



WEEKLY EPIDEMIOLOGICAL REPORT

A publication of the Epidemiological Unit,

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Melamine contamination - Part I

Description of the event

More than 54 000 infants and young children have sought treatment for urinary problems, possible renal tube blockages and possible kidney stones related to the melamine contamination of infant formula and related dairy products. Three deaths among infants have been confirmed, more than 14 000 infants have been hospitalized and a little less than 11 000 remain so. Kidney stones in infants are very rare. While the exact onset date of illness resulting from contamination and the beginning of the contamination itself remain unknown, a manufacturer (Sanlu) received a complaint of illness in March 2008.

Chinese media reported at the beginning of September that Sanlu brand infant formula produced by Hebei-based Sanlu Group was contaminated with melamine. Sanlu's powdered infant formula is widely consumed by infants across China because the product is relatively affordable compared to others. Following inspections conducted by China's national inspection agency, at least 22 dairy manufacturers across the country were found to have melamine in some of their products. Two companies, Guangdong Yashili and Qingdao Suokang, exported their products to Bangladesh, Burundi, Myanmar, Gabon and Yemen. While contamination in those exported products remains unconfirmed, a recall has been ordered from China.

Other countries, however, have also reported finding melamine in dairy products manufactured in China.

So far, contamination has also been found in liquid milk, frozen yogurt dessert, biscuits, can-

dies and in coffee drink. All these products were most probably manufactured using ingredients made from melamine contaminated milk.

In 2007, melamine was found in pet feed manufactured in China and exported to the United States of America, causing death of a large number of dogs and cats due to kidney failure.

Why was melamine added into milk?

In China, where adulteration has occurred, water has been added to raw milk to increase its volume. As a result of this dilution the milk has a lower protein concentration. Companies using the milk for further production (e.g. of powdered infant formula) normally check the protein level through a test measuring the nitrogen content. The addition of melamine increases the nitrogen content of the milk and therefore its apparent protein content.

Melamine contamination

Melamine is a chemical compound that has a number of industrial uses, including the production of laminates, glues, dinnerware, adhesives, moulding compounds, coatings and flame retardants. Melamine is a name used both for the chemical and for the plastic made from it. In this event, all references are to the chemical. There are no approved direct food uses for melamine, nor are there any recommendations in the Codex Alimentarius. Melamine is illegally added to inflate the apparent protein content of food products. Since it is high in nitrogen, the addition of melamine to a food artificially increases the apparent protein content as measured with standard tests.

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Source of contamination

In this event, contamination appears to have happened as fraudulent contamination in primary production. Chinese government officials have pinpointed milk collecting stations as the sites where the melamine was added. According to Sanlu, contaminated milk was used in the manufacture of powdered infant formula processed before 6th August 2008 and the tainted milk powder has also been used in the manufacture of a number of other products.

Contamination levels

There are a total of 175 infant formula manufacturers across China, of which 66 have halted production and the remaining 109 manufacturers have undergone inspection due to the current events of melamine contamination. The results of the inspection presented by the Administration of Quality Supervision, Inspection and Quarantine (AQSIQ) show evidence of the presence of melamine. Out of 491 batches tested, 69 of them, produced by 22 companies, tested positive for Melamine.

According to the State Council of China, the levels found in the batches ranged between 0.09 mg/kg and 619 mg/kg. Batches from the company Shijiangzhuang Sanlu Co. contained the highest levels, up to 2563 mg/kg.

Action taken by INFOSAN [International Food Safety Authorities Network]

INFOSAN is working directly with Ministry of Health (MoH), China in collaboration with the WHO Country Office in China. Through the INFOSAN Emergency surveillance system, WHO has learned of the contamination of infant formula with melamine and requested further information about the event on the 11th September 2008. MoH confirmed on 12th September 2008 that incriminated products from the Sanlu Company had not been exported and provided WHO with a description of the development of the event. Through further interaction between INFOSAN and MoH the issue of potential other use of the contaminated milk powder as well as parallel (illegal) distribution of contaminated milk powder was raised. An INFOSAN alert was subsequently distributed to the entire network on the 16th September 2008 alerting members of the event and of the possibility of contaminated products finding their way to other markets.

INFOSAN has several times during the past week, kept the entire network informed of developments in relation to this event as well as additional information on other products being found contaminated, information about the toxicity of the melamine and other information to help Member States better understand and assess the potential risks associated with melamine contaminated products.

Toxicology of melamine

Based on the previous incidents of melamine contaminated pet food and the development of kidney stones and subsequent acute kidney failure in cats and dogs, it appears that melamine and its structural analogues, such as cyanuric acid, may act together to form crystals. This crystal formation occurs at very high-dose levels and is a threshold and concentration dependent phenomenon, which would not be relevant at low levels of exposure (US FDA/CFSAN Interim Melamine and Analogues safety/risk).

Exposure

Consumer exposure to melamine is considered to be low, but may occur through the extraction of melamine from compression moulds by acidic foods, such as lemon or orange juice or curdled milk, at high temperature. Taking into account these sources the estimated oral uptake of melamine is around 0.007 mg melamine/kg/day (OECD 1998).

Toxicity of melamine

Melamine is not metabolized and is rapidly eliminated in the urine. No human data could be found on the oral toxicity of melamine but there are data from animal studies. These show the compound to have a low acute toxicity, with an oral LD in the rat of 3161 mg/kg body weight. In animal feeding studies, high doses of melamine have an effect on the urinary bladder, in particular causing inflammation, the formation of bladder stones and crystals in the urine. Analysis of the bladder stones has shown that these are a mixture of melamine, protein, uric acid and phosphate. Animal studies have generally not shown any renal toxicity or the formation of kidney stones.

Sources

1. WHO Fact Sheet on Food safety –Melamine contamination event China [www.who.int/foodsafety/fs_management/infosan_events/en/index.html]
2. WHO Fact Sheet on Food safety –Melamine contamination [www.who.int/foodsafety/fs_management/infosan_events/en/index1.html]
3. WHO Fact Sheet on Food safety – Epidemiology and treatment [www.who.int/foodsafety/fs_management/infosan_events/en/index3.html]
4. WHO Fact Sheet on Food safety - Toxicology of melamine [http://www.who.int/foodsafety/fs_management/infosan_events/en/index2.html]

Tetanus Toxoid Multidose Vials

In the coming months Epidemiology Unit is expecting to introduce a new 20 dose multidose vials of T. Toxois instead of 10 dose multidose vials currently being used.

Storage conditions, dosage [0.5 ml] and application of open vial policy for the new 20 dose vials is same as for earlier vials.

All MOOH are expected to educate their supportive staff regarding this new initiative.

Table 1: Vaccine-preventable Diseases & AFP

20th - 26th August 2008 (39th 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	01 GM=1	01 KD=1	00	00	00	01 KR=1	00	00	00	03	00	76	63	+20.6%
Diphtheria	00	00	00	00	00	00	00	00	00	00	00	00	00	00.0%
Measles	00	01 NE=1	00	00	00	00	00	00	00	01	02	95	56	+69.6%
Tetanus	00	00	00	00	00	00	00	00	00	00	01	28	27	+3.7%
Whooping Cough	00	00	00	00	00	00	00	00	00	00	00	39	32	+21.8%
Tuberculosis	63	03	14	01	09	08	19	00	13	130	101	6508	7605	-14.4%

Table 2: Newly Introduced Notifiable Diseases

20th - 26th August 2008 (39th 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	2	12	15	00	03	09	06	04	21	96	49	4119	2570	+60.3%
Meningitis	02 CB=1 GM=1	00	05 HA=2 MT=2 GL=1	00	00	05 KR=3 PU=2	01 AP=1	01 MO=1	02 RP=1 KG=1	16	16	1012	472	+114.4%
Mumps	07	13	08	00	04	06	01	01	08	48	71	2275	1579	+44.1%

Key to Table 1 & 2

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 20th - 26th 2008 (39th 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	00	02	00	01	00	00	00	00	00	00	00	00	00	00
Total number to date in 2008	124	136	09	23	00	00	06	08	01	08	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.

Table 4: Selected notifiable diseases reported by Medical Officers of Health
20th - 26th August 2008 (39th Week)

DPDHS Division	Dengue Fever / DHF*		Dysentery		Encephalitis		Enteric Fever		Food Poisoning		Leptospirosis		Typhus Fever		Viral Hepatitis		Human Rabies		Returns Received
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	
Colombo	19	1319	11	205	00	14	06	105	01	88	102	732	00	02	00	93	00	00	92
Gampaha	05	808	04	169	00	17	02	43	00	98	29	591	00	07	03	137	00	05	71
Kalutara	03	394	03	256	00	11	09	57	00	20	21	461	00	03	01	38	00	02	75
Kandy	05	220	04	246	00	07	00	51	00	88	15	367	03	87	00	108	00	02	76
Matale	03	112	02	174	00	04	01	41	00	10	09	644	00	02	01	25	00	00	75
Nuwara	00	24	08	216	00	03	05	224	00	166	06	47	00	36	01	98	00	01	85
Galle	02	90	03	149	01	15	01	16	00	43	09	304	01	13	00	08	00	03	82
Hambantota	00	85	04	87	00	05	00	07	00	12	02	85	01	77	00	14	00	01	82
Matara	01	250	06	168	00	13	02	35	00	06	17	372	02	191	00	14	00	01	88
Jaffna	00	53	04	123	00	04	01	234	00	15	00	00	00	151	00	35	00	00	63
Kilinochchi	00	00	00	35	00	00	00	01	00	04	00	02	00	00	00	01	00	00	00
Mannar	00	25	02	20	00	06	00	155	00	00	00	00	00	01	00	14	00	00	25
Vavuniya	00	11	01	56	00	02	01	12	03	19	00	05	00	01	00	05	00	00	100
Mullaitivu	00	00	00	11	00	00	00	13	00	13	00	00	00	01	00	09	00	00	00
Batticaloa	00	85	06	115	00	05	01	21	00	26	00	08	00	01	00	86	00	06	55
Ampara	00	30	01	242	00	00	00	07	00	283	01	22	00	00	01	09	00	00	14
Trincomalee	00	177	02	91	00	01	00	13	00	14	00	30	00	16	00	13	00	00	90
Kurunegala	03	292	01	188	00	14	00	51	00	23	17	553	00	26	05	64	01	07	68
Puttalam	01	275	09	83	00	08	02	147	00	26	05	53	01	36	00	29	00	04	67
Anuradhapu	00	116	03	89	00	09	01	12	00	09	01	235	01	11	00	13	00	03	68
Polonnaruw	00	62	05	115	00	01	00	21	00	21	00	59	00	01	00	19	00	00	86
Badulla	03	80	05	397	00	05	00	116	00	95	02	55	00	103	00	127	00	02	53
Monaragala	00	52	07	299	00	03	01	36	00	116	01	90	03	93	03	44	00	00	91
Ratnapura	01	241	05	317	00	32	01	46	00	68	03	151	00	78	00	48	00	00	61
Kegalle	05	363	06	264	00	25	02	62	02	11	47	385	01	60	09	465	00	01	82
Kalmunai	00	35	04	236	00	02	00	09	00	16	00	02	00	03	00	23	00	00	46
SRI LANKA	51	5199	106	4351	01	206	36	1535	06	1290	287	5253	13	1000	24	1539	01	38	70

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 4 October, 2008 Total number of reporting units =238. Number of reporting units data provided for the current week: 227

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