



WEEKLY EPIDEMIOLOGICAL REPORT

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Foodborne disease surveillance - Part I

In developing countries, infectious diseases transmitted by contaminated food and water are a constant and frequently fatal threat to health. The diseases concerned range from the well-known diarrhoeal diseases, cholera, and hepatitis A to the more exotic parasitic trematode infections that affect an estimated 40 million people and are a leading cause of liver cancer. Diarrhoeal diseases alone are estimated to cause an annual 2.7 billion cases and 1.9 million deaths, mostly in infants and young children.

When the causes of these infections and deaths are considered, the strategy for improving food safety in the developing world appears straightforward: prevent faecal contamination of human food. However, the difficulty of implementing such a strategy in impoverished settings makes food safety a part of the broader development problems of water supply, sanitation, household hygiene, food security, and poverty. Poverty also greatly increases the risk that people will consume unsafe food even when fully aware of the consequences. For example, cassava, a food staple throughout much of sub-Saharan Africa, is known to contain a potent cyanide toxin that is eliminated through traditional food preparation practices. In times of food shortage and social instability, large outbreaks of acute poisoning leading to neuropathy and paralytic disease have occurred when desperate populations consumed inadequately processed cassava.

Foodborne diseases are also a pervasive, though far less lethal, threat in the industrialized world, where sporadic and usually mild infections affect an estimated 30% of the population each year. Most affluent countries rely on sophisticated

systems of regulatory control, testing, and inspection to safeguard the food supply, and many of these measures are based on international safety standards issued jointly by FAO and WHO. Such measures are largely invisible until an outbreak of foodborne disease occurs, and food safety flares into the headlines accompanied by public panic, huge economic losses, and probing questions about the ability of governments to protect consumer health.

In recent years, traditional measures for safeguarding the food supply have been undermined by several trends. These include the globalization of the food supply, advances in food production and processing technologies, changes in agricultural and animal husbandry practices, and the emergence of new foodborne pathogens. Foodborne pathogens are now found in a broader range of foods, at greater frequency, and with far more severe consequences for health. Deaths from kidney failure and progressive brain and nerve disorders have now joined debilitating complications, such as arthritis and paralysis, as reasons to fear foodborne disease. The result has been a series of increasingly frequent and frightening outbreaks that have taken governments by surprise and shaken public confidence in the safety of the food supply. Following the events of September 2001, some governments have expressed concern that food and water supplies might be targeted by terrorists seeking to incapacitate large numbers of people and incite widespread panic.

A food chain of unprecedented complexity

Demographic changes, most notably ageing of the population, have greatly increased the

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Number of people susceptible to severe and sometimes fatal consequences of Foodborne disease. Other factors influencing host susceptibility in the general population include increases in the number of immunocompromised patients and the greatly increased use of immunosuppressive agents, particularly among persons receiving cancer chemotherapy or undergoing organ transplantation. Persons with weakened immune systems become infected with foodborne pathogens at lower doses than their healthy counterparts and are more susceptible to severe complications. Infections that are normally mild can be rapidly fatal in these groups. Advanced age and underlying disease also increase the risk of severe and potentially fatal infections.

Global food trade is increasing, and with it the potential to disseminate foodborne pathogens between countries and continents. While globalization of the food supply offers consumers a wider variety of quality foods, it has also resulted in a food chain of unprecedented length and complexity. Consumers purchasing food from the local grocer risk exposure to pathogens native to remote parts of the world. In such an environment, tracing the origin of all ingredients in a meal has become virtually impossible, creating an enormous challenge for the control of foodborne disease.

Another trend is the integration and consolidation of agriculture and food industries. This consolidation, combined with increasing global trade, means that large amounts of food from a single source are distributed over far greater distances than ever before, creating the possibility for larger and more widespread outbreaks of foodborne illness. The 1999 dioxin crisis in Belgium, involving meat and poultry products, illustrates the potential for widespread contamination from a single source. On this occasion, potentially carcinogenic dioxins entered the food chain when animal fat contaminated with industrial oil was used in livestock feed. More than 1 500 farms in Europe received feed from a single source in a two-week period. The incident caused widespread consumer alarm and cost the country's food industry an estimated US\$ 767 million.

Changes in lifestyle also play a role. Greater numbers of people eat outside their homes in restaurants and fast food outlets where mass catering practices introduce multiple opportunities for food contamination to occur. The growth of fast food chains with a wide geographical reach and huge numbers of customers has likewise enhanced the potential of a single contaminated source to affect large numbers of people over a wide geographical area. It has also enlarged the complexity of outbreak investigation and increased the quantities of food that may need to be recalled. In the USA, spectacular outbreaks of *Escherichia coli* O157:H7 in 1993, 1997, and 2002 prompted the nationwide recall of millions of tonnes of ground beef. The 1993 outbreak alone, linked to deficient cooking practices in a fast food chain, resulted in the closing

of restaurants and the recall of more than 250 000 hamburger patties.

On another front, intensive farming practices have greatly increased the risk of contamination of the food supply with residues of veterinary drugs and chemicals in fertilizers and pesticides. Intensive farming practices could also have influenced the prevalence in herds and animals of certain zoonotic pathogens, including *Salmonella* and *Campylobacter*, possibly helping to explain the significant increases in human disease caused by these microorganisms over recent decades. Intensive farming practices, notably the use of meat and bones from cattle and other ruminant carcasses in the preparation of cattle feed, are now known to be the driving force behind the epidemic of bovine spongiform encephalopathy (BSE), or "mad cow disease". Cases, first recognized in the UK in 1986, have subsequently been detected in 19 countries.

When we consider the food born disease situation in Sri Lanka, for the year 2007 total number of 5869 viral hepatitis cases, 1037 food poisoning cases, 1805 enteric fever cases and 7292 dysentery cases were notified to the epidemiology unit from the different parts of the country.

During this period Medical Research Institution has analyzed 1848 water samples collected from different parts of the country and found 53% were unsatisfactory. Out of 1768 food samples analyzed, 31% were unsatisfactory [Source-MRI].

Emerging foodborne diseases

Of all the recent trends affecting the safety of the food supply, the emergence of foodborne pathogens causes the greatest alarm. Emerging foodborne pathogens include newly identified infectious agents transmitted by food, infectious agents newly associated with foodborne transmission, and well-known foodborne pathogens behaving in new ways that allow them to circumvent conventional control measures.

E. coli O157:H7, also known as enterohaemorrhagic *E. coli*, was first identified as a pathogen in 1982 in an outbreak of bloody diarrhoea traced to hamburgers from a fast food chain in the USA. The pathogen has since emerged as a major foodborne agent causing large and serious outbreaks on several continents. Its ability to cause haemolytic uraemic syndrome, renal failures and death, especially in young children, has made the profile of foodborne diseases distinctly more sinister.

Reference : Global defense against the infectious disease threat. Global Disease 2002, World Health Organization, Geneva, 2003.

The editor wishes to acknowledge Dr. K. J. Cooray (Consultant Microbiologist, MRI) for the assistance provide in the preparation of this article.

Part II of this article will be continued in the next issue.

Table 1: Vaccine-preventable Diseases & AFP

2nd – 8th Feb 2008 (6th Week)

Disease	No. of Cases by Province									Number of cases during current week in 2008	Number of cases during same week in 2007	Total number of cases to date in 2008	Total number of cases to date in 2007	Difference between the number of cases to date between 2008 & 2007
	W	C	S	N	E	NW	NC	U	Sab					
Acute Flaccid Paralysis	00	00	00	00	00	00	00	00	01	01	03	08	12	-33.3%
Diphtheria	00	00	00	00	00	00	00	00	00	00	00	00	00	00.0%
Measles	02	00	00	00	00	03	00	00	00	05	01	11	01	+1000.0%
Tetanus	00	00	00	00	01	00	00	00	00	01	02	05	05	00.0%
Whooping Cough	00	00	01	00	00	00	01	00	00	02	01	04	06	-33.3%
Tuberculosis	78	41	03	02	07	00	29	00	00	160	127	1197	1013	+18.2%

Table 2: Newly Introduced Notifiable Diseases

2nd – 8th Feb 2008 (6th Week)

Disease	No. of Cases by Province									Number of cases during current week in 2008	Number of cases during same week in 2007	Total number of cases to date in 2008	Total number of cases to date in 2007	Difference between the number of cases to date between 2008 & 2007
	W	C	S	N	E	NW	NC	U	Sab					
Chicken-pox	19	04	15	00	05	06	08	10	16	83	46	554	272	+103.7%
Meningitis	05 GM=1 CO=3 KL=1	01 NE=1	03 GL=3	00	03 BT=2 KM=1	08 KR=6 PU=2	04 PO=4	02 BD=2	09 RP=2 KG=7	35	00	227	35	+548.5%
Mumps	07	05	09	00	01	06	02	00	02	32	11	276	78	+253.8%

Provinces :W=Western, C=Central, S=Southern, N=North, E= East, NC=North Central, NW=North Western, U=Uva, Sab=Sabaragamuwa.
DPDHS Divisions : CB=Colombo, GM=Gampaha, KL=Kalutara, KD=Kandy, ML=Matale, NE=Nuwara Eliya, GL=Galle, HB=Hambantota, MT=Matara, JF=Jaffna, KN=Killinochchi, MN=Mannar, VA=Vavuniya, MU=Mullaitivu, BT=Batticaloa, AM=Ampara, TR=Trincomalee, KM=Kalmunai, KR=Kurunegala, PU=Puttalam, AP=Anuradhapura, PO=Polonnaruwa, BD=Badulla, MO=Moneragala, RP=Ratnapura, KG=Kegalle

Table 3: Laboratory Surveillance of Dengue Fever

2nd – 8th Feb 2008 (6th Week)

Samples	Number tested		Number positive *		Serotypes									
					D ₁		D ₂		D ₃		D ₄		Negative	
	GT	AH	GT	AH	GT	AH	GT	AH	GT	AH	GT	AH	GT	AH
Number for current week	04	01	01	00	00	00	01	00	00	00	00	00	00	00
Total number to date in 2008	27	13	03	05	00	00	01	01	00	00	00	00	02	00

Sources: Genetech Molecular Diagnostics & School of Gene Technology, Colombo [GT] and Genetic Laboratory Asiri Surgical Hospital [AH]

* Not all positives are subjected to serotyping.

NA= Not Available.

Data Sources:

Weekly Return of Communicable Diseases: Diphtheria, Measles, Tetanus, Whooping Cough, Human Rabies, Dengue Haemorrhagic Fever, Japanese Encephalitis, Chickenpox, Meningitis, Mumps.

Special Surveillance: Acute Flaccid Paralysis.

National Control Program for Tuberculosis and Chest Diseases: Tuberculosis.

Table 4: Selected notifiable diseases reported by Medical Officers of Health
2nd – 8th Feb 2008 (6th Week)

DPDHS Division	Dengue Fever / DHF*		Dysentery		Encephalitis		Enteric Fever		Food Poisoning		Leptospirosis		Typhus Fever		Viral Hepatitis		Human-Rabies		Returns Received Timely**
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	
Colombo	35	230	00	20	01	04	03	22	00	44	02	11	00	00	02	16	00	00	85
Gampaha	24	182	03	17	00	02	03	08	10	10	02	19	00	00	02	23	00	00	93
Kalutara	17	75	07	48	01	02	02	07	01	04	08	23	01	02	03	07	00	00	100
Kandy	05	28	03	28	00	01	01	05	01	07	03	26	04	11	08	32	00	00	88
Matale	01	11	03	35	00	00	00	07	00	00	11	94	00	01	00	01	00	00	100
Nuwara Eliya	00	02	00	11	00	00	02	09	00	00	01	04	01	07	01	16	00	00	67
Galle	00	20	04	23	02	04	00	03	00	00	02	40	01	06	01	02	01	01	94
Hambantota	05	25	04	22	01	02	00	02	00	00	02	16	05	14	01	01	00	00	100
Matara	02	40	03	25	00	00	00	11	00	00	02	19	01	28	00	02	00	01	88
Jaffna	00	19	00	16	00	00	01	38	00	02	00	00	00	54	00	07	00	00	25
Kilinochchi	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	01	00	00	00
Mannar	00	00	00	00	00	00	00	26	00	00	00	00	00	00	00	02	00	00	00
Vavuniya	00	09	00	08	00	01	00	00	00	00	00	00	00	00	01	02	00	00	75
Mullaitivu	00	00	00	01	00	00	00	02	00	00	00	00	00	00	00	02	00	00	00
Batticaloa	05	29	01	10	00	00	01	02	00	00	00	00	00	00	07	22	00	02	91
Ampara	02	04	05	37	00	00	00	00	00	00	02	05	00	00	00	01	00	00	57
Trincomalee	09	35	01	14	00	00	00	01	00	01	00	01	02	03	00	04	00	00	89
Kurunegala	02	84	07	71	01	03	02	11	00	00	00	04	01	05	01	08	00	00	89
Puttalam	07	58	04	21	00	00	03	16	00	01	00	02	01	03	01	06	00	00	89
Anuradhapur	07	45	03	16	00	02	01	03	00	02	03	17	01	05	00	01	00	00	95
Polonnaruwa	02	16	02	18	00	01	01	03	02	03	01	04	00	00	01	04	00	00	100
Badulla	00	11	12	59	00	01	05	13	00	01	02	05	05	13	05	26	00	00	100
Monaragala	01	04	00	27	00	00	00	06	00	05	00	09	01	14	00	02	00	00	90
Ratnapura	14	53	04	29	03	07	11	23	00	42	06	17	13	35	06	08	00	00	94
Kegalle	06	41	15	67	01	09	00	03	00	00	01	11	00	08	21	52	00	00	91
Kalmunai	01	02	11	30	00	00	00	00	00	00	00	00	00	01	00	06	00	00	92
SRI LANKA	145	1023	92	653	10	39	36	221	14	122	48	327	37	210	61	254	01	04	85

Source: Weekly Returns of Communicable Diseases (WRCD).

*Dengue Fever / DHF refers to Dengue Fever / Dengue Haemorrhagic Fever.

**Timely refers to returns received on or before 16 February . 2008 Total number of reporting units =290. Number of reporting units data provided for the current week: 238

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