

FOOD POISONING / CONTAMINANT INCIDENT SUMMARY No. 1

PRODUCT:	Ice Creams
DATE:	1986
COMPANY:	Marigold Foods Inc.
COUNTRY:	USA Minneapolis

NATURE OF INCIDENT: Two massive recalls of ice cream because of contamination with *Listeria monocytogenes*.

ILLNESS: Illness reported but details not published.

PEOPLE AFFECTED: Not known.

CAUSE: Probable cause of the contamination was in a dehumidifier; *Listeria* was also found in floor drains in the plant.

CRITICAL CONTROL POINT

ACTION TAKEN BY COMPANY:

- Manufacturing.
- Million gallons ice-cream recalled (recall cost \$ 3 million).
- Production stopped.
- Dehumidifier removed.
- Plant sanitised.

LESSONS TO BE LEARNED:

- Ensure that product cannot become contaminated after pasteurisation.
- Ensure proper sanitation of the plant. Officers from the FDA speculated that "over-reliance on new technology may be resulting in lack of emphasis on basic quality control activities".

FOOD POISONING / CONTAMINANT INCIDENT SUMMARY No. 2

PRODUCT:	Dried Italian Egg Lasagne
DATE:	1984 (published 1986)
COMPANY:	Braibanti
COUNTRY:	Italy

NATURE OF INCIDENT:	International outbreak of food poisoning.
ILLNESS:	Staphylococcal.
PEOPLE AFFECTED:	Over 50 people in Italy, Luxembourg, France and the UK.
CAUSE:	The source of contamination was inadequately pasteurised liquid egg. Prolonged holding of unrefrigerated raw pasta dough permitted extensive growth of surviving staphylococci. In the early stages of pasta manufacture, the mixing and drying conditions favour the growth of this bacterium.
CRITICAL CONTROL POINT	Manufacturing.
ACTION TAKEN BY COMPANY:	<ul style="list-style-type: none">• Products recalled.• Pasteurisation process rectified.• Drying temperatures increased to prevent bacterial growth.• Improvements made to hygiene and quality control in factory.
OUTSIDE BODIES INVOLVED:	<ul style="list-style-type: none">• Health authorities in the four countries involved.• World Health Organisation.• Italian authorities issued a code of good manufacturing for pasta products.
LESSONS TO BE LEARNED:	<ul style="list-style-type: none">• Company managers should be aware of the critical points in each process.• Company personnel should know that holding food materials at warm temperatures spells danger.• The WHO Early Warning (Alert) System worked well throughout Europe and helped to contain the problem.

FOOD POISONING / CONTAMINANT INCIDENT SUMMARY No. 3

PRODUCT:	Branded dried infant foods and dietary products
DATE:	1985/6
COMPANY:	Farley Health Products: Parent Company Glaxo
COUNTRY:	UK

NATURE OF INCIDENT:	Widespread salmonellosis traced to contaminated product.
ILLNESS:	Salmonellosis caused by <i>Salmonella ealing</i> .
PEOPLE AFFECTED:	70 people (mostly infants but at least 11 adults).
CAUSE:	The salmonellae are believed to have entered the factory in raw milk from a local herd of cows that were infected with <i>S. ealing</i> . How contamination spread from the raw milk to the pasteurised milk/powder is not known. None of the food handlers were found to be excreting <i>S. ealing</i> .
CRITICAL CONTROL POINT	Manufacturing.
ACTION TAKEN BY COMPANY:	<ul style="list-style-type: none">• Products recalled.• Company liquidated and sold for £ 18 million as against an expected £ 40 million before the <i>Salmonella</i> problem.• New parent company (Boots) stripped down the plant and installed new.• Old parent company set aside £10 million to meet outstanding debts and compensation claims.
OUTSIDE BODIES INVOLVED:	The PHLS examined over 5'000 packs of Farleys products; they estimate that the total cost of the outbreak to the Company and to the British nation will exceed £ 50 million sterling.
LESSONS TO BE LEARNED:	<ul style="list-style-type: none">• Salmonellae can spread from raw milk to pasteurised milk.• Salmonellae survive well in dried milk and they are difficult to eradicate once they have become established in a dried milk plant.• In the UK, the PHLS are getting better at finding the cause of widely scattered incidents of foodborne disease.

Note: Since this outbreak, other dried milk producers in Europe have found salmonellae in their plants.

FOOD POISONING / CONTAMINANT INCIDENT SUMMARY No. 4

PRODUCT:	Low fat milk (2 brand labels) pasteurised
DATE:	March 1985
COMPANY:	Hillfarm Dairy
COUNTRY:	USA

NATURE OF INCIDENT:	Milk contaminated with <i>Salmonella typhimurium</i> .
ILLNESS:	Salmonellosis.
PEOPLE AFFECTED:	16'000 confirmed cases.
CAUSE:	<ul style="list-style-type: none">• Cross-contamination i.e., raw milk coming into contact with pasteurised milk in one or more of the following ways:• Valves permitted seepage of raw milk into lines carrying pasteurised milk.• Salmonellae present on threaded caps that are interchangeable between raw and pasteurised lines.• Contamination of pasteurised milk by reclaimed milk.
CRITICAL CONTROL POINT	Manufacturing.
ACTION TAKEN BY COMPANY:	<ul style="list-style-type: none">• Plant closed; incriminated valves disconnected, products recalled.
OUTSIDE BODIES INVOLVED:	US FDA, Centre for Disease Control, Illinois Dept. of Public Health, various consultants.
LESSONS TO BE LEARNED:	<ul style="list-style-type: none">• Plant managers must intensify their efforts to prevent post-pasteurisation contamination; all potential bypasses around the pasteuriser have to be identified and stopped.• Up-to-date diagrams of all operations within the plant must be available.• Inspections to detect faulty equipment have to be thorough.• Operatives must be properly educated so that they understand the health consequences of improper pasteurisation or post- pasteurisation contamination.

FOOD POISONING / CONTAMINANT INCIDENT SUMMARY No. 5

PRODUCT:	Chocolate low-fat milk in half-pint cartons
DATE:	1986 (information received)
COMPANY:	South Eastern Dairy
COUNTRY:	USA - Louisville, Kentucky

NATURE OF INCIDENT: Chocolate milk contaminated with *Staphylococcus aureus*.

ILLNESS: Staphylococcal Food poisoning.

PEOPLE AFFECTED: 300 school children reported ill but true number of cases probably about 1'000.

CAUSE: Several mechanical faults in the dairy plant due to poor equipment maintenance; the main fault was with the water jacket of the tank used when chocolate powder was added to raw skim milk. This jacket was plumbed to take either hot water for heating or cold water for cooling the mix. However, with the hot tap turned off, hot water was leaking into the jacket, warming the product to body temperature and enabling staphylococci to grow. The toxin can survive pasteurisation.

CRITICAL CONTROL POINT Manufacturing.

ACTION TAKEN BY COMPANY: Product recalled. Company had to carry out 9 main actions at the insistence of the FDA to correct faults.

OUTSIDE BODIES INVOLVED: FDA made a full investigation of the plant.

LESSONS TO BE LEARNED:

- Importance of proper maintenance of equipment.
- Operators should know that holding food at warm temperatures is dangerous.

FOOD POISONING / CONTAMINANT INCIDENT SUMMARY No. 6

PRODUCT:	Shrimp Salad
DATE:	1986 (but published in 1988)
COMPANY:	McDonald's Corporation
COUNTRY:	USA

NATURE OF INCIDENT: Outbreak of enteric fever traced to a shrimp salad contaminated with *Salmonella typhi*.

ILLNESS: Enteric fever (typhoid fever).

PEOPLE AFFECTED: 10 people (one boy nearly died).

CAUSE: The organism was traced to a food handler who had vacationed in India and returned to work as a symptomless carrier. Twelve salads were contaminated.
Many salads and salad ingredients had been stored at room temperature rather than under refrigeration.

CRITICAL CONTROL POINT Preparation.

ACTION TAKEN BY COMPANY: McDonald's estimated losses of \$ 2 million per month in sales and much more in legal action.

LESSONS TO BE LEARNED: All companies which produce "high risk" foods and all catering establishments should:

- have a system to advise their food handlers how best to avoid acquiring enteric diseases when visiting endemic areas
- develop contingency plans how best to handle a serious incident such as this.

FOOD POISONING / CONTAMINANT INCIDENT SUMMARY No. 7

PRODUCT:	Milumil and Aptamil
DATE:	1988
COMPANY:	Milupa
COUNTRY:	France and UK

NATURE OF INCIDENT: Product contaminated with *Salmonella*.

ILLNESS: none

PEOPLE AFFECTED: none

CAUSE: Salmonellae were found in a batch of powdered milk during routine inspection at the company's factory in Colmar, France. The source of the contamination has not been made public.

CRITICAL CONTROL POINT Manufacturing

ACTION TAKEN BY COMPANY: Company recalled three powders (Milumil, Aptamil and Milupa infant breakfasts) with sell by date of July 1989. Company advised public that similar products made in West Germany were safe.

OUTSIDE BODIES INVOLVED: In the UK, the Department of Health and Social Security warned the public not to buy the suspect products.

LESSONS TO BE LEARNED:

- Salmonellae are sometimes found in dried milk
- Companies should be able to locate and recall specific codes of product.

FOOD POISONING / CONTAMINANT INCIDENT SUMMARY No. 8

PRODUCT:	Vacherin Mont d'Or Soft Cheese
DATE:	1987-1988
COMPANY:	Several small cheese manufacturers in the Canton of Vaud
COUNTRY:	Switzerland

NATURE OF INCIDENT:	Epidemiological data linked consumption of this cheese with human listeriosis.
ILLNESS:	Listeriosis.
PEOPLE AFFECTED:	Probably 60 (may have caused 31 deaths over the previous 5 years).
CAUSE:	This product is a local speciality cheese produced by traditional methods. Each loaf (500 g-3 kg) is wrapped in a piece of bark from a fir tree and packed in a wooden box. This allows cross-contamination during production and ripening.
CRITICAL CONTROL POINT	Manufacturing
ACTION TAKEN:	Production and export of this type of cheese stopped (by Swiss Federal Office of Public Health).
OUTSIDE BODIES INVOLVED:	Swiss authorities issued a health warning to pregnant women and those with reduced immune defence system advising them not to eat the rind of soft cheeses.
LESSONS TO BE LEARNED:	<ul style="list-style-type: none">• epidemiologists are getting better at tracing sources of foodborne illnesses• manufacturers of products that are eaten cold should carry out risk analyses of their operations and eliminate potentially hazardous practices.

**FOOD POISONING / CONTAMINANT
INCIDENT SUMMARY No. 9**

PRODUCT:	Frozen pre-cooked beef burgers
DATE:	1988
COMPANY:	Redi Serve Foods Inc.
COUNTRY:	USA

NATURE OF INCIDENT: Contamination by the infectious pathogen *Escherichia coli*.

ILLNESS: Bloody diarrhoea.

PEOPLE AFFECTED: 31 school children (6 of them hospitalised)

CAUSE: It is not known whether these products (pre-cooked, charbroiled beef patties and beef burgers) were inadequately cooked, or whether they were re-contaminated after cooking.

CRITICAL CONTROL POINT Preparation

ACTION TAKEN BY COMPANY: The company advised its customers to regard all its pre-cooked products as raw products and to cook them thoroughly before serving.

OUTSIDE BODIES INVOLVED: USDA, and the Minnesota Dept. of Agriculture.

LESSONS TO BE LEARNED: It is important that all pre-cooked meat (and fish) products receive a thermal process, which will achieve a 6-log reduction of infectious pathogens. Thereafter they must be handled and packed so as to prevent recontamination.

**FOOD POISONING / CONTAMINANT
INCIDENT SUMMARY No. 10**

PRODUCT:	8 oz. Glass jar of chopped garlic in olive oil
DATE:	1989
COMPANY:	Colavita Pasta and Olive Oil Co.
COUNTRY:	USA

NATURE OF INCIDENT: Product wrongly stored at ambient temperatures rather than under refrigeration.

ILLNESS: Botulism.

PEOPLE AFFECTED: 3 adults hospitalised.

CAUSE: The jar of this speciality product had been purchased over a year before the incident; portions had been used intermittently on garlic bread, but the product had not been stored under refrigeration, despite the "keep refrigerated" label on the pack.

CRITICAL CONTROL POINT Consumer.

ACTION TAKEN BY COMPANY: Product recalled (all sizes of container) and discontinued.

OUTSIDE BODIES INVOLVED: FDA.

LESSONS TO BE LEARNED: Products designed to be stored under refrigeration must feature a prominent instruction to this effect on the label, as this is the **second** outbreak of botulism caused by this type of product. In 1988, 36 people in Canada acquired botulism from commercially prepared chopped garlic in soybean oil.

FOOD POISONING / CONTAMINANT INCIDENT SUMMARY No. 11

PRODUCT:	Hazelnut yoghurt
DATE:	June 1989
COMPANY:	Acorn Dairies
COUNTRY:	England

NATURE OF INCIDENT:	Botulism caused by contaminated yoghurt.
ILLNESS:	Type B botulism.
PEOPLE AFFECTED:	27 (1 death).
CAUSE:	The yoghurt had been flavoured with canned hazelnut puree supplied by Young's Fruit Farms (Folkstone, UK). 9 out of 21 cans seized by the Health Authorities were blown and <i>C. botulinum</i> type B toxin was found in 1 of them. The organism and the toxin were also found in opened and unopened cartons of yoghurt. To create a low calorie yoghurt, the sugar in the puree had been replaced by saccharin. With the new formulation, the thermal process given to the puree was not adequate to destroy <i>Clostridium botulinum</i> .
CRITICAL CONTROL POINT	Manufacturing.
ACTION TAKEN BY COMPANY:	Production stopped, yoghurt recalled, and health warnings broadcast. Environmental health officers found many faults at Young's premises. The company was later fined £ 3'000. Young's who once had an annual turnover of £ 1.5 million, went into receivership, with debts of £ 222'000.
OUTSIDE BODIES INVOLVED:	UK Department of Health, Environmental Health Authorities, Public Health Laboratory Service.
LESSONS TO BE LEARNED:	<ul style="list-style-type: none">• Low-acid products require a full botulinum cook'• The company that used the puree to flavour the yoghurt probably used blown cans. All food handlers need to understand that blown, rusty or damaged cans of food must be rejected.• When changes are introduced, it is necessary to review the entire process.

FOOD POISONING / CONTAMINANT INCIDENT SUMMARY No. 12

PRODUCT:	Chocolate Coins
DATE:	1985-6 (but not published until 1989)
COMPANY:	Anonymous confectioner in Belgium
COUNTRY:	USA and Canada

NATURE OF INCIDENT:	International outbreak of salmonellosis traced to chocolate coins.
ILLNESS:	Salmonellosis caused by <i>Salmonella nima</i> .
PEOPLE AFFECTED:	29 (many of them children).
CAUSE:	<i>Salmonella nima</i> is very rare in Canada and the USA. Thirteen out of 44 samples of Belgian chocolate medallions were contaminated with this organism (31%). The contamination levels were very low: only 4-24 cells / 100 g.
CRITICAL CONTROL POINT	Manufacturing.
ACTION TAKEN BY COMPANY:	Products withdrawn from the market.
OUTSIDE BODIES INVOLVED:	Health authorities in Canada, USA and Belgium.
LESSONS TO BE LEARNED:	<ul style="list-style-type: none">• Separation of uncooked raw materials from finished ready-to-eat product is vital in any food manufacturing operation.• Salmonellae survive very well in chocolate.• All products should carry batch or date codes (the chocolate coins involved in this outbreak did not).• Low numbers of Salmonellae may be sufficient to cause infections, especially in children.

**FOOD POISONING / CONTAMINANT
INCIDENT SUMMARY No. 13**

PRODUCT:	Frozen raw oysters
DATE:	1990 (reported)
COMPANY:	Undisclosed Company in Japan
COUNTRY:	Scotland

NATURE OF INCIDENT: Outbreak of gastro-enteritis.

ILLNESS: Viral Gastro-enteritis.

PEOPLE AFFECTED: At least 37.

CAUSE: The oysters were imported frozen from Japan. A caterer in Scotland thawed them and served them raw at an "oyster bar". The instructions on the pack were in Japanese and when translated said "Keep frozen at -18°C, when defrosted fry or sauté with butter, cook at a high temperature".

Had these instructions been followed, all viruses and other infectious pathogens would have been destroyed in the cooking process. Neither the caterer nor the importer was aware that the oysters should not be served raw.

CRITICAL CONTROL POINT Manufacturing, preparation.

ACTION TAKEN BY COMPANY: None, the customer had not followed the instructions on the pack.

OUTSIDE BODIES INVOLVED: Scottish Health Authorities.

LESSONS TO BE LEARNED: Exporting / importing companies should ensure that the instructions on the pack of any food product are written in a language that the consumer can be expected to read.

FOOD POISONING / CONTAMINANT INCIDENT SUMMARY No. 14

PRODUCT:	Frozen Beef burgers
DATE:	1991
COMPANY:	McDonald's
COUNTRY:	UK

NATURE OF INCIDENT:	Diarrhoeal disease with serious sequelae linked to beef burgers.
ILLNESS:	<i>E. coli</i> haemorrhagic colitis.
PEOPLE AFFECTED:	24.
CAUSE:	This particular microbe was first found on raw beef in Alberta, Canada where it caused several outbreaks of the disease. The origin of the beef in the UK outbreak was not Canada but the UK. The microbe could not be found in the beef burgers (despite several thousands being analysed) but the Health Authorities are confident that the epidemiological evidence points to the beef burgers as the cause of illness.
CRITICAL CONTROL POINT	Preparation.
OUTSIDE BODIES INVOLVED:	UK Department of Health; UK Public Health Laboratory Service.
ACTION BY AUTHORITIES:	Health warnings issued in press and on TV advising caterers and consumers to cook beef burgers thoroughly.
LESSONS TO BE LEARNED:	<ul style="list-style-type: none">• The UK Health Authorities are getting better at tracing foodborne illness to specific products.• A pathogen does not always have to be isolated from the product before the authorities will incriminate the product - epidemiological evidence can be enough.• End product testing cannot be used to assure the safety of a product (in this outbreak thousands of beef burgers from the suspect batch were tested and the pathogen was never found).• <i>E. coli</i>, like all other infectious pathogens is very sensitive to heat. The recommended cooking time to achieve a 6 - log drop is 70°C for 2 minutes (or the equivalent) and this is the critical control point of the McDonald's process.• Food handlers in a catering operation must know the critical control points; management must monitor the situation to ensure that the process is in control.

FOOD POISONING / CONTAMINANT INCIDENT SUMMARY No. 15

PRODUCT:	Canned mushrooms
DATE:	1989 (Published 1990)
IMPORTING COMPANY:	Nature's Farm Products Inc.
MANUFACTURING COMPANY:	8 canneries in 5 areas in USA
PRODUCING COUNTRY:	China

NATURE OF INCIDENT:	At least 4 separate outbreaks of staphylococcal food poisoning traced to Chinese canned mushrooms.
ILLNESS:	Staphylococcal food poisoning.
PEOPLE AFFECTED:	More than 100 people ill.
CAUSE:	During the 1980's the methods for getting raw mushrooms picked by hand from the farms to the canneries were changed. Instead of farmers supplying canneries locally (where the delivery time from farm to cannery was 2-4 hrs) the mushrooms were bought by brokers and shipped to the cannery over several days. The mushrooms were packed in tied-off non-permeable polythene or PVC bags; this environment rapidly became anaerobic, suppressed growth of normal spoilage flora and allowed the staphylococci (from the hands of the pickers) to grow and form toxin in the mushrooms without showing signs of spoilage. The toxin survived the canning process.
CRITICAL CONTROL POINT	Raw materials.
ACTION TAKEN BY IMPORTING COMPANY:	A HACCP team was sent to China to investigate the canned mushroom industry. The critical control points were identified. The recommendations were presented to FDA.
OUTSIDE BODIES INVOLVED:	In 1989, FDA automatically detained all mushrooms imported into the USA from China. In 1990 the FDA evaluated the data from the HACCP study and allowed Nature's Farm Products to import mushrooms from certain Chinese plants.
LESSONS TO BE LEARNED:	<ul style="list-style-type: none">• The HACCP (Hazard Analysis and Critical Control Point) system is an excellent tool for identifying points in a food production process that must be controlled.• Changes in packaging and transport can introduce new and unexpected hazards.• A good relationship between the FDA and the marketing company helped to get the product back onto the market.

FOOD POISONING / CONTAMINANT INCIDENT SUMMARY No. 16

PRODUCT:	Chocolate
DATE:	1987 (Published 1989)
COMPANY:	A factory in Trondheim
MANUFACTURING COUNTRY:	Norway
MARKETING COUNTRY:	Norway / Finland

NATURE OF INCIDENT:	Outbreak of salmonellosis.
ILLNESS:	<i>Salmonella typhimurium</i> infection, acute haemorrhagic diarrhoea.
PEOPLE AFFECTED:	349 (Norway); 12 (Finland); the majority young children.
CAUSE:	The epidemic strain was traced (via its characteristic plasmid profile) to three chocolate products manufactured by a single factory. The level of contamination ranged from 0 to 60 CFU per 10 g chocolate; about 90 % of positive samples contained 10 CFU / 100g or less. The presence of the outbreak strain could not be traced to raw ingredients. However, isolates were obtained from dead bullfinches in the same district. The strain may have originated from an avian reservoir; birds may have later gained access to the plant and introduced contamination somewhere along the production line.
CRITICAL CONTROL POINT	Manufacturing.
ACTION TAKEN BY COMPANY:	All chocolate produced by the factory was removed from 13'500 retail outlets.
OUTSIDE BODIES INVOLVED:	Norwegian <i>Salmonella</i> Reference Centre; Norwegian Department of Health.
LESSONS TO BE LEARNED:	<ul style="list-style-type: none">• A prompt public health warning and subsequent product recall probably prevented thousands more cases.• An inoculum of <10 organisms may have been enough to produce symptomatic infection.• Fatty ingredients present in chocolate may protect <i>Salmonella</i> against the action of gastric acid. The few salmonellae present may then colonise the lower gastrointestinal tract and produce clinical symptoms.• Low moisture and high sugar content of chocolate do not favour bacterial growth but increase their thermal resistance.• Molecular methods are helping epidemiologists to trace outbreaks to their sources.

FOOD POISONING / CONTAMINANT INCIDENT SUMMARY No. 17

PRODUCT:	Cantaloupe melons
DATE:	1991
SOURCE:	Difficult to trace
COUNTRY:	North America, possibly Texas or Mexico

NATURE OF INCIDENT:	Outbreak of salmonellosis.
ILLNESS:	<i>Salmonella poona</i> infection.
PEOPLE AFFECTED:	> 400.
CAUSE:	Melons had been pre-cut and held for an unknown time and temperature at retail before being purchased and eaten. In the field the surfaces of melons may be contaminated with dirt, untreated water and animal excreta. Not all producers wash and dip melons in a chlorine solution. It is possible that the melons implicated in these outbreaks were contaminated when cut and excessive storage at room temperature may then have permitted growth of <i>Salmonella</i> .
CRITICAL CONTROL POINT	Preparation.
OUTSIDE BODIES INVOLVED:	FDA sampled imported cantaloupes and watermelons at US border in 1990/91 and isolated many serotypes of <i>Salmonella</i> from 1% rinds. FDA recommended procedures for cleaning, serving and storage of melons.
LESSONS TO BE LEARNED:	<ul style="list-style-type: none">• Thoroughly clean melons with potable water before cutting them.• Prepare cut melons using clean and sanitised utensils and surfaces.• Portions should be consumed immediately or held at chill (< 7°C) before serving.• Limit display of cut melons to < 4 hours if not kept refrigerated.• Fresh cut melon products should be obtained from regulated food sources.

FOOD POISONING / CONTAMINANT INCIDENT SUMMARY No. 18

PRODUCT:	Sliced patés (probably several products were involved)
DATE:	1987-89 (Published 1991)
COMPANY:	A number of importing companies
MANUFACTURING COUNTRY:	Belgium
MARKETING COUNTRY:	UK and Ireland

NATURE OF INCIDENT:	Outbreaks of listeriosis
ILLNESS:	Listeriosis.
PEOPLE AFFECTED:	Approx. 350.
CAUSE:	Circumstantial evidence pointed to contamination of paté with <i>Listeria</i> . Two strains of <i>Listeria monocytogenes</i> (4bPT6, 7 and 4bX) isolated from the manufacturers paté were indistinguishable from those responsible for the upsurge in human listeriosis. These isolates were uncommon among isolates from other manufacturers and a wide range of other foodstuffs. The start of the decline in numbers of cases of listeriosis coincided with government health warnings advising sensitive consumers not to eat paté and a withdrawal of the product from sale by marketing companies. If paté was indeed the cause of the outbreak, then the most likely vehicles of infection are those paté products that are sliced after cooking, i.e. the problem may have been caused by post-process contamination in the plant in Belgium.
CRITICAL CONTROL POINT	Manufacturing.
ACTION TAKEN BY MARKETING COMPANY:	Sales of paté were suspended.
OUTSIDE BODIES INVOLVED:	UK Department of Health; UK Public Health Laboratory Service.
LESSONS TO BE LEARNED:	<ul style="list-style-type: none">• Products may be incriminated even though there is no strong evidence that they have caused illness - contamination with <i>Listeria</i> is enough.• If one brand suffers, so do others.• Public Health Authorities are getting better at "fingerprinting" <i>Listeria monocytogenes</i> and at linking cases of illness with food products on the market place.

FOOD POISONING / CONTAMINANT INCIDENT SUMMARY No. 19

PRODUCT:	Orange juice
DATE:	1991
COMPANY:	Not disclosed
MANUFACTURING COUNTRY:	Australia
MARKETING COUNTRY:	Australia

NATURE OF INCIDENT:	Outbreak of gastro-enteritis.
COUNTRY OF OUTBREAK:	Australia.
ILLNESS:	Viral gastro-enteritis.
PEOPLE AFFECTED:	> 3'000.
CAUSE:	Most notified cases were airline travellers. Surveys of groups travelling together found attack rates of illness up to 100 % among orange juice drinkers and 0 % among non-drinkers. The evidence implicated the orange juice as the vehicle of transmission. Studies of faecal samples indicated the presence of a small round structured virus (SRSV). Several problem areas were identified at the factory where contamination could have occurred; this included cross-connections between potable water and wastewater / sewage.
CRITICAL CONTROL POINT	Manufacturing.
ACTION TAKEN BY COMPANY:	Orange juice was immediately withdrawn and production stopped. All collected produce was disposed of in landfill.
OUTSIDE BODIES INVOLVED:	Health Department Victoria.
LESSONS TO BE LEARNED:	<ul style="list-style-type: none">• Enteric viruses, unlike enteric bacteria, survive well at a very low pH.• A pathogen does not have to be isolated from a product for it to be incriminated - epidemiological evidence can be enough.• Companies should fully understand the layout of water services around the factory.

FOOD POISONING / CONTAMINANT INCIDENT SUMMARY No. 20

PRODUCT:	Frozen coconut milk
DATE:	1991
MANUFACTURING COMPANY:	Asian Best
MANUFACTURING COUNTRY:	Thailand
IMPORTING COMPANY:	Distributor in USA
MARKETING COUNTRY:	USA

NATURE OF INCIDENT:	Suspected contamination with <i>Vibrio cholerae</i> .
COUNTRY OF OUTBREAK:	USA
ILLNESS:	Cholera.
PEOPLE AFFECTED:	3.
CAUSE:	The outbreak was traced to a party where homemade Thai-style rice pudding was served with a topping made from frozen coconut milk. Toxigenic <i>Vibrio cholerae</i> 01 was isolated from the patients and from another shipment of the product. Heating of the coconut milk was insufficient to kill the <i>Cholera</i> vibrios, and prolonged holding time at room temperature allowed the organisms to multiply. The source of infection of the implicated coconut milk remains under investigation. The manufacturer of this brand was not licensed by the Thai FDA and shipped products only to the USA.
CRITICAL CONTROL POINT	Manufacturing / Preparation.
ACTION BY THE DISTRIBUTING COMPANY:	Voluntary recall of product.
OUTSIDE BODIES INVOLVED:	FDA halted further importation of product.
LESSONS TO BE LEARNED:	<ul style="list-style-type: none">• The incident illustrates the potential for the worldwide spread of cholera in a frozen food product.• Coconut is recognised as a vehicle for bacterial pathogens and should be adequately heat processed.• Canned coconut milk is safer to use because the standard heat treatment during processing will kill vibrios; a thermal process of 70°C for 2 min. will achieve a 6 -log reduction of <i>Vibrio cholerae</i> and all other infectious pathogens.

FOOD POISONING / CONTAMINANT INCIDENT SUMMARY No. 21

PRODUCT:	Creamed coconut
DATE:	1991
MANUFACTURING COUNTRY:	UK
IMPORTING COMPANY:	Not disclosed
MARKETING COUNTRY:	UK

NATURE OF INCIDENT:	Isolation of <i>Salmonella</i> from a product.
COUNTRY OF OUTBREAK:	UK.
ILLNESS:	None.
PEOPLE AFFECTED:	0.
CAUSE:	Routine sampling found <i>Salmonella senftenberg</i> in retail packs of creamed coconut. Incoming raw desiccated coconut was also contaminated with <i>Salmonella</i> . Production of creamed coconut was considered a low risk operation despite the risk of <i>Salmonella</i> in the raw material and insufficient heat during processing to achieve pasteurisation. HACCP principles were not applied and the necessary manufacturing controls were not in place.
CRITICAL CONTROL POINT	Manufacturing.
ACTION TAKEN BY COMPANY:	Production and distribution of all creamed coconut products was voluntarily stopped; products already on the market were withdrawn. New process controls and other measures were implemented; the re-starting of production was supervised and monitored by the local authority.
OUTSIDE BODIES INVOLVED:	UK Department of Health, UK Public Health Laboratory Service, European Community.
LESSONS TO BE LEARNED:	<ul style="list-style-type: none">• Coconut is a vehicle for bacterial pathogens; it is an important risk factor in food products that may not be bactericidally heat processed before consumption; it is also a risk in cross-contamination.• Even in a simple process the principles of HACCP must be applied. The Critical Control Points are:<ul style="list-style-type: none">- adequate pasteurisation of coconut products- clean handling following pasteurisation• Illness does not have to be reported; isolation of a pathogen is enough to warrant a complete withdrawal of product.• Proper stock control and batch code records could have prevented all products from having to be destroyed.

FOOD POISONING / CONTAMINANT INCIDENT SUMMARY No. 22

PRODUCT:	Pre-cooked meat patties
DATE:	1988 (reported 1991)
MANUFACTURING COMPANY:	Not disclosed
MANUFACTURING COUNTRY:	Not disclosed

NATURE OF INCIDENT:	Outbreak of <i>E. coli</i> 0157 colitis.
COUNTRY OF OUTBREAK:	USA
ILLNESS:	Haemorrhagic colitis.
PEOPLE AFFECTED:	32.
CAUSE:	An outbreak of <i>E. coli</i> 0157 haemorrhagic colitis among children at a junior school was linked to consumption of heat-processed meat patties. <i>E. coli</i> were cultured from similar batches to the implicated patties, although serotype 0157:H7 was not isolated. Patties should have been sufficiently cooked by the manufacturer to destroy enteric pathogens before they were frozen. At the school, the patties were heated in an oven but their temperatures were not routinely monitored as they had already been cooked at the manufacturing plant. Review of the cooking and handling procedures at the plant identified several points in the production line where undercooking may have occurred. These included manual control of the conveyor belt and flame height, variation in temperature of raw meat mixture, overlapping of patties, excess meat mixture on the belt.
CRITICAL CONTROL POINT	Manufacturing / Preparation.
ACTION TAKEN BY COMPANY:	The company reviewed its operations including cooking, handling of cooked product, plant sanitation and equipment.
OUTSIDE BODIES INVOLVED:	Minnesota Dept of Health, Centres for Disease Control, US Dept of Agriculture.
LESSONS TO BE LEARNED:	<ul style="list-style-type: none">• Large-scale production and distribution for pre-cooked meat products creates a potential for widespread illness.• Use of HACCP ensures that meat products purchased with the assumption that they are safe for human consumption without additional cooking are pathogen free.• Good hygiene during processing and proper heating of foods are important control measures in keeping numbers of not only <i>E. coli</i>, but other pathogens, as low as possible.

FOOD POISONING / CONTAMINANT INCIDENT SUMMARY No. 23

PRODUCT:	Salami
DATE:	1991
COMPANY:	Not disclosed
MANUFACTURING COUNTRY:	Australia
MARKETING COUNTRY:	

NATURE OF INCIDENT: Outbreak of food poisoning linked to *Salmonella anatum*.

COUNTRY OF OUTBREAK: Australia.

ILLNESS: *Salmonella* food poisoning.

PEOPLE AFFECTED: 104.

CAUSE: An outbreak of food poisoning occurred amongst guests at a wedding reception. Salami served as part of the antipasto was thought to be the source. Food storage and handling procedures adopted by the catering staff were not thought to be significant factors in allowing growth of *Salmonella*. Samples collected from the caterer showed *S anatum* was present in salami from the same batch as that served at the reception. A small number of cases in the community were also traced to consumption of salami. A number of different *Salmonella* serotypes in other batches of salami highlighted concerns with the manufacturer's processing procedures and quality control practices. If contaminated meat is used in the manufacture of fermented sausage, and the lactic acid fermentation is weak, pathogens may survive and grow.

CRITICAL CONTROL POINT Manufacturing.

ACTION TAKEN BY COMPANY: Sale, movement and disposal of suspect and subsequent batches were prohibited until the microbiological evidence was complete. The manufacturer was advised to implement a quality program to assure the safety of the product prior to its release for sale.

OUTSIDE BODIES INVOLVED: South Australian Health Commission.

LESSONS TO BE LEARNED: Fermented meat products are at risk from contamination of pathogens, especially *Salmonella*, if the process is not properly controlled.

**FOOD POISONING / CONTAMINANT
INCIDENT SUMMARY No. 24**

PRODUCT:	Milk
DATE:	1985 (published, May 1986)
COMPANY:	Not revealed
COUNTRY:	USA (Wisconsin)

NATURE OF INCIDENT: Ammonia contamination of cartons of milk.

ILLNESS: Ammonia poisoning (burning in throat).

PEOPLE AFFECTED: 20 schoolchildren (all recovered).

CAUSE: A leak in the ammonia cooling system sprayed liquid ammonia over 250'000 half-pint cartons of milk.

CRITICAL CONTROL POINT Manufacturing.

ACTION TAKEN BY COMPANY: On finding the leak, the company destroyed cartons with obvious contamination; after tasting and smelling 75 of the remaining cartons, they said the milk was safe and distributed it to 268 schools. When illness was reported the company recalled and destroyed all remaining product.

OUTSIDE BODIES INVOLVED: Wisconsin Division of Health.

LESSONS TO BE LEARNED: Sampling cannot be relied upon to identify hazardous materials in food.

**FOOD POISONING / CONTAMINANT
INCIDENT SUMMARY No. 25**

PRODUCT:	Bread
DATE:	1988
COMPANY:	not revealed
COUNTRY:	Sierra Leone

NATURE OF INCIDENT: Flour contaminated with parathion was used to bake bread.

ILLNESS: Acute parathion poisoning.

PEOPLE AFFECTED: 49 people poisoned, 14 of whom died (mostly children).

CAUSE: A container of the dangerous pesticide parathion spilled onto flour in a truck on the 300 km journey from the mill in Freetown to the general store in Kenema. Bread baked from the flour was highly toxic.

CRITICAL CONTROL POINT Raw material.

ACTION TAKEN: Bakery closed.

OUTSIDE BODIES INVOLVED: Not known.

- **LESSONS TO BE LEARNED:**
 - Toxic chemicals must never be carried on vehicles used for food materials.
 - The national government should consider banning the use of parathion (or at least severely restricting its use) in accordance with the "International Code of Conduct on the Distribution and Use of Pesticides".

FOOD POISONING / CONTAMINANT INCIDENT SUMMARY No. 26

PRODUCT:	Bottled mineral water
DATE:	1990
COMPANY:	Source Perrier
PRODUCING COUNTRY:	France
MARKETING COUNTRIES:	120 countries around the world

NATURE OF INCIDENT: Contamination of the water with minute traces of benzene (a known carcinogen).

ILLNESS: None. The detected benzene levels (7-22 ppb) were above the USA recommended limit of 5 ppb and the WHO limit of 10 ppb.

PEOPLE AFFECTED: None.

CAUSE: Initially the company blamed human error, saying that a product containing benzene had been used to clean the bottling line. Later, they said that carbon filters (used to remove chemical contaminants from the natural carbon dioxide gas) had become clogged; the maintenance teams had not noticed this.

CRITICAL CONTROL POINT Manufacturing

ACTION TAKEN BY COMPANY: All Perrier water from around the world was withdrawn from sale and poured to waste (160 million bottles representing 3-4 months production). After 2 months the product was relaunched amidst an intensive advertising campaign.

OUTSIDE BODIES INVOLVED: Health Authorities in Europe and in the USA (including the FDA). Relaunch of the product on the USA market was delayed because the FDA challenged the product labelling.

LESSONS TO BE LEARNED:

- A product can become suspect even if it has not caused illness nor contained harmful levels of contaminants.
- If purity or quality is the key marketing attribute of a branded product, then the manufacturing system must be set up to assure this.
- In any operation, the critical control points must be understood, controlled and monitored. This is especially important if there is a single plant and product and a world market.
- When a product is under suspicion, the company must be open, honest and consistent with the media.
- Once a product is suspect, it may attract more intensive surveillance by the health authorities.

FOOD POISONING / CONTAMINANT INCIDENT SUMMARY No. 27

PRODUCT:	Chinese Noodles (Loh see fun)
DATE:	1988 (Published in 1995)
COMPANY:	Not disclosed
COUNTRY:	Malaysia

NATURE OF INCIDENT:	A widespread outbreak was associated with the consumption of Chinese noodles locally known as <i>loh see fun</i> . The noodles were produced by a factory and distributed to eight food stalls. Illness was reported in 5 towns of 2 districts in Malaysia
ILLNESS:	Aflatoxicosis manifested by acute hepatic encephalopathy.
PEOPLE AFFECTED:	Out of 129 people who consumed the implicated food, 25 became ill. 17 were hospitalised and 13 of these, all children < 12 years old died within 1-7 days
CAUSE:	The cause of the outbreak was difficult to determine. Probably, a batch of noodles was contaminated, which was then unevenly distributed. Ingredients analysed found aflatoxin levels of < 35ppb.
CRITICAL CONTROL POINT	Manufacturing.
OUTSIDE BODIES INVOLVED:	Department of Epidemiology and Community Medicine, University of Ottawa, Canada.
LESSONS TO BE LEARNED:	<ul style="list-style-type: none">• The risk of mould growth and aflatoxin formation should be considered during noodle production.• Inappropriate shortcuts in production may be hazardous.• Children are more vulnerable to the acute effects of aflatoxin.
Reference:	Lye Sann Munn et al. An outbreak of acute hepatic encephalopathy due to severe aflatoxicosis in Malaysia. <i>American Journal of Tropical Medicine and Hygiene</i>

**FOOD POISONING / CONTAMINANT
INCIDENT SUMMARY No. 28**

PRODUCT:	Shark meat
DATE:	1993
COMPANY:	Private homes (Community Outbreak)
COUNTRY:	Madagascar

NATURE OF INCIDENT: A community outbreak in a medium-sized coastal town, caused by the ingestion of meat from a single shark.

ILLNESS: liposoluble toxins carchatoxin -A and -B poisoning.

PEOPLE AFFECTED: 188 patients were hospitalised. There were about 50 deaths, resulting in an overall case fatality rate of about 30%.

CAUSE: Ingestion of shark flesh and/or liver. Toxins were found in the shark meat itself. These were tentatively named Carchatoxin -A and Carchatoxin -B.

CRITICAL CONTROL POINT Raw material.

OUTSIDE BODIES INVOLVED: WHO Representation in Antananarivo, Madagascar. Faculty of Agriculture, Tohoku University, Japan.

LESSONS TO BE LEARNED: Shark can be a source of ciguatera.

References: Boiser, P. et al. Fatal mass poisoning in Madagascar following Ingestion of a shark (*Carcharhinus Leucus*): Clinical and epidemiological aspects and isolation of toxins. *Toxicon*, 33(10): 1359-1364, 1995.

FOOD POISONING / CONTAMINANT INCIDENT SUMMARY No. 29

PRODUCT:	Powdered infant formula
DATE:	January - June 1994
COMPANY:	Not disclosed
COUNTRY:	Spain

NATURE OF INCIDENT: A widespread outbreak that occurred over a period of 6 months affecting 14 out of 17 regions of Spain. The vehicle was a powdered infant formula sold only in Spain.

ILLNESS: Salmonellosis caused by lactose-fermenting *Salmonella virchow*.

PEOPLE AFFECTED: 48 cases were recorded during the months of outbreaks. The majority of the cases (47) were babies under 7 months old, with two secondary cases among adults.

CAUSE: Inadequate processing of the infant formula.

CRITICAL CONTROL POINT Manufacturing.

OUTSIDE BODIES INVOLVED: Laboratory of the Enteric Division, Colindale, London.

ACTION TAKEN BY COMPANY: The Spanish Health Authorities immediately ordered the implicated product to be withdrawn from sale and all affected batches destroyed.

LESSONS TO BE LEARNED:

- *Salmonella* serotypes can ferment lactose and cause undetected outbreaks.
- Good hygiene practices are required in factories.
- It is important for industries to exchange information on experiences of food contamination.
- It is important to have a National Epidemiological *Salmonella* Surveillance Network.

Reference: Usera, MA. et al. Interregional foodborne Salmonellosis outbreak due to powered infant formula contaminated with lactose fermenting *Salmonella virchow*. *European Journal of Epidemiology* 12: 377-381, 1996.

**FOOD POISONING / CONTAMINANT
INCIDENT SUMMARY No. 30**

PRODUCT:	Uncooked pork & raw boar viscera
DATE:	September 1994 and January 1995
COMPANY:	Private homes
COUNTRY:	Korea

NATURE OF INCIDENT: Two separate outbreaks involving similar vehicles (pork and boar). The pork meat and the boar viscera were consumed without prior treatment.

ILLNESS: Toxoplasmosis manifested by unilateral chorioretinitis and lymphadenopathy.

PEOPLE AFFECTED: The first outbreak involved 3 patients while the second involved 5 soldiers out of 11.

CAUSE: Contaminated meat. Consumption of raw boar meat and raw pork in the first incident and raw liver and uncooked pork in the second.

CRITICAL CONTROL POINT Preparation.

OUTSIDE BODIES INVOLVED: Institute of Puericulture, Paris.

LESSONS TO BE LEARNED: Toxoplasmosis chorioretinitis in humans may also be frequent in patients with acquired toxoplasmosis (i.e. non-congenital).

Reference: Choi Won-Young et al. Foodborne Outbreaks of Human Toxoplasmosis. *The Journal of Infectious Diseases* 175: 1280-2, 1997

FOOD POISONING / CONTAMINANT INCIDENT SUMMARY No. 31

PRODUCT:	Jerky from a black-tailed deer
DATE:	November 13 & 20, 1995
COMPANY:	Private homes
COUNTRY:	USA

NATURE OF INCIDENT: An outbreak of *E.coli* O157:H7 occurred following the consumption of homemade venison jerky

ILLNESS: *Escherichia coli* infection due to *E.coli* O157:H7

PEOPLE AFFECTED: A total of 6 confirmed and 5 possible cases were identified. These included 9 out of 11 persons in 3 households (an extended family) and 2 friends who visited for a weekend. The age range of the cases was 9 months to 54 years with a median of 22 years

CAUSE: Consumption of contaminated jerky. Storage of jerky at ambient temperature may have resulted in multiplication of bacteria. Low heat dehydration was not effective in eradicating *E.coli* O157:H7.

CRITICAL CONTROL POINT Consumer.

LESSONS TO BE LEARNED:

- Conditions necessary to ensure the safety of dried meat needs to be reviewed.
- Game should be handled with the same caution used for commercially slaughtered meat.
- Deer can be colonized by *E.coli* O157:H7 and can be a source of human infections. *E.coli* can survive in dry meat.

Reference: Keene WE et al. An Outbreak of *Escherichia coli* O157:H7 Infections traced to Jerky made from deer meat. *Journal of American Medical Association*, 277(15): 1229-1231, 1996.

FOOD POISONING / CONTAMINANT INCIDENT SUMMARY No. 32

PRODUCT:	Ice cream
DATE:	September 1994
COMPANY:	Schwans
COUNTRY:	USA

NATURE OF INCIDENT: A nation-wide *Salmonella* outbreak from ice cream occurred in the United States. The attack rate was 6.6 % for consumers.

ILLNESS: Salmonellosis caused by *Salmonella enteritidis*.

PEOPLE AFFECTED: It is estimated that *S. enteritidis* developed in 224,000 persons in the US.

CAUSE: Cross contamination: Ice cream premix was transported by tanker trailers that had carried non-pasteurized eggs.

CRITICAL CONTROL POINT Manufacturing.

ACTION TAKEN BY COMPANY: Withdrawal of the product from the market.

LESSONS TO BE LEARNED:

- It is important to transport food products not destined for repasteurization in dedicated containers.
- Public Health officials should take action whenever sufficient epidemiological evidence exists to implicate a food and should not be required to wait for microbial confirmation.
- The HACCP plan should be verified.

Reference: Hennessey, TW et al. A national outbreak of *Salmonella enteritidis* infections from ice cream. *New England Journal of Medicine*, 334: 1281-1286

FOOD POISONING / CONTAMINANT INCIDENT SUMMARY No. 33

PRODUCT:	Processed White Cheese
DATE:	April, 1992
COMPANY:	Air force base canteen
COUNTRY:	Israel

NATURE OF INCIDENT: A foodborne outbreak of haemolytic *Streptococcus* A (GAS) pharyngitis occurring in an Israeli air force base was linked to consumption of processed cheese.

ILLNESS: *Streptococcus* manifested by pharyngitis.

PEOPLE AFFECTED: 197 and a few secondary cases (1.6 % of the base personnel).

CAUSE: Improper storage of inoculated cheese. Storage time between preparation and serving allowed streptococcal growth to produce sufficient inoculum.

CRITICAL CONTROL POINT Consumer.

LESSONS TO BE LEARNED:

- Minimise hand contact.
- Refrigerate food properly, especially in warm temperature/weather.

Reference: Bar-Dayan, Y et al. Foodborne outbreak of streptococcal pharyngitis in an Israeli airforce base. *Scandinavia Journal of infectious diseases*, 28: 563-566, 1996.

FOOD POISONING / CONTAMINANT INCIDENT SUMMARY No. 34

PRODUCT:	Suspected, Kaiware-daikon (fresh radish sprouts)
DATE:	July 1996
COMPANY:	School canteen
COUNTRY:	Japan

NATURE OF INCIDENT:	An outbreak of <i>E.coli</i> occurred in Sakai city in Japan affecting a large number of elementary school children from 62 municipal elementary schools.
ILLNESS:	Enterohemorrhagic <i>Escherichia coli</i> (EHEC) infection. The serotype was O157:H7.
PEOPLE AFFECTED:	A total of 6,309 school children and 92 school staff members were affected. There were 162 secondary infections. 534 cases were hospitalized. 101 patients suffered from haemolytic uraemic syndrome (HUS), two died.
CAUSE:	The cause of the outbreak could not be determined since there was no laboratory confirmation of the vehicle. The epidemiological investigation pointed to the consumption of raw radish sprouts.
CRITICAL CONTROL POINT	Raw material.
ACTION TAKEN BY COMPANY:	Preventive measures to ensure hygienic practice in mass feeding facilities were put in place.
LESSONS TO BE LEARNED:	<ul style="list-style-type: none">• High risk foods are not appropriate for mass catering.• Germination of seeds provides an opportunity for pathogens to grow.

Reference: Reports of the Ministry of Health and Welfare, Tokyo. Enterhaemorrhagic *Escherichia coli* infection. *Weekly Epidemiological Record* No. 35: 267-268, 30 August 1996

FOOD POISONING / CONTAMINANT INCIDENT SUMMARY No. 35

PRODUCT:	Uncooked pork with Thai spices & chilli (laebmoo)
DATE:	October 1987 (Published in 1990)
COMPANY:	Private home (social gathering)
COUNTRY:	Thailand

NATURE OF INCIDENT:	An outbreak of cholera occurred in a village in Thailand following a funeral at which 264 people were served food. Food remnants were not available, but there was a statistically significant association between the cholera attacks and eating of laebmoo.
ILLNESS:	<i>Vibrio cholerae</i> O1 infection.
PEOPLE AFFECTED:	24 people were positive for <i>Vibrio cholerae</i> O1.
CAUSE:	The consumption of raw pork which was suspected to have been contaminated by a carrier. The storage of uncooked pork at ambient temperature overnight may have allowed the cholera to multiply.
CRITICAL CONTROL POINT	Preparation.
ACTION TAKEN:	<ul style="list-style-type: none">• Improvement of environmental sanitation.• Health education, including warnings against the consumption of raw food.
LESSONS TO BE LEARNED:	<ul style="list-style-type: none">• Raw meat contains pathogens; it is important to cook it thoroughly before consumption.• Hands can be a source of cross-contamination.

Reference: Swaddiwudhipong, Witaya et al. A cholera outbreak associated with eating uncooked pork in Thailand. *Journal of Diarrhoeal Disease Research* 8(3): 94-96 1990

FOOD POISONING / CONTAMINANT INCIDENT SUMMARY No. 36

PRODUCT:	Squid cooked with chili, garlic, onion & ginger (sambal sotong)
DATE:	November 1982
COMPANY:	Marine Parade Canteen
COUNTRY:	Singapore

NATURE OF INCIDENT:	An outbreak occurred among construction workers who ate at a construction site canteen where the implicated food was prepared. Two of the workers had moderate to severe dehydration and required intravenous therapy.
ILLNESS:	<i>Vibrio cholera</i> O1 biotype El Tor, serotype ogawa phage type 1 infection.
PEOPLE AFFECTED:	37 people in all were affected, 22 of which were confirmed and 15 cases were asymptomatic.
CAUSE:	There were no remnants of the food for testing. An infected food handler was the probable cause, followed by cross contamination between cooked and raw seafood. Improper storage of prepared food allowed bacteria to multiply.
CRITICAL CONTROL POINT	Preparation.
ACTION TAKEN::	The canteen was closed immediately..
LESSONS TO BE LEARNED:	<ul style="list-style-type: none">• Importance of good food handling.• Prepared food must be stored properly.• Importance of foodborne epidemiological surveillance for the early detection of outbreaks.

Reference: Goh KT et al. A common source foodborne outbreak of cholera in Singapore. *International Journal of Epidemiology*, 14(2): 210-215, 1984

FOOD POISONING / CONTAMINANT INCIDENT SUMMARY No. 37

PRODUCT:	Monkey meat
DATE:	1992 (Date of publication)
COMPANY:	Private homes
COUNTRY:	Sri Lanka

NATURE OF INCIDENT:	The outbreak occurred after the consumption of a curry made from monkey meat. The carcass of the monkey had been found under a tree; it was thought to have fallen by accident. The entrails of the monkey were also used in the curry.
ILLNESS:	Salmonellosis caused by <i>Salmonella enteritidis</i> (phage type 8).
PEOPLE AFFECTED:	A total of 9 people were affected; one, a malnourished 12 year old boy, died. The other 8 were hospitalized and discharged in about a week.
CAUSE:	None of the remnants of the monkey curry was available for testing. It is suspected that the monkey had died of Salmonellosis. Entrails that may have contaminated with intestinal bacteria were used in the food preparation.
CRITICAL CONTROL POINT	Raw material.
LESSONS TO BE LEARNED:	Animals that have died from unknown causes or diseased animals should not be eaten.

Reference: Lamabadusuriya, SP. et al. An outbreak of Salmonellosis following consumption of monkey meat. *Journal of Tropical Medicine and Hygiene* 95: 292-295, 1992

FOOD POISONING / CONTAMINANT INCIDENT SUMMARY No. 38

PRODUCT:	Commercial cheese sauce
DATE:	1993 (Published in 1996)
COMPANY:	A delicatessen
COUNTRY:	USA

NATURE OF INCIDENT: An outbreak of botulism occurred among people who ate at a delicatessen. The vehicle was a potato salad with meat and cheese sauce. An open can of the cheese sauce contained Type A botulinum toxin & yielded *C. botulinum* on culture.

ILLNESS: Botulism.

PEOPLE AFFECTED: 8 out of 52 patrons. 5 out of the 8 were hospitalised. One of them, a 38 year old woman, died of pulmonary embolism.

CAUSE: It was not possible to determine how the cheese sauce became contaminated. The sauce was contaminated with *C. botulinum* spores and left at room temperature. Inadequate storage may have caused multiplication of spores.

CRITICAL CONTROL POINT Preparation.

OUTSIDE BODIES INVOLVED: The FDA officials assisted in the inspection of the premises.

LESSONS TO BE LEARNED:

- An unusual vehicle that causes mild botulism may be misdiagnosed.
- Botulism should be included in the differential diagnosis of persons with signs/symptoms of acute cranial nerve dysfunction.
- Cheese sauce supports germination and growth of *C. botulinum* and it can become toxic without appearing spoiled.
- Post-contamination of canned foods can occur in the kitchen.
- To stop outbreaks and prevent severe illness and deaths, it is important to report all cases of botulism.

Reference: Townes, JM et al. An Outbreak of type A botulism associated with a commercial cheese sauce. *Annals of Internal Medicine*, 125(7): 558-563, 1996.

FOOD POISONING / CONTAMINANT INCIDENT SUMMARY No. 39

PRODUCT:	Crab Meat
DATE:	1991
COMPANY:	Private home
COUNTRY:	USA (food imported from Ecuador)

NATURE OF INCIDENT:	An outbreak occurred after the consumption of crab salad prepared from fresh crabs, purchased, boiled and shelled in Ecuador and transported as part of the personal belongings of an airline passenger into USA.
ILLNESS:	<i>Vibrio cholerae</i> O1 serotype inaba, biotype El Tor infection.
PEOPLE AFFECTED:	Eight family members and friends; 7 sought care in a local emergency room. Two were hospitalised.
CAUSE:	No remnant of the food was available for culture. Transport of crabs at ambient temperature, unrefrigerated for hours, may have resulted in multiplication of the cholera agent. The agent may have survived due to inadequate cooking of contaminated crabmeat.
CRITICAL CONTROL POINT	Preparation.
LESSONS TO BE LEARNED:	<ul style="list-style-type: none">• There is a risk of importing pathogens from endemic areas through the transport of high-risk foods.• Perishable foods should not be transported without refrigeration.
Reference:	Finelli, L et al. Outbreak of cholera associated with crab brought from an area with epidemic disease. <i>The Journal of Infectious Diseases</i> 166: 1433-5, 1992.

**FOOD POISONING / CONTAMINANT
INCIDENT SUMMARY No. 40**

PRODUCT:	Unpasteurised milk (suspected)
DATE:	1993
COMPANY:	Church camp
COUNTRY:	Australia

NATURE OF INCIDENT: Two people were hospitalised with campylobacteriosis. An investigation revealed that they had attended a church camp and the outbreak had occurred within the group.

ILLNESS: Campylobacteriosis.

PEOPLE AFFECTED: 21 out of 47 people were affected. Two people, 15 year-old twins were hospitalised.

CAUSE: The vehicle responsible for the outbreak was not identified but a suspected source was unpasteurised milk. Other likely sources were roast chicken, beef chow mein, hamburger and steak.

CRITICAL CONTROL POINT Raw material.

LESSONS TO BE LEARNED: The importance of follow-up surveillance of notifications for the detection of foodborne diseases.

Reference: Watson, T. Coleman, D. and Jacobs, M. Campylobacteriosis outbreak at church camp, Penguin, Tasmania, January, 1993. *Communicable Disease Intelligence* 17(8): 159-160, 1993

FOOD POISONING / CONTAMINANT INCIDENT SUMMARY No. 41

PRODUCT:	Minestrone Soup
DATE:	1990 (Published in 1992)
COMPANY:	Hotel conference centre
COUNTRY:	USA

NATURE OF INCIDENT:	An outbreak occurred among a group of people who attended a cake decorators' conference. The group had lunch together at the conference centre. The epidemiological investigations pointed to minestrone soup as the source of the outbreak. The soup (leftover) had been prepared two days earlier, refrigerated and reheated for the lunch.
ILLNESS:	Gastro-enteritis caused by <i>Clostridium perfringens</i> .
PEOPLE AFFECTED:	32 people (76% of the people exposed) were affected.
CAUSE:	Contamination may have occurred via the chicken-based broth or by unwashed vegetables used in the preparation of the soup. Inadequate cooling and reheating of leftovers caused proliferation of <i>Clostridium perfringens</i> in the minestrone soup. Improper holding after reheating and prior to serving compounded the problem.
CRITICAL CONTROL POINT	Preparation.
LESSONS TO BE LEARNED:	<ul style="list-style-type: none">• Non-animal protein sources such as legumes can support substantial <i>C. perfringens</i> growth.• Serving food hot can diminish the outbreak of <i>C. perfringens</i>.• The strict observance of cooling, reheating and holding temperatures is essential.
Reference:	Roach, RL. and Sienko, D.G. <i>Clostridium perfringens</i> outbreak associated with Minestrone Soup. <i>American Journal of Epidemiology</i> , 136(10): 1288-1291, 1992.

FOOD POISONING / CONTAMINANT INCIDENT SUMMARY No. 42

PRODUCT:	Rice Vermicelli (Fried Meehoon)
DATE:	1983
COMPANY:	School canteen
COUNTRY:	Malaysia

NATURE OF INCIDENT:	An outbreak of staphylococcus intoxication occurred among students who ate at their school canteen. The affected students had eaten 19 food items, 96% were found to have eaten 2 of these items. A fried vermicelli dish was implicated.
ILLNESS:	<i>Staphylococcus aureus</i> intoxication.
PEOPLE AFFECTED:	48 people were affected. All were treated in a Health Centre. None of the cases were hospitalised.
CAUSE:	The cause of the outbreak was not determined, however it the food was probably contaminated by a food handler since the same agent was isolated from three of the food handlers.
CRITICAL CONTROL POINT	Preparation.
LESSONS TO BE LEARNED:	<i>S. aureus</i> grows well in pasta/egg.

Reference: Rampal, L. A food poisoning outbreak due to staphylococcus aureus, Kapar, Malaysia, 1983. *Medical Journal of Malaysia*, 38(4): 294-298, 1983.

FOOD POISONING / CONTAMINANT INCIDENT SUMMARY No. 43

PRODUCT:	Shellfish (Clams)
DATE:	1987 (Published in 1990)
COMPANY:	Private Homes (Community outbreak)
COUNTRY:	Guatemala

NATURE OF INCIDENT: A major outbreak of lethal paralytic shellfish (clam) poisoning occurred along the coast of Guatemala. The symptoms were mainly neurological.

ILLNESS: Shellfish poisoning caused by *Pyridinium bahamense*.

PEOPLE AFFECTED: 187 people were affected. Of these, 130 were hospitalized and 26 people died. The patients were aged 9 months-86 years, mean age 21. The highest attack rate was in patients 13-17 years.

CAUSE: The outbreak was traced to poisoned clams. A local clam identified as *Amphichaena kindermanni* was responsible for the outbreak.

CRITICAL CONTROL POINT Raw materials.

OUTSIDE BODIES INVOLVED:

- The US Food and Drug Administration (FDA).
- Center of Infectious Diseases and Center for Environmental Health, CDC, Atlanta, Georgia.

ACTION TAKEN BY COMPANY: Three sampling sites along the coast were established by the Guatemalan government for shellfish monitoring with mouse bioassay.

LESSONS TO BE LEARNED:

- Paralytic Shellfish Poisoning (PSP) can be prevented by shellfish surveillance.
- Recognition of minor symptoms caused by small amounts of toxin may lead to earlier PSP investigation and prevent additional cases.

Reference: Rodrigue DC et al. Lethal Paralytic Shellfish Poisoning in Guatemala. *American Journal of Medical Hygiene*, 42(3): 267-270, 1990.

FOOD POISONING / CONTAMINANT INCIDENT SUMMARY No. 44

PRODUCT:	Fish
DATE:	1987 (Published in 1988)
COMPANY:	Tourist resort
COUNTRY:	Canada (Fish consumed in Cuba)

NATURE OF INCIDENT:	A large outbreak occurred among Canadian tourists in Cuba. The outbreak became evident when the tourists returned from a resort on the southwest coast of Cuba. A fish casserole dish had been served 4 hours before departure. Most cases became acutely ill within 48 hours of consuming the fish. The attack rate was 93%.
ILLNESS:	Ciguatera fish poisoning.
PEOPLE AFFECTED:	57 Tourists had the poisoning. Their average age was 43 years.
CAUSE:	Poisoned fish. The toxin is usually produced by a dinoflagellate, which in turn is consumed by the fish. The toxin which is not harmful to the fish is heat stable and harmful to humans.
CRITICAL CONTROL POINT	Raw material.
LESSONS TO BE LEARNED:	<ul style="list-style-type: none">• Tourists to the Caribbean and Pacific should be made aware of fishes presenting risks of ciguatera poisoning, such as barracuda, grouper, red snapper, amberjack, kingfish and dolphin.• Ciguatera is unaffected by preservation or preparation procedures.
Reference:	Frenette, C, Maclean, DJ. and Gyorkos, TW. A large common-source outbreak of ciguatera fish poisoning. <i>The Journal of Infectious Diseases</i> , 158(5): 1128-1131, 1988.

**FOOD POISONING / CONTAMINANT
INCIDENT SUMMARY No. 45**

PRODUCT:	Raspberries
DATE:	1996
COMPANY:	Social events (luncheons etc)
COUNTRY:	USA & Canada (Raspberries imported from Guatemala)

NATURE OF INCIDENT:	A large outbreak of cyclosporiasis occurred in several states in the USA and in Canada. These outbreaks were associated with 55 events held from May 3 through June 14. The raspberries served in 29 of the 55 events were imported from Guatemala.
ILLNESS:	Cyclosporiasis.
PEOPLE AFFECTED:	978 confirmed cases were reported between spring and summer 1996. 725 were cluster associated cases and 740 were sporadic cases.
CAUSE:	The illness was caused by the consumption of raspberries. The source of contamination was unknown.
CRITICAL CONTROL POINT	Raw material.
LESSONS TO BE LEARNED:	<ul style="list-style-type: none">• A local cluster of foodborne illness may be part of a widespread outbreak, during investigation.• It is important to verify the supplier's hygiene measures.

Reference: Herwaldt, BL. An outbreak in 1996 of cyclosporiasis associated with imported raspberries. *The New England Journal of Medicine*, 336(22): 1548-1555, 1997.

FOOD POISONING / CONTAMINANT INCIDENT SUMMARY No. 46

PRODUCT:	Raw clams
DATE:	1988 (Published in 1991)
COMPANY:	Private homes
COUNTRY:	China

NATURE OF INCIDENT:	An epidemic of Hepatitis A occurred in Shanghai, China, for about 3 months (early January-end of March). The epidemic was widespread with 95% of the cases reported from 12 districts.
ILLNESS:	Acute viral Hepatitis A.
PEOPLE AFFECTED:	292,301 cases were reported in Shanghai during this period with 32 deaths. The highest attack rates were in age groups 20-29 and 30-39, representing 83.5% of the total cases.
CAUSE:	Ingestion of raw clams. Clams were contaminated with untreated sewage from the residential area and untreated effluent from fishing vessels.
CRITICAL CONTROL POINT	Preparation.
ACTION TAKEN:	<ul style="list-style-type: none">• Withdrawal of clams from Shanghai markets.• Sale of clams was forbidden in Shanghai following the epidemic.• Catching of clams in areas administered by the Ministry of Agriculture has been forbidden since 1989.• Hygienic control of food and water monitoring.
LESSONS TO BE LEARNED:	<ul style="list-style-type: none">• Thorough cooking of clams gives a greater measure of safety.• Raw/undercooked shellfish should not be eaten.

Reference: Halliday, ML. et al. An epidemic of Hepatitis A attributable to the ingestion of raw clams in Shangai, China. *The Journal of Infectious Diseases*, 164: 852-9, 1991.

FOOD POISONING / CONTAMINANT INCIDENT SUMMARY No. 47

PRODUCT:	Kanda (smoked zebu meat pies)
DATE:	1996
COMPANY:	Private homes
COUNTRY:	Central African Republic

NATURE OF INCIDENT:	A severe outbreak of haemorrhagic colitis occurred among a village population, affecting both infants and adults. Several developed symptoms of haemolytic-uraemic syndrome.
ILLNESS:	Enterohaemorrhagic <i>Escherichia coli</i> infection
PEOPLE AFFECTED:	108 people were affected. There were 4 deaths.
CAUSE:	The cause of the outbreak was not identified, but investigations pointed strongly to the consumption of Kanda. It is suspected that the storage of Kanda at ambient temperatures for hours/days resulted in the growth of microorganisms.
CRITICAL CONTROL POINT	Preparation.
OUTSIDE BODIES INVOLVED:	Pasteur Institute in Bangui.
LESSONS TO BE LEARNED:	<ul style="list-style-type: none">• It is important to store cooked food carefully.• Precooked foods should be reheated thoroughly and should be consumed immediately after reheating.

Reference: Germani, Y. et al. Enterohaemorrhagic *Escherichia coli* in Central African Republic. *The Lancet*, 439 :1670, 1997.

**FOOD POISONING / CONTAMINANT
INCIDENT SUMMARY No. 48**

PRODUCT:	Hydroponic Cucumbers
DATE:	1977 & 78 (Published in 1980)
COMPANY:	Private homes
COUNTRY:	USA

NATURE OF INCIDENT: Two outbreaks were reported, both linked to eating hydroponic cucumbers produced by the same greenhouse. The onset of symptoms, which were very severe, occurred rapidly, indicating the involvement of a chemical substance.

ILLNESS: Carbamate pesticide intoxication.

PEOPLE AFFECTED: In the first outbreak, 9 people aged 7-80 were involved. The second outbreak affected 5 people, aged 6-49.

CAUSE: The suspected cause of the outbreak was a carbamate pesticide, aldicarb. The pesticide was not isolated from cucumbers consumed, as there were no leftovers. It was isolated from cucumbers as well as materials from the greenhouse. The source of contamination could not be determined (the farmer denied using pesticides).

CRITICAL CONTROL POINT Raw material.

LESSONS TO BE LEARNED:

- Food should not be stored next to pesticides.
- Pesticides in water nutrients (solution of water and nutrients) used to nourish plants during growth may remain in food after harvest.

Reference: Goes, EA. et al. Suspected foodborne carbamate pesticide intoxications associated with ingestion of hydroponic cucumbers. *American Journal of Epidemiology*, 11(2): 254-260, 1980.

CATERING INCIDENT SUMMARY No. 1

IMPLICATED FOOD:	Celery / non-potable water
DATE:	1988 (reported 1991)
VENUE:	US Air Force Academy

NATURE OF INCIDENT:	Outbreak of gastro-enteritis.
NATURE OF OUTBREAK:	USA.
ILLNESS:	Gastro-enteritis associated with Norwalk virus.
PEOPLE AFFECTED:	1002.
CAUSE:	Source of the outbreak was thought to be one meal served in the cadet dining room. Chicken salad was implicated as the vehicle of infection - the celery in it was particularly suspect. The area used to prepare vegetables was substandard: vegetable sinks had been removed and a hose, used frequently to unclog the floor drain, was used to provide water for washing and soaking celery for the chicken salad recipe. Raw, trimmed celery was exposed to this non-potable water for approx. 60 min., drained, chopped, covered and refrigerated before inclusion in the recipe. No other ingredient was contaminated with water from the hose or any other source; all ingredients and the completed salad were refrigerated. Norwalk virus was thought to be responsible due to high antibody titres recorded although a link with <i>Citrobacter freundii</i> , also associated with the cases of gastroenteritis, cannot be ruled out.
CRITICAL CONTROL POINT	Preparation.
OUTSIDE BODIES INVOLVED:	Environmental Health Services, Centers for Disease Control.
LESSONS TO BE LEARNED:	<ul style="list-style-type: none">• Even in the developed world, non-potable water can be contaminate foods with enteric pathogens.• Clean, potable water should always be used in food preparation areas and should not be contaminated because of bad practices.• Contaminated potable water can be a source of Norwalk virus; other outbreaks have been attributed to food handlers (see CA2) or more direct exposure to contaminated water, e.g. shellfish.• Norwalk agents can be transmitted onto salad vegetables where they survive well because they are inhibited through the plants vascular system.

CATERING INCIDENT SUMMARY No. 2

IMPLICATED FOOD:	Salad ingredients
DATE:	1987 (reported 1992)
VENUE:	Hotel - 2 banquets held

NATURE OF INCIDENT: Outbreak of foodborne viral gastro-enteritis.

NATURE OF OUTBREAK: USA.

ILLNESS: Gastro-enteritis caused by Norwalk or Norwalk-like agent.

PEOPLE AFFECTED: 533.

CAUSE: Cases of gastro-enteritis were reported from by diners and those attending two banquets at a hotel. Within a week, 50% of the staff were also infected. The outbreak was terminated following a 48 hrs enforced absence from work of food handlers. The outbreak was traced to one individual who prepared the salad after having had diarrhoea the previous night. Another food handler had been ill one week earlier and may have been the initial source of infection. Food samples and faecal specimens were negative for enteric bacterial pathogens but elevated titres to the Norwalk antigen suggested that this was the cause of the outbreak.

CRITICAL CONTROL POINT Preparation

ACTION BY MANAGEMENT: Enforced absence from work of food handlers for 48 hrs.

OUTSIDE BODIES INVOLVED: Department of Health, Centers for Disease Control.

LESSONS TO BE LEARNED:

- Norwalk agents are highly infectious with very high attack rates (see also No. CA1).
- Norwalk agents can be transmitted on salads and other seemingly safe foods.
- Food handlers with the slightest signs of gastro-enteritis must not handle food.
- In cases of doubt, disposable gloves will prevent spread of contamination.
- Food handlers who have had viral gastro-enteritis should be prevented from handling food for 48 hrs (and preferably 72 hrs) after onset of illness.

CATERING INCIDENT SUMMARY No. 3

IMPLICATED FOOD:	Raw eggs
DATE:	1991 (reported 1992)
VENUE:	Restaurant

NATURE OF INCIDENT:	Outbreak of gastro-enteritis.
NATURE OF OUTBREAK:	USA.
ILLNESS:	<i>Salmonella enteritidis</i> infection.
PEOPLE AFFECTED:	38.
CAUSE:	An outbreak of <i>S. enteritidis</i> in 15 diners was traced to a Caesar salad served in a restaurant. During the outbreak, 23 employees in the restaurant also developed gastro-enteritis; this was associated with eating the restaurant's raw egg dishes or handling raw eggs. The Caesar salad dressing was prepared with hand-cracked eggs; neither lemon juice nor vinegar were included in the recipe. The dressing was refrigerated until the restaurant was opened, when it was placed in a chilled compartment for approximately 8-12 hrs. A later inspection revealed the temperature of salad dressings in the compartment to be 15.6°C. <i>S. enteritidis</i> phage type 8 was isolated from another batch of eggs from the same supplier and an ill employee. The flock had been destroyed before recognition of the outbreak.
CRITICAL CONTROL POINT	Preparation.
OUTSIDE BODIES INVOLVED:	US Department of Agriculture, Centers for Disease Control.
LESSONS TO BE LEARNED:	<ul style="list-style-type: none">• Raw eggs must not be used in any food that will be served or tasted without further cooking (e.g. ice cream, royal icing, mayonnaise, dressings, sauces, etc.).• Egg dishes (including omelettes, scrambled eggs, boiled, poached and fried eggs) must be cooked at least until the yolk has set and held at 62.7°C or above if the dishes are intended to be eaten hot; egg dishes to be eaten cold should be cooked as above and refrigerated at temperatures < 5°C.• Precautions should be taken to prevent cross-contamination from raw eggs and poultry to cooked foods.• Unless raw eggs are adequately heat processed in a closed container, pasteurised eggs should always be used in the manufacture of food products.

CATERING INCIDENT SUMMARY No. 4

IMPLICATED FOOD:	Unknown
DATE:	1991/92
VENUE:	Restaurant

NATURE OF INCIDENT:	Outbreak of typhoid associated with food.
NATURE OF OUTBREAK:	UK.
ILLNESS:	Illness due to <i>Salmonella typhi</i> .
PEOPLE AFFECTED:	2 (+ 1 asymptomatic).
CAUSE:	Two cases of gastrointestinal illness, caused by <i>S. typhi</i> , were traced to a restaurant. An investigation of the restaurant staff found an asymptomatic carrier who had recently arrived from Bengal. Conditions at the premises were unsatisfactory and hand washing practices were also poor.
CRITICAL CONTROL POINT	Preparation.
ACTION BY MANAGEMENT:	The food handler was not allowed to work until twelve consecutive clear samples had been obtained over a six month period. Restaurant remains under observation by local authority.
OUTSIDE BODIES INVOLVED:	Environmental Health Department.
LESSONS TO BE LEARNED:	<ul style="list-style-type: none">• Staff selection will differ between countries but all employees should have high standards of hygiene and should not be carriers of any salmonellae.• Management have a responsibility to ensure that all food handlers undergo hygiene training and have through hand-washing habits.• A case or carrier of enteric fever (typhoid) poses a serious threat to other staff and "high risk" foods and contingency plans should be in place should this occur.• <i>S. typhi</i> is highly infectious. Cases such as this highlight the need for continued vigilance in respect of this organism.

HANDWASHING & TYPE A HEPATITIS : A CAUTIONARY TALE

An outbreak of type A hepatitis involving over 50 patients was traced to bread distributed by a small family business in the UK. The source of the outbreak was a male food handler who had mild hepatitis but continued to work making rolls, sandwiches and so on. His wife who was another food handler in the same organisation had proven clinical hepatitis and was the index case. The food handler also had painful skin lesions on his hands which he duly covered with adhesive dressings in line with health and hygiene recommendations. However, because of the dressings, the food handler was unable to wash his hands thoroughly, even though they were visibly soiled. Further spread of hepatitis within the community was prevented by comprehensive control measures; asymptomatic food workers were tested for IgM and IgG antihepatitis A antibody to detect subclinical cases. Those asymptomatic food handlers who were not immune were given prophylactics with intramuscular normal human immunoglobulin (500 mg). None developed symptoms and all continued to work normally.

Lessons to learn

- The type A hepatitis virus is readily transmitted on "high risk" food.
- Whenever type A hepatitis is confirmed in one food handler, the management should take immediate action to protect other workers and to protect the products.
- Thorough handwashing is a vital step in the prevention of enteric foodborne diseases; if food handlers cannot wash their hands thoroughly for one reason or another, then they must not be allowed to handle food.
- Disposable gloves may have prevented this outbreak, but note that disposable gloves are not a substitute for thorough handwashing.
- Prophylactic immune gamma globulin can be used to control the spread of hepatitis type A in a food factory setting, but it must be given early on in the infection and is of limited duration.

Reference "Hepatitis A outbreak involving bread" by A.R.E. Warburton et al. (1991). *Epidemiology & Infection*, 106; 199-202.

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