics in South America. The different species complexes in South-East Asia (A. dirus, A. minimus, A. balabacensis) have been affected in different ways by forest clearance with different impacts on malaria incidence. The ability of zoophilic vectors to adapt to human blood as an alternative source of food and to become associated with human dwellings (peri-domestic behaviour) have influenced the distribution of the leishmaniasis in South America. Certain species of sandflies (Lutzomyia intermedia, Lu. longipalpis, Lu. whitmani), which were originally zoophilic and sylvatic, have adapted to feeding on humans in peri-domestic and even periurban situations. The changes in behaviour of reservoir hosts and the ability of pathogens to adapt to new reservoir hosts in the newly-created habitats also influence the patterns of disease. In anthroponotic infections, such as Plasmodium, Onchocerca and Wuchereria, changes in disease patterns and vector ecology may be more difficult to detect. Detailed knowledge of vector species and species complexes is needed in relation to changing climate associated with deforestation. The distributions of the Anopheles gambiae and Simulum damnosum species complexes in West Africa are examples. There have been detailed longitudinal studies of Anopheles gambiae populations in different ecological zones of West Africa. Studies on Simulium damnosum cytoforms (using chromosome identification methods) in the Onchocerciasis Control Programme were necessary to detect changes in distribution of species in relation to changed habitats. These examples underline the need for studies on the taxonomy of medically-important insects in parallel with long-term observations on changing habitats.(ABSTRACT TRUNCATED AT 400 WORDS).

Wang T.K. et al. [K-serotype analyses of Vibrio parahaemolyticus isolated in northern Taiwan, 1983 through 1993]. *Chung Hua Min Kuo Wei Sheng Wu Chi Mien I Hseuh Tsa Chih*. 1996; 29(4): 210-24p. Abstract: From 1983 through 1993, 786 strains of Vibrio parahaemolyticus were collected from food-borne disease outbreaks and sporadic cases of diarrheal illness in northern Taiwan, involving 42 K-serotypes. Five top leading serotypes were K8 (36.8%), K15 (10.8%), K12 (8.7%), K56 (7.9%) and K63 (4.7%). However, a variation of K-serotypes was found during this study period. From 112 food-borne outbreaks associated with this microorganism, only 54 (48.2%) outbreaks were caused by a single serotype, while 58 (51.8%) were caused by multiple K-serotypes. Numbers of outbreaks caused by two, three and more than three K-serotypes were 29 (26%), 16 (14.2%), and 13 (11.6%), respectively. In a special outbreak, eight K-serotypes was found. Outbreaks caused by party caterers were most frequently associated with multiple K-serotypes.

Wartenberg D. et al. The fallacy of ranking possible carcinogen hazards using the TD50. *Risk Anal.* 1990; 10(4): 609-13p. Abstract: Ames et al. have proposed a new model for evaluating carcinogenic hazards in the environment. They advocate ranking possible carcinogens on the basis of the TD50, the estimated dose at which 50% of the test animals die. From this model, it is possible to compare the hazards from low level exposures to a wide range of chemicals. Ames et al.'s use of these TD50 ranks to compare the hazards from low level exposures to contaminants in our food and environment is wholly inappropriate and inaccurate. Their dismissal of public health concern for environmental exposures, in general, based on these comparisons, is not supported by the data.

Waterman S.R. et al. Acid-sensitive enteric pathogens are protected from killing under extremely acidic conditions of pH 2.5 when they are inoculated onto certain solid food sources. *Appl Environ Microbiol*. 1998; 64(10): 3882-6p. Abstract: Gastric acidity is recognized as the first line of defense against food- borne pathogens, and the ability of pathogens to resist this pH corresponds to their oral infective dose (ID). Naturally occurring and genetically engineered acid-sensitive enteric pathogens were examined for their ability to survive under acidic conditions of pH 2.5 for 2 h at 37 degreesC when inoculated onto ground beef. Each of the strains displayed significantly high survival rates under these normally lethal conditions. The acid-sensitive pathogens Campylobacter jejuni and Vibrio cholerae, which were
Escherichia coli O157:H7 in food.

Salmonella species have a higher oral ID of approximately 10(5) cells when administered under defined conditions but have been observed to cause disease at doses as low as 50 to 100 organisms when consumed as part of a contaminated food source. They may also help explain why some pathogens are associated primarily with food-borne modes of transmission rather than fecal-oral transmission.

Webb S. et al. Indirect human exposure to pharmaceuticals via drinking water. *Toxicol Lett.* 2003; 142(3): 157-67p. **Abstract:** There are numerous observations of pharmaceuticals (or their metabolites) as contaminants in wastewater, surface water and groundwater. This implies a potential for indirect human exposure to pharmaceuticals via drinking water supplies. Various effect benchmarks may be employed in an evaluation of the significance of such indirect exposure. In this study a comparison was made between reported concentrations of pharmaceuticals in German drinking water and therapeutic dose. The margin between potential indirect daily exposure via drinking water and daily therapeutic dose was at least three orders of magnitude and typically much more. For certain compounds it was also possible to benchmark exposure against ADIs derived within the context of meat and food stuff residues following veterinary use. In all cases potential exposure was less than the ADIs, similarly suggesting that for these compounds there are no substantial concerns with regards to indirect exposure via drinking water.

Weeratna R.D. et al. Detection and production of verotoxin 1 of Escherichia coli O157:H7 in food. *Appl Environ Microbiol.* 1991; 57(10): 2951-5p. **Abstract:** Verotoxin 1 (VT1) is a recognized virulence factor of Escherichia coli O157:H7, a cause of severe food-borne disease. The public health significance of preformed verotoxin in food is unknown, and relatively little research has been done to determine the production of VT1 in food. The purposes of this study were to develop a sensitive method to detect VT1 in milk and in ground beef and to determine the conditions for VT1 production in these foods. A sandwich enzyme-linked immunosorbent assay in which we used VT1-specific monoclonal antibody 9C9F5 as the capture antibody and a rabbit polyclonal antibody raised against VT2 as the detection antibody was developed for the detection and quantification of VT1 in milk and in ground beef. The enzyme-linked immunosorbent assay was sensitive to a minimum of 0.5 ng of VT1 per ml of milk and 1.0 ng of VT1 per g of ground beef. The greatest amount of VT1 detected in milk (306 ng/ml) was detected in samples that were incubated at 37 degrees C with agitation (160 rpm) for 48 h. Very little toxin (1 ng/ml) was produced at 25 or 30 degrees C within 96 h. VT1 production was greater in ground beef than in milk and in ground beef and to determine the conditions for VT1 production in these foods. A sandwich enzyme-linked immunosorbent assay in which we used VT1-specific monoclonal antibody 9C9F5 as the capture antibody and a rabbit polyclonal antibody raised against VT2 as the detection antibody was developed for the detection and quantification of VT1 in milk and in ground beef. The enzyme-linked immunosorbent assay was sensitive to a minimum of 0.5 ng of VT1 per ml of milk and 1.0 ng of VT1 per g of ground beef. The greatest amount of VT1 detected in milk (306 ng/ml) was detected in samples that were incubated at 37 degrees C with agitation (160 rpm) for 48 h. Very little toxin (1 ng/ml) was produced at 25 or 30 degrees C within 96 h. VT1 production was greater in ground beef than in milk; 452 ng of VT1 per g was produced in beef at 37 degrees C in 48 h. Relatively little VT1 was produced in beef within 96 h at 25 and 30 degrees C (2.1 and 9.8 ng of VT1 per g, respectively). Our results indicate that ground beef is a better medium for VT1 production than milk. **(ABSTRACT TRUNCATED AT 250 WORDS).**

Weisburger J.H. Human protection against non-genotoxic carcinogens in the US without the Delaney Clause. *Exp Toxicol Pathol.* 1996; 48(2-3): 201-8p. **Abstract:** Cancers of many types are major chronic diseases with a high fatality rate and a high cost to society. In the USA, the Delaney Clause was implemented in 1958 because the public believed that many cancers stem from food additives and food contaminants. In the intervening years, research has provided key information about the mechanisms of carcinogenesis and demonstrated that there are two major classes of carcinogens, genotoxic and non-genotoxic. Two case reports are presented, of sodium saccharin and ethylenebisdithiocarbamates that were banned based on the Delaney Clause in an unjustified manner, based on the underlying mechanisms not relevant for non-genotoxic carcinogens. Also, the causes of major cancers have been discovered. Most cancers are associated with lifestyle, specifically tobacco and excessive alcohol use, inappropriate nutritional traditions, and lack of exercise. These lifestyle components involve now known genotoxic carcinogens and importantly, non-genotoxic carcinogens. The effect of non-genotoxic carcinogens is highly dose dependent and also reversible upon lowering the dose below a threshold. Thus, it is quite possible to lower human cancer risk, and also the risk of related chronic diseases such as coronary heart disease, hypertension and stroke, adult on-set diabetes, by proper lifestyle adjustments. Clearly, the Delaney Clause plays no role in disease prevention.

Wells G.A. et al. The neuropathology and epidemiology of bovine spongiform encephalopathy. *Brain Pathol.* 1995; 5(1): 91-103p. **Abstract:** Bovine spongiform encephalopathy (BSE), defined originally from its characteristic neuropathology, retains a place of particular interest in the scrapie-like or prion disease group, presenting uniquely an example of such diseases occurring as a nationwide food-borne epidemic in Great Britain. Comprehensive monitoring of the epidemic, both pathologically and epidemiologically, has facilitated our present understanding of the disease. BSE presents the classical neuropathological features of the transmissible spongiform encephalopathies. Although particularly similar to natural scrapie of sheep, BSE has, unlike scrapie, a stereotypic lesion profile from which it has been concluded that host and agent factors, including probably the strain of agent, which influence the profile, are constant in this disease. Neuronal loss in BSE may make an important but hitherto inapparent contribution to functional deficits. Preliminary ultrastructural studies have confirmed light microscopic features of brain changes in BSE but have as yet not established significant new findings. Immunohistochemical studies of PrP accumulation reveal distinctive forms and distributions of immunolabelling, confirming features reported previously in experimental models of scrapie, including perineuronal and perineuritic "synapse-like" reactivity. The histopathological diagnosis of BSE, validated on a single section of the medulla for the statutory diagnosis of large numbers of cases, is supplemented where necessary by fibril (SAF) examination which performs similarly to the histological diagnosis in the majority of cases. Epidemiological studies of BSE have supported the pathological findings that there is no detectable variation in susceptibility within the cattle population. The
Wheatley B. et al. Balancing human exposure, risk and reality: questions raised by the Canadian aboriginal methylmercury incidence during 1993 which has been continued into 1994. The main effect has been a reduction in the national incidence during 1993 which has been continued into 1994. Analytical studies have not revealed any means of transmission, other than the food-borne source, capable of maintaining the epidemic in Great Britain. An international comparison of risk factors for the occurrence of BSE indicates that an epidemic of similar magnitude outside the British Isles is unlikely.

Wesley J.V. et al. Restriction enzyme analysis of Listeria monocytogenes strains associated with food-borne epidemics. Appl Environ Microbiol. 1991; 57(4) : 969-75p. Abstract: Listeria monocytogenes (serotype 4b) has caused four major food-borne epidemics in North America. In this study, L. monocytogenes isolates from the Nova Scotia (Canada), Boston (Mass.), and Los Angeles (Calif.) outbreaks were examined by restriction enzyme analysis with the endonuclease Hhal. Human isolates (n = 32) from the 1981 Canadian outbreak were compared with a strain recovered from cows, which was epidemiologically incriminated as the vehicle of infection. After Hhal digestion, 29 of 32 isolates exhibited the restriction enzyme pattern of the reference coleslaw isolate. The restriction enzyme patterns of the nine clinical isolates from the 1983 Massachusetts outbreak were identical to each other but differed from those of raw milk isolates recovered from sources supplying the pasteurizer. Isolates (n = 48) from the 1985 California outbreak were evaluated. The restriction enzyme patterns of the L. monocytogenes isolates from humans and from the suspect cheese samples were identical to those of four of five cheese factory environmental isolates. Isolates from each of these outbreaks exhibited a restriction enzyme pattern that was characteristic of that outbreak. The case with which restriction enzyme analysis can be applied to all serotypes of L. monocytogenes argues for its use in the epidemiology of L. monocytogenes.

Wheatley B. et al. Methylmercury and the health of indigenous peoples: a risk management challenge for physical and social sciences and for public health policy. Sci Total Environ. 2000; 259(1-3) : 23-9p. Abstract: Methylmercury in aquatic ecosystems and bio-accumulated in aquatic biota, especially fish, is a major public health concern internationally. Precautionary efforts are currently underway internationally to reduce the anthropogenic release of mercury, which in turn, over time, will reduce human exposure. However, at the present time, it is important to address the issue of management of the risks of exposure as they exist now. Of particular concern are the impacts of methylmercury on indigenous populations which depend on fish as a subsistence food source, both in remote areas of developed countries, such as Canada, and in developing countries such as Brazil. Research into these impacts over the past two or three decades has shown that, other than in very severe pollution situations such as occurred in Minamata, Japan, the direct impacts on human health are difficult to prove. On the other hand, the indirect negative effects of methylmercury on health, mediated through the disruption of lifestyle and eating patterns and the associated socio-cultural and socio-economic consequences among the affected native populations, have, in many cases, been significant. These social factors have raised serious challenges in determining practical public health policies on the issue. Policy development relating to environmental contaminants has been presented, with the problem of assessing the role of the various factors which contribute to the impact on health as a result of socio-cultural disruption. These factors include changes in diet and lifestyle due to methylmercury in the environment and its real or perceived risk. The standard physical sciences risk assessment process, based on the lowest observed adverse effects level (LOAEL) of observed adverse effects level (NOAEL) used in defining health policies may be seen as over-simplistic theoretical extrapolations when viewed in the context of the concerns of the social sciences. Both approaches, however, have relevance to health policies that address the risks posed by environmental methylmercury. Therefore, the standard physical sciences approach of the past three decades now needs to be linked with the social sciences approach, with its focus on the indirect impacts of exposure to methylmercury, to provide a comprehensive approach to public health policy development. With this objective in mind, this paper reviews methylmercury-related data from both physical and social sciences. It attempts to draw on the findings in both disciplines to provide suggestions for an integrated approach in policy development relating to human health and human exposure to methylmercury, especially among indigenous peoples in remote areas and in developing countries. An integrated approach such as this may help to limit adverse health effects in the indigenous communities affected.

Whelton B.D. et al. Skeletal changes in multiparous, nulliparous and ovariectomized mice fed either a nutrient-sufficient or -deficient diet containing cadmium. Toxicology. 1997; 119(2) : 103-21p. Abstract: As a simulation of the etiological factors known for Itai-Itai disease, a syndrome characterized by osteomalacia and renal dysfunction in its Japanese victims, female mice were subjected to the individual and combined stresses of dietary cadmium, nutrient-deficient diet, multiparity and ovariectomy; the calcium-depleting effect of each factor was evaluated by determining Ca levels in femur and lumbar vertebrae. At age 68 days, female mice were given nutrient-sufficient (+) or -
White J.C. et al. Tracking chlordane compositional and chiral profiles in soil and vegetation. *Chemosphere.* 2002; 47(6): 639-46p. Abstract: The cycling of chlordane and other persistent organic pollutants through the environment must be comprehensively elucidated to assess adequately the human health risks posed from such contaminants. In this study the compositional and chiral profiles of weathered chlordane residues in the soil and vegetative compartments were investigated in order to provide details of the fate and transport of this persistent pesticide. Zucchinis were planted in a greenhouse in three bays containing chlordane-contaminated soil. At harvest the vegetation and soil were extracted and analyzed for chlordane content using chiral gas chromatography/ion trap mass spectrometry. Both achiral and chiral chlordane components were quantified. The chlordane concentration in the rhizosphere (soil attached to roots) was significantly less than that in the bulk soil. However, the enantiomeric ratio of the chiral components and overall component ratios had changed little in the rhizosphere relative to the bulk soil. Significant levels of chlordane were detected in the vegetation, the amount varying in different plant tissues from a maximum in roots to a minimum in fruit. In addition to the chlordane concentration gradient in plant tissues, significant shifts in compositional profile, as indicated by the component ratios, and in chiral profile, as indicated by the enantiomeric ratio, of the contaminant were observed in the plant tissues. The data indicate that abiotic processes dominate the transport of the chlordane components through the soil to the plant. This is the first report of the effect of rapid biotic processes within the plant compartment on chlordane compositional and chiral profiles.

Wilairatana P. et al. Intestinal sarcocystosis in Thai laborers. *Southeast Asian J Trop Med Public Health.* 1996; 27(1) : 43-6p. Abstract: To determine the prevalence of Sarcocystis and other intestinal parasites in Thai laborers who were going abroad for work, stool examinations of 362 asymptomatic laborers were studied. The four most frequently parasites found in stool were Sarcocystis sp (23.2%), Opisthorchis viverrini (40.3%), hookworm (21.5%), and Strongyloides stercoralis (14.1%). Giardia intestinalis (5.2%), Entamoeba coli (1.7%), Endolimax nana (2.5%), Blastocystis hominis (4.1%), Echinostoma sp (3.6%), Trichuris trichiura (0.3%), Taenia sp (1.7%), Hymenolepis nana (0.6%), and Enterobius vermicularis (0.3%) were present at low rates. Sarcocystis were frequently found in male laborers (83.3%) (p < .01). The laborers from northeastern Thailand (n = 278) had a higher prevalence (26.6%) of Sarcocystis infection (p < .01). This study shows that Thai laborers, particularly from northeastern Thailand, are commonly infected with intestinal parasites. The high prevalence rates of Sarcocystis and other intestinal parasites in this study were indicative of the local habit of eating raw beef and pork, poor living conditions, and low levels of hygiene in Thai laborers. Sarcocystosis could be a significant food-borne zoonotic infection in Thailand.

Wilesmith J.W. An epidemiologist's view of bovine spongiform encephalopathy. *Philos Trans R Soc Lond B Biol Sci.* 1994; 343(1306) : 357-61p. Abstract: Bovine spongiform encephalopathy was first recognized in Great Britain in 1986 and was the result of infection with a scrapie-like agent surviving in meat and bone meal used in feedstuffs. This effective exposure commenced in 1981-82 and was associated with a reduction in the use of hydrocarbon solvents in the manufacture of meat and bone meal. The epidemiological features are consistent with sheep scrapie as the original source, but the epidemic was amplified by the recycling of infected cattle tissue resulting in a marked increase in incidence from 1989. The food borne source was eliminated by legislation introduced in July 1988. The first effects of this became apparent during 1991 and these have become more obvious during 1993 with a reduction in the national incidence. Specific studies are still in progress to determine whether other means of transmission can occur, but none capable of maintaining the epidemic have been detected.

Wilkinson T.H. et al. Salmonella outbreaks in the Kansas City metropolitan area: varying presentations. *Mo Med.* 1999; 96(2) : 62-6p. Abstract: Four outbreaks of Salmonella in the Kansas City metropolitan area between 1996 and 1998 are used to illustrate changes in the epidemiology of foodborne diseases and recognition by public health authorities. Physicians are the critical link in the recognition of foodborne outbreaks, and that linkage is tied directly to
their index of suspicion and the appropriate collection and testing of specimens from their patients, as well as notification of the local health department.

Williams E.S. et al. Spongiform encephalopathies in Cervidae. Rev Sci Tech. 1992; 11(2) : 551-67p. Abstract: The known host range of naturally-occurring transmissible spongiform encephalopathies has expanded in recent years to include wild ruminants. Chronic wasting disease (CWD) occurs in mule deer (Odocoileus hemionus hemionus) and Rocky Mountain elk (Cervus elaphus nelsoni) in Colorado and Wyoming, United States of America. These species belong to the family Cervidae. Cases have occurred primarily in captive animals but a few affected free-ranging animals have been identified. Clinical disease in both species is characterised by progressive weight loss, behavioural alterations and excessive salivation. In deer polydipsia and polyuria also commonly occur. Significant lesions are confined to the central nervous system and consist of spongiform change in grey matter, intraneuronal vacuolation, astrocytosis and amyloid plaques. Inflammatory reaction is absent. The origin of this disease is not known. In contrast to the cases of spongiform encephalopathy recognised in five species of antelope (family Bovidae) in British zoological parks, which are an extension of the current bovine spongiform encephalopathy epizootic, CWD is not the result of food-borne exposure to the infectious agent. CWD appears to be maintained within captive populations by lateral and, possibly, maternal transmission. Spongiform encephalopathies in wild ruminants are currently geographically isolated and involve relatively small numbers of animals. However, these potentially transmissible diseases could be of greater importance in the future and should be viewed with concern in the light of international movements of wild ruminants and the current expansion of the game farming and ranching industry in many parts of the world.

Williamson B.L. et al. Rapid HPLC screening method for contaminants found in implicated L-tryptophan associated with eosinophilia myalgia syndrome and adulterated rapeseed oil associated with toxic oil syndrome. Biomed Chromatogr. 1998; 12(5) : 255-61p. Abstract: In 1981 a massive food-borne epidemic, termed the toxic oil syndrome (TOS), occurred in Spain. Eight years later a closely related disease, the eosinophilia myalgia syndrome (EMS), was reported in the USA with many additional cases being reported worldwide. Although EMS was linked to the ingestion of contaminated L-tryptophan and TOS to aniline denatured rapeseed oil, the etiological agent(s) responsible for both diseases remains unknown. However, contaminants in both the oil and the dietary supplement are believed to have triggered these diseases, and there has been much speculation that a common contaminant may have caused both epidemics. In this report, methods for the facile preparation and HPLC analysis of EMS-implicated L-tryptophan and TOS adulterated rapeseed oil samples associated with TOS are described which allow a direct comparison between the contaminants of both foodstuffs. A combination of solvent and solid phase extraction methods are demonstrated along with the application of C18 reversed-phase high-performance liquid chromatography (RP-HPLC) coupled with on-line UV and MS detection. These methods have allowed us to determine for the first time, based upon this work, that there are no detectable common contaminants that possess a UV response, between EMS implicated L-tryptophan and TOS implicated rapeseed oil samples.

Winquist A.G. et al. Outbreak of campylobacteriosis at a senior center. J Am Geriatr Soc. 2001; 49(3) : 304-7p. Abstract: OBJECTIVES: In August 1997, campylobacteriosis was diagnosed in four older persons in one Connecticut town. We investigated this outbreak to determine its cause and to identify appropriate preventive measures. We also analyzed surveillance data to assess the impact of campylobacteriosis among persons age 65 years and older in Connecticut. DESIGN: The outbreak was investigated through a case-control study and an environmental investigation. Surveillance data were from population-based, active foodborne disease surveillance. SETTING: The outbreak and environmental studies were conducted at a senior center identified as the one eating place common to all four patients. Active surveillance data were from three Connecticut counties during 1996/1997. PARTICIPANTS: We administered a questionnaire to senior center attendees. A case was defined as onset of diarrhea with fever or abdominal cramps during August 20-25 in a person who ate at the senior center during August 18-20. Respondents without illness meeting the case definition who ate at the senior center during August 18-20 were controls. MEASUREMENTS: Case-control study participants were asked about symptoms of gastrointestinal illness and meals and foods eaten at the center. The environmental investigation gathered information about food preparation procedures and facilities. Active surveillance data were analyzed to determine age-specific annual campylobacteriosis incidence rates and proportions of cases involving hospitalization. RESULTS: For the case-control study, there were 66 respondents (16 case patients, 50 controls), representing approximately 52% of August 18-20 attendees. Case patients were more likely than controls to have eaten at a Hawaiian luau at the center. The most strongly implicated food was sweet potatoes. Review of food preparation procedures identified multiple opportunities for cross-contamination from raw meats to other foods. In Connecticut's active surveillance area during 1996/1997, the annual campylobacteriosis incidence rate was highest among young adults, but the proportion of hospitalized cases was highest among persons age 70 years and older. CONCLUSION: Campylobacter transmission occurred at the luau, likely because of cross-contamination in the kitchen. This investigation emphasizes the importance of strict separation of raw meats from other foods during preparation. Careful attention to these measures is particularly important when an older population is served.

Wittman R.J. et al. Microbial contamination of shellfish: prevalence, risk to human health, and control strategies. Annu Rev Public Health. 1995; 16 123-40p. Abstract: There has been significant concern in recent times about the safety of molluscan shellfish for human consumption. Despite extensive efforts to assure a safe supply of molluscan shellfish, the number of cases of disease and death are still great enough to cause concern among the public. The number of cases of illness and death associated with the ingestion of shellfish falls in the lower end of the range of other similar microbial pathogen-related foodborne disease. Disease and deaths due to viruses and naturally occurring bacteria are now of greatest concern because they are the most often cited causative agents. The greatest risk of disease or death due to shellfish consumption is among the population with underlying health conditions who choose to consume raw shellfish. Control strategies to limit shellfish-borne disease should focus upon disease and death caused by viruses and naturally occurring bacteria among at-risk populations.
Wondimagegnehu T. et al. Hookworm infection among the Melka Sedi banana plantation residents, middle Awash Valley, Ethiopia. *Ethiop Med J.* 1992; 30(3) : 129-34p. Abstract: A study of intestinal parasites was done among the people who lived within the banana plantation zone of the Melka Sedi Agricultural Enterprise, Awash Valley, Ethiopia in April 1987. The methods of parasite detection were the Ritchie formal ether and the charcoal culture method for hookworm larvae species identification. From the total 633 population, 311 were examined at random of whom 60.8% were positive for one or more intestinal parasites. Eight parasites were encountered. Ascaris lumbricoides in 1.3%, Trichuris trichiura in 6.4%, Strongyloides stercoralis in 3.9%, hookworm in 53.1%, Taenia sp. in 3.5%, Schistosoma mansoni in 1.9%, Entamoeba histolytica in 0.6% and Hymenolepis sp. in 0.6%. Prevalence of hookworm infection was significantly higher than that of any of the other parasites (p less than 0.001). In the hookworm infected individuals there were more males than females, and the 25 to 34 year age group had significantly higher infection rates (p less than 0.05). The majority of those with hookworm were banana plantation workers. This communication emphasizes the basic guidelines for control and prevention of hookworm and other related faecal/soil-borne infections in this and similar agricultural settings.

Wong H.C. et al. Ribotyping of Vibrio parahaemolyticus isolates obtained from food poisoning outbreaks in Taiwan. *Microbiol Immunol.* 1999; 43(7) : 631-6p. Abstract: Ribotyping of Vibrio parahaemolyticus is a prevalent food-borne pathogen in Taiwan, Japan and other Asian countries. This work presents a novel ribotyping method for the molecular epidemiological examination of this pathogen. Genomic DNA was fragmented by HindIII digestion and hybridized with cDNA probe for Escherichia coli 16S and 23S RNA genes. A total of 121 isolates obtained from outbreaks during 1992 and 1994 in Taiwan were characterized by this ribotyping method. Four to seventeen restricted fragments were visualized in these isolates. After hierarchical cluster analysis, these isolates were grouped into thirty different ribotypes. In addition, A3, A7, E3 and F1 were the major ribotypes, consisting of 22.3, 13.2, 9.1, and 8.3% of the isolates, respectively. A, E, F, G and B were the major groups, consisting of 46.2, 14.0, 9.1, 6.7, and 6.7% of the isolates, respectively. The discriminatory ability of this ribotyping method, as determined by Simpson's index of diversity, was 0.93, which closely resembled that of a previously reported pulsed-field gel electrophoresis method.

Wong H.C. et al. Molecular typing of Vibrio parahaemolyticus isolates, obtained from patients involved in food poisoning outbreaks in Taiwan, by random amplified polymorphic DNA analysis. *J Clin Microbiol.* 1999; 37(6) : 1809-12p. Abstract: Vibrio parahaemolyticus is one of the most important food-borne pathogens in Taiwan, Japan, and other countries with long coastlines. This paper reports on the development of a new random amplified polymorphic DNA (RAPD) method for the molecular typing of this pathogen. The 10-mer primer 284 (5’-CAG GCG CAC A-3’) was selected to generate polymorphic amplification profiles of the genomic DNA at an annealing temperature of 38 degrees C. A total of 308 clinical isolates of *V. parahaemolyticus* collected during food poisoning outbreaks in Taiwan, mostly occurring between 1993 and 1995, plus 11 environmental and clinical reference strains were analyzed by this RAPD method. A total of 41 polymorphic RAPD patterns were recognized, and these patterns were arbitrarily grouped into 16 types (A to P). Types A, B, C, D, and E were the major types, and subtypes C3, C5, E1, B1, D2, and A2 were the major patterns. The major types were phylogenetically more closely related to each other than to any of the minor types.

Wong H.C. et al. Effect of mild acid treatment on the survival, enteropathogenicity, and protein production in vibrio parahaemolyticus. *Infect Immun.* 1998; 66(7) : 3066-71p. Abstract: Vibrio parahaemolyticus is an important food-borne enteropathogen that encounters various adverse conditions in its native environment or during infection. Effects of mild acid treatment on survival under stress conditions, enteropathogenicity, and protein production in this pathogen were investigated. Logarithmically grown cells, at pH 7.5 shifted to pH 5.0 for 30 min, were more resistant to subsequent acid challenge at pH 4.4. A two-phase adaptive procedure (pH 5.8 for 30 min; pH 5.0 for 30 min) was better than a single-phase procedure for enhancing the acid tolerance of this pathogen. The acid-adapted cells were cross-protected against the challenges of low salinity and thermal inactivation. One-dimensional polyacrylamide gel electrophoresis revealed that proteins with molecular masses of 6.4, 9.0, 13.6, 16.3, 18.9, 22.9, 24.4, 28.3, 33.9, 36.9, 41.2, 47.6, 58.1, 65.6, 80.5, 88.2, and 96.9 kDa were induced or significantly enhanced, while proteins of 25.3, 30.1, 30.7, and 91.7 kDa were significantly inhibited. Two-dimensional polyacrylamide gel electrophoresis revealed that 20 species of proteins were induced or significantly enhanced, while 26 species were inhibited. In assays conducted using the suckling mouse model, enteropathogenicity of the acid-adapted cells was significantly enhanced in terms of intestine/body weight ratio and in vivo recovery of infected cells.

Woteki C.E. et al. Keep food safe to eat: healthful food must be safe as well as nutritious. *J Nutr.* 2001; 131(2S-1) : 502S-509Sp. Abstract: The inclusion of food safety in the 2000 edition of the Dietary Guidelines for Americans is an important step toward ensuring their continued relevance for health promotion and disease prevention. The inclusion of food safety is consistent with the original intent of the Guidelines and the increased focus on food safety today; it also better reflects current knowledge about diet and long-term health. A wide spectrum of surveillance methods can be used to monitor progress in reducing the incidence of foodborne illness, from surveys of food safety attitudes to epidemiologic data on foodborne illness. Surveillance data show that progress is being made, but that much work remains to be done. Strategies for reducing foodborne illness require a farm-to-table approach and the involvement of all those who have a responsibility for food safety, i.e., government, industry and the public. Federal agencies and others are finding it useful to use a risk analysis framework, i.e., risk assessment, risk management and risk communication, as a means of organizing available information, identifying data gaps, quantifying risks for specific pathogens and foods, and presenting strategies for improvement. Food safety education is a critical part of the overall strategy to reduce the incidence of foodborne illness and complements regulatory, research and other activities.
important step toward ensuring their continued relevance for health promotion and disease prevention. The inclusion of food safety is consistent with the original intent of the Guidelines and the increased focus on food safety today; it also better reflects current knowledge about diet and long-term health. A wide spectrum of surveillance methods can be used to monitor progress in reducing the incidence of foodborne illness, from surveys of food safety attitudes to epidemiologic data on foodborne illness. Surveillance data show that progress is being made, but that much work remains to be done. Strategies for reducing foodborne illness require a farm-to-table approach and the involvement of all those who have a responsibility for food safety, i.e., government, industry and the public. Federal agencies and others are finding it useful to use a risk analysis framework, i.e., risk assessment, risk management and risk communication, as a means of organizing available information, identifying data gaps, quantifying risks for specific pathogens and foods, and presenting strategies for improvement. Food safety education is a critical part of the overall strategy to reduce the incidence of foodborne illness and complements regulatory, research and other activities.

Wu M.L. et al. Scombroid fish poisoning: an overlooked marine food poisoning. Vet Hum Toxicol. 1997; 39(4): 236-41p. Abstract: Scombroid fish poisoning is a food-borne chemical intoxication caused by certain spoiled fish that contain a large amount of histamine and some biogenic diamines. It has gradually become a world-wide medical problem and probably is the most common cause of fish poisoning. As the data on the incidents of scombroid fish poisoning in Taiwan remains scarce, we report 2 incidents of scombroid fish poisoning in Northern Taiwan. We collected data of the 2 outbreaks of suspected fish poisoning which were reported to us in 1996. An epidemiological investigation was undertaken. Questionnaire interviews were given to persons who ate lunch in the same cafeteria in outbreak 2. The leftover fish were sent for species identification and toxin analysis. The first incident involving 4 women occurred in March 1996. All cases experienced flush, dizziness, blurred vision and skin rashes after eating lunch. A non-scombroid fish of Makaira with histamine levels of 118.5 mg/100 g flesh was implicated in this incident. In August 1996, another incident involving some cases who ate lunch at the same cafeteria were investigated. A total of 146 questionnaires were distributed with a return of 132 questionnaires (90.4%). Fifty-five employees reported positive signs or symptoms; 48 persons who ate fish and 7 women who did not eat fish were ill. Fish was the only food associated with the illness with an attack rate of 73.8% (p < 0.001). The incriminated fish was later identified as a scombroid fish of Euthynnus with a histamine content of 271.9 mg/100 g flesh in 1 leftover piece and 118.5 mg/100 g flesh in another piece. Most cases in these 2 outbreaks received treatment with antihistamines and had rapid and complete recovery. The diagnosis of scombroid fish poisoning could be misdiagnosed as food allergy or bacterial food poisoning if physicians are not aware of such poisoning. The nonspecific but characteristic symptomatology of histamine food poisoning and previous consumption of fish should alert physicians to the possibility of scombroid fish poisoning. Unless complicated with shock or respiratory distress, supportive treatment with antihistamines usually concludes with a good prognosis. Toxin analysis of the fish flesh remains the most important step in approaching a confirmed diagnosis.

Xu L. et al. Exogenous mouse mammary tumor virus (MMTV) infection induces endogenous MMTV sag expression. Virology. 1996; 215(2): 113-23p. Abstract: The mouse mammary tumor virus (MMTV) superantigen (Sag) protein is involved in the transmission of milk-borne MMTV from virus-infected milk in the gut to the target mammary gland tissue. Using an RT-PCR assay for in vivo MMTV infection, BALB/c or C3H mice nursed on C3H MMTV- infected mothers showed sag mRNA expression in intestine, spleen, and thymus as early as 1 day after infection, whereas uninfected BALB/c control animals had approximately 10- to 30-fold lower sag expression. Further fractionation experiments with small intestine indicated that sag expression occurred in gut-associated lymphoid cells. Restriction enzyme digestion of PCR products indicated that the sag mRNA detected was derived from the endogenous MMTVs, and sequencing analysis confirmed that the PCR products were derived from endogenous MTV-6. Expression of C3H-specific mRNA was detectable in BALB/cfC3H or C3H tissues by RNase protection or by RT-PCR. Endogenous MMTV sag expression was low in spleen and undetectable in thymocytes of C3H MMTV- infected C57BL/6 mice, a strain resistant to C3H MMTV tumorigenesis and defective for HMC class II I-E molecules. The RT-PCR assay for sag mRNA appears to measure the Sag-induced stimulation previously predicted for milk-borne MMTV infection. Together these data suggest that exogenous MMTV sag expression is minimal, but sufficient to rapidly stimulate transcription of endogenous MMTV sag mRNA in B- and T-cells in an MHC class II I-E-dependent manner. The endogenous sag expression on maternal lymphocytes may increase the number of proliferating T-cells available for milk-borne MMTV infection.

Xu Z.Y. et al. Ecology and prevention of a shellfish-associated hepatitis A epidemic in Shanghai, China. Vaccine. 1992; 10 Suppl 1 S67-5p. Abstract: During a shellfish-borne hepatitis A outbreak in Shanghai during the first quarter of 1988, 300,000 cases were reported in two months. Using cell culture and experimental infection of marmosets, hepatitis A virus (HAV) was isolated from clams collected from the market and the sea bed during the epidemic. A dose-response curve correlating the quantity of clams consumed to the attack rate of hepatitis A was well documented. The occurrence of the epidemic was associated with a good harvest of clams in a new area, serious pollution of this area with sewage and importation of the clams in large quantities into Shanghai where most young adults were susceptible. Clams can apparently be decontaminated by using a continuous water flow. In this way, HAV titres can be reduced by 90% in one day and by 99.9% in two weeks. An attenuated live HAV vaccine which has been developed in China has been shown to be safe and immunogenic and may be used for prevention of such epidemics in the future.

Yamamoto S. et al. Listeria monocytogenes-induced gamma interferon secretion by intestinal intraepithelial gamma/delta T lymphocytes. *Infect Immun.* 1993; 61(5): 2154-61p. **Abstract**: gamma/delta T cells represent a major proportion of intestinal intraepithelial lymphocytes (IEL), and it has been suggested that these IEL serve as a first immune barrier against microbial invasion and that they do so by destroying infected epithelial cells. In the present study, we confirmed that both alpha/beta and gamma/delta IEL from naive mice express potent cytotoxicity and produce gamma interferon (IFN-gamma) after T-cell receptor (TCR) engagement by specific monoclonal antibodies (MAb). Intraperitoneal administration of the anti-gamma/delta TCR MAb GL3 caused downregulation of the gamma/delta TCR in IEL, and IEL from gamma/delta TCR-modulated mice failed to express cytotoxic activity and to secrete IFN-gamma after gamma/delta TCR engagement. In contrast, alpha/beta IEL from such mice were still cytolytic and secreted IFN-gamma. Mice were infected orally with virulent Listeria monocytogenes at doses which caused bacterial invasion through the intestinal epithelium. Although alpha/beta and gamma/delta IEL from these mice expressed high cytolytic activities in antibody-redirected killer assays, target cells pulsed with listerial antigens were not lysed. In contrast, IFN-gamma secretion by IEL from L. monocytogenes-infected mice was induced not only by anti-TCR MAb but also by target cells pulsed with listerial antigens, whereas irrelevant antigens, including heat shock protein 60, did not induce IFN-gamma secretion. Furthermore, the number of IFN-gamma-secreting IEL, as assessed by the enzyme-linked immunospot technique, was increased during listeriosis. Gamma/delta TCR modulation by GL3 administration abrogated antigen-induced IFN-gamma secretion by IEL from infected mice. These findings suggest that L. monocytogenes induced IFN-gamma secretion by gamma/delta IEL from mice suffering from intestinal L. monocytogenes infection and invasion. Thus, the data provide evidence for a role of IFN-gamma-secreting IEL in local resistance against listeriosis and perhaps other foodborne diseases.

Yatsuyanagi J. et al. Enteropathogenic Escherichia coli strains harboring enteroaggregative Escherichia coli (EAggEC) heat-stable enterotoxin-1 gene isolated from a food-borne-like outbreak. *Kansenshogaku Zasshi.* 1996; 70(1): 73-9p. **Abstract**: A food-poisoning outbreak occurred in G Town in Minami-Akita District, Akita Prefecture on 16 January 1995. As the causative agent of the outbreak, Enteropathogenic Escherichia coli (EPEC) O126:NM were isolated. The isolates showed the same plasmid profile and antibiotic susceptibility patterns suggesting that the EPEC strains originated from the same infectious source. The isolates lacked eae and EAF genes which were considered to play a significant role in the diarrheagenic mechanism of EPEC. On the other hand, the isolates possessed Enteroaggregative E. coli (EAggEC) heat-stable enterotoxin-1 (EAST-1) gene, though they did not possess the agg A gene in which the coded structural subunit of Aggregative adherence fimbriae 1 (AAF/1) has been demonstrated to be involved in the expression of ability for EAggEC to adhere to cultured cells in aggregative pattern, indicating that the EPEC strains apparently differed from EAggEC. These data suggested that EAST-1 showed its enteroactive activity to human, and that EPEC represented multiple category of E. coli strains with different diarrheagenic mechanism, in which both eae and EAST-1 might be involved.

Chinese-style barbecued meats: a public health challenge. *Can J Public Health.* 2000; 91(5): 386-9p. Abstract: The custom of displaying Chinese-style barbecued meats at room temperature has been a controversial food safety issue in North America. This article is intended to facilitate development of a risk-based food safety policy for this custom of displaying Chinese-style barbecued meats at room temperature. The risk-based food safety policy is proposed.

Yoder D.R. et al. Epidemiologic findings from an outbreak of cysticercosis in feedlot cattle. *J Am Vet Med Assoc.* 1994; 205(1): 45-50p. Abstract: An outbreak of cysticercosis in a south-central Idaho custom feedlot reached a peak prevalence of 11% in January 1993 and extended from October 1992 through March 1993. Of 5,164 cattle slaughtered from this feedlot during the outbreak, 457 (9%) were cysticercosis infected. Total discounts on the infected cattle at slaughter cost the feedlot $154,400. Most evidence was suggestive of feed-borne transmission of Taenia saginata eggs to the cattle in the feedlot. By use of logistic regression analysis of feedlot records, significant (P = 0.004) association of cysticercosis prevalence at slaughter with days on feed was revealed. Similarly, a decline in cysticercosis prevalence was significantly (P < 0.001) related to the number of days cattle were fed a ration not containing potato byproduct. Although sources other than potato byproduct were systematically evaluated during the investigation, findings suggested that potato byproduct fed in this feedlot was contaminated with T. saginata eggs.

Yoh M. et al. Comparison of Vibrio parahaemolyticus hemolysin (Vp-TRH) produced by environmental and clinical isolates. *FEMS Microbiol Lett.* 1992; 71(2): 157-61p. Abstract: TDH-related hemolysin (Vp-TRH) produced by Kanagawa-phenomenon-negative (KP-) Vibrio parahaemolyticus has been demonstrated to be a possible virulence determinant. Though almost half of KP-isolates examined from diarrhoeal patients produced Vp-TRH, few reports mentioned the ability of environmental isolates to produce Vp-TRH. Considering the route of infection with V. parahaemolyticus, this toxin must be produced by the organisms in the sea or in sea food. To confirm that Vp-TRH produced by V. parahaemolyticus could be involved in sea-food-borne diarrhoeas, Vp-TRH-producing strains were isolated from the environment, identified and hemolysin purified from these strains was compared to hemolysin (Vp-TRH) isolated from diarrhoeal patients. The results showed that the hemolytic activity, antigenicity, reactivity in the rabbit ileal loop test and N-terminal amino acid sequence of Vp-TRH from environmental strains was indistinguishable from the toxin of clinical origin.


Yoshimoto T. et al. A V beta 8.2-specific superantigen from exogenous mouse mammary tumor virus carried by FM mice. *Eur J Immunol.* 1994; 24(7): 1612-9p. Abstract: A number of endogenous mouse mammary tumor virus (MMTV) proviruses encode superantigen that have the ability to stimulate T cells with a certain T cell receptor (TCR) beta-chain variable region (V beta) and to mediate the V beta-specific clonal deletion. The tumorigenic milk-borne MMTV carried by C3H and GR mice also have superantigenic properties in vivo. In the present study we identified and characterized a novel V beta 8.2-specific superantigen of exogenous MMTV carried by FM mice. The open reading frame (ORF) in the 3' long terminal repeat of the MMTV was cloned by polymerase chain reaction with primers corresponding to conserved regions spanning the ORF coding region. Sequence analysis of the ORF revealed that there is no sequence identical to those in other known MMTV in the carboxyl terminus implicated in TCR V beta recognition. Subcutaneous injection of the virus into adult BALB/c mice induced an approximately three- to fourfold enlargement of
draining lymph nodes and a substantial increase of V beta 8.2+ CD4+ T cells in the lymph nodes within 6 days. The exposure of newborn BALB/c mice to the virus by foster nursing resulted in a marked deletion of V beta 8.2+ cells both in CD4+ and CD8+ T cells. Thus, a novel milk-borne MMTV in FM mice expresses strong superantigenic properties capable of stimulating V beta 8.2+ T cells. V beta 8.2+ T cells have been demonstrated to be frequently involved in recognition of conventional antigens and responsible for autoimmune diseases such as experimental allergic encephalomyelitis. Therefore, the MMTV (FM) may provide a new mouse model system for inducing immunodeficiency or autoimmune disease by retroviral infection.

Younis T.A. et al. Interaction between acari ectoparasites and rodents in Suez Governorate, Egypt. J Egypt Soc Parasitol. 1995; 25(2): 377-94p. Abstract: From the medical point of view, the relation between man and rodents comes in the priority. Some rodent populations are wild but others are commensal and live in close association with man. They steal his food and conveying many zoonotic diseases. Their arthropod ectoparasites play an important role in conveying or transmitting these zoonotic diseases. Several disorders and diseases of man are tick borne relapsing fever, Rocky mountain spotted fever, Lyme disease, and many others. Besides numerous species of mites occasionally infest man. They transmit several diseases as Rickettsia tsutsugamushi fever, epidemic haemorrhagic fever, and they cause severe allergic reaction. The results obtained are summarized in the following (1) Six species and subspecies of rodents were detected. In a descending order of abundance, they were (a) Rattus norvegicus, (b) Rattus rattus alexandrinus (c) Rattus rattus frugivorous (d) Acomys cahirinus (e) Gerbillus gerbillus asyutensis (f) Mus m. praetextus. (2) The most common rodent was R. norvegicus and the least common was M. musculus. (3) The collected ticks and mites were 2 genera of tick larvae; Rhipicephalus species and Hyalomma species. The collected mites were Ornithonyssus bacoti and Laelaps nuttali. (4) Most of the tick larvae were collected from wild rodents; Gerbillus g. asyutensis. (5) Most of the mites were collected from commensal rodents particularly R. norvegicus. Descriptive morphology and illustrations were given to the collected rodents and their acari ectoparasites.

Zaludko J. et al. [Familial epidemics of tick-born encephalitis in central Povazie]. Bratisl Lek Listy. 1994; 95(11): 523-6p. Abstract: The authors describe two cases of tick-born encephalitis family epidemics in the natural focus of tick-born encephalitis (TbE) in the central part of Povazie in the district of Povazka Bystrica in the years 1989 and 1993. The infection took place due to consumption of raw goat milk. The best prevention against tick-born encephalitis is represented by vaccination. (Tab. 4, Ref. 6.).

Zastrow K.D. et al. [Outbreaks of food-borne infections and microbe-induced poisonings in West Germany 1991]. Gesundheitswesen. 1993; 55(5): 250-3p. Abstract: Analysis of the outbreaks of food-borne infections and intoxications with a total of 2,610 patients in 1991 demonstrates that these cases were caused in 67.4% by Salmonella species. Eggs were mainly responsible for the outbreaks, whereas poor kitchen hygiene played also a main part in promoting disease.

Zheng W. et al. Differentiation of epidemic-associated strains of Listeria monocytogenes by restriction fragment length polymorphism in a gene region essential for growth at low temperatures (4 degrees C). Appl Environ Microbiol. 1995; 61(12): 4310-4p. Abstract: The growth of Listeria monocytogenes in food stored in the cold has often been implicated in outbreaks of listeriosis. Many subtyping schemes have suggested that epidemic-associated strains belong to a unique genetic group. It has not yet been possible, however, to identify molecular or bacteriologic markers unique to epidemic-associated strains. Recently we cloned three genes of L. monocytogenes, ItrA, ItrB, and ItrC, which are essential for growth at low temperatures (4 degrees C). The use of a 1.2-kb PsI fragment derived from ItrB as a probe in Southern blots of HindIII-digested DNA revealed three hybridization patterns: the first (a 5.0-kb band) was observed in strains of serotypes 4b, 1/2b, and 3b; the second (a 3.1-kb band) was seen in strains of serotypes 1/2a, 3a, 1/2c, and 3c; and the third (a 9.5-kb band) was characteristic of epidemic-associated serotype 4b strains. These and other data suggest that probes derived from this gene region that is essential for growth at low temperatures can be useful molecular tools for the subtyping of strains implicated in food-borne listeriosis.

Zhu J. et al. Apoptotic effect of outer-membrane proteins from Campylobacter jejuni on chicken lymphocytes. Curr Microbiol. 1999; 38(4): 244-9p. Abstract: Campylobacter jejuni is a significant cause of food-borne diseases in humans. The bacterium is considered a commensal organism in chickens, and it can heavily colonize chickens without causing inflammation. Poultry may be the major reservoir for the human infection in developed countries. Here we show that an outer-membrane protein extract prepared from the bacteria caused apoptosis of chicken lymphocytes detected in vitro with the terminal deoxynucleotidyl transferase-mediated dUTP nick end-labeling assay that preferentially labels individual apoptotic cells. Blood- and spleen-lymphocytes from different-aged chickens displayed a significantly greater percentage of apoptotic cells after culture with the outer-membrane proteins from C. jejuni than controls treated with phosphate-buffered saline, chicken ovalbumin, or outer-membrane proteins prepared from E. coli strain BL21. The C. jejuni extract also produced apoptosis of chicken lymphoblastoid tumor cell lines. Apoptosis was blocked by pretreating the extract with proteinase K or antiserum against outer-membrane proteins. The results suggest that C. jejuni may be capable of achieving immune avoidance in chickens by causing apoptosis of lymphocytes.

Zwieten M.H. et al. Sensitivity analysis in quantitative microbial risk assessment. Int J Food Microbiol. 2000; 58(3): 213-21p. Abstract: The occurrence of foodborne disease remains a widespread problem in both the developing and the developed world. A systematic and quantitative evaluation of food safety is important to control the risk of foodborne diseases. World-wide, many initiatives are being taken to develop quantitative risk assessment. However, the quantitative evaluation of food safety in all its aspects is very complex, especially since in many cases specific parameter values are not available. Often many variables have large statistical variability while the quantitative effect of various
phenomena is unknown. Therefore, sensitivity analysis can be a useful tool to determine the main risk-determining phenomena, as well as the aspects that mainly determine the inaccuracy in the risk estimate. This paper presents three stages of sensitivity analysis. First, deterministic analysis selects the most relevant determinants for risk. Overlooking of exceptional, but relevant cases is prevented by a second, worst-case analysis. This analysis finds relevant process steps in worst-case situations, and shows the relevance of variations of factors for risk. The third, stochastic analysis, studies the effects of variations of factors for the variability of risk estimates. Care must be taken that the assumptions made as well as the results are clearly communicated. Stochastic risk estimates are, like deterministic ones, just as good (or bad) as the available data, and the stochastic analysis must not be used to mask lack of information. Sensitivity analysis is a valuable tool in quantitative risk assessment by determining critical aspects and effects of variations.