

Third Report of the Expert Group on Melamine Incident

**Submitted to the Chief Secretary for Administration
(15 April 2009)**

Executive Summary

This is the Third Report of the Expert Group on Melamine Incident (the Group), which was formed on 26 September 2008 to coordinate actions, monitor the situation and address public concerns arising from the melamine incident. Its First and Second Reports were submitted to the Chief Secretary for the Administration and published on 20 October 2008 and 21 January 2009 respectively. This is the final report of the Group which covers its progress of work and also seeks to conclude the work of the Group, as the issues arising from melamine contaminated food in terms of food testings and health services and treatment of children affected have stabilized. The Group is dissolved today after the publication of this report.

2. The three Sub-groups, established under the Group, have coordinated and monitored the provision of health services, treatment and food safety, supply and control. Significant progress has been made since the publication of the Group's Second Report and the situation arising from the melamine incident has all stabilized. The three Sub-groups have made the following arrangements to ensure continued vigilance and smooth transfer of emergency response actions into regular services of various government departments and the Hospital Authority (HA) -

- (a) **Clinics:** The HA had smoothly operated the free screening and assessment services at the Designated Clinics (DCs) and Special Assessment Centres (SACs) for six months since their establishment on 23 September 2008. In view of the decreasing demands, the DCs and SACs ceased operation on 1 April and 10 April 2009 respectively. After the closure of the DCs and SACs, children suspected with renal symptoms related to melamine tainted milk products (MTMP) can attend HA's General Outpatient Clinics (GOPCs) for assessment and the GOPC consultation fee (\$45) will apply. The GOPCs have adopted the DCs' screening criteria to assess children when approached. If clinically indicated, the patient may be referred

to paediatric Specialist Outpatient Clinics (SOPCs) for further assessment. Since the closure of the DCs and SACs, there have been two attendances at GOPCs for renal symptoms suspected to be related to MTMP, and both of them were referred to SOPCs for follow up assessment.

- (b) **Reported cases:** Since September 2008, the Centre for Health Protection (CHP) of the Department of Health (DH) has so far received 15 reported cases of children with renal stones suspected to be related to MTMP. Two cases have been reported by private doctors and the rest by HA. The latest report was received on 13 March 2009. CHP will continue with its current case notification system and surveillance function.
- (c) **Telephone hotline:** Since the setting up of the hotline in September 2008, the number of enquiries made to CHP's designated hotline continued to decrease and only a few enquiries were received each day in March 2009. Therefore, the hotline ceased service on 1 April 2009. Thereafter, members of the public can access DH's general enquiry service for health information related to melamine.
- (d) **Treatment:** For the 15 children diagnosed with renal stones suspected to be related to the consumption of MTMP, 14 cases are being followed up regularly by HA at SOPCs, while one case is being followed by a private doctor.
- (e) **At risk children:** HA has developed a clinical protocol to follow up children regarded as "at risk" (i.e. those with abnormal findings on ultrasound, repeated urinalysis or impaired renal function identified in SAC consultations) for at least two years, to facilitate early detection of any possible late-onset pathologies related to exposure to MTMP.
- (f) **Research:** The Food and Health Bureau (FHB) has commissioned ten research projects on medium to long term health effects of melamine. The amount of funds granted totalled \$8 million. They have commenced in March/early April 2009. The majority of projects will finish in September 2010 to March 2011. Research findings will be published on completion of the projects.
- (g) **Food safety:** Between mid September 2008 and mid February 2009, the Centre for Food Safety (CFS) conducted a

special surveillance and sampling programme and tested a total of 5 532 food samples. Only 40 samples were found to contain melamine at levels exceeding the legal limits, an overall unsatisfactory rate of less than 1%. CFS had reviewed the special programme and incorporated melamine testing into its routine surveillance programme since mid February 2009. From mid February 2009 and up to 7 April 2009, CFS has tested another 76 samples and no failed sample has been found. The total number of food samples tested since mid September 2008 is 5 608, with only 40 samples found to be exceeding the legal limits. At present, CFS issues press releases on biweekly basis to announce the testing results for melamine in food samples whereas unsatisfactory results will be announced as soon as they are available. With the Group's endorsement, CFS will publish the testing results of melamine monthly with effect from May 2009, via the Food Safety Report of CFS, together with the other tests conducted under the routine surveillance programme. The Government Laboratory continues to provide testing service to CFS.

3. The details of the above arrangements are provided in this full report.

4. This is the concluding report of the Expert Group. Having completed its task, the Expert Group is dissolved after issue of this report. Follow-up actions in respect of health services, treatment, medical research, food testing for melamine and monitoring of the development will continue to be undertaken by the respective government departments and HA under FHB's coordination.

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Background

In September 2008, melamine was reported to be found in infant formula and there were infants in the Mainland who suffered from kidney stones and kidney failure after consuming such infant formula. It had caused public concern in Hong Kong that milk and milk products contaminated by melamine might also be available in Hong Kong and such contamination affected human health particularly that of young children. As a matter of swift response, the Expert Group on Melamine Incident (the Group), chaired by the Secretary for Food and Health, was set up on 26 September 2008 to address public health and food safety issues arising from the incident. This is the final report of the Group which covers its progress of work and also seeks to conclude the work of the Group, as the issues arising from melamine contaminated food in terms of food testings and health services and treatment of children affected have stabilized. The Group is dissolved today after the publication of this report.

Expert Group Reports

2. The Group first met on 26 September 2008 and set up three Sub-groups to look into different issues. They are the Health Services Sub-group, the Treatment Sub-group and the Food Safety, Supply and Control Sub-group. After its second and third meetings held on 20 October 2008 and 21 January 2009 respectively, the Group submitted its First and Second Reports to the Chief Secretary for Administration and released them to the public on the same day.¹

3. The Group had in its Second Report asked its three Sub-groups to continue monitoring the implementation of the various measures to address public concerns arising from the incident, and report progress to the Group in another three months. Each Sub-group has submitted its progress report to the Group. Their contents have been incorporated

¹ Please visit the Food and Health Bureau's website for access to the first and second Reports of the Expert Group on Melamine Incident, the Terms of Reference and Membership of the Expert Group and its three Sub-groups at <http://www.fhb.gov.hk/melamine/doc/report20081020.pdf> and http://www.fhb.gov.hk/melamine/doc/e_report20090121.pdf.

into this report.

Present Situation

4. In the wake of the melamine incident six months ago, FHB took immediate action to address local public concerns on food safety and health impact of MTMP, particularly to infants and children. The Group has been taking the lead since its establishment to further address these concerns. Over the last six months, public concern regarding the melamine incident has subsided and the situation has further stabilized. These are evidenced by the decreasing number of attendances at the free screening and assessment services for Hong Kong children at or under 12 years of age, the number of telephone enquiries, stabilized number of reported cases, and no unsatisfactory food sample testing result since early December 2008.

Health Services and Medical Treatment

5. In the past three months, the demands for health services in relation to the melamine incident have continued to decline. Our public health services have fully met the demands in various aspects.

Designated Clinics and Special Assessment Centres

6. FHB and HA had closely monitored the free services provided at the DCs and SACs since they commenced operation in late September 2008. HA's 18 DCs and 8 SACs had operated effectively and been able to meet the demands which had been decreasing as reflected in the table below –

	<u>Month</u>	<u>Daily average number of attendances at</u>	
		<u>DCs</u>	<u>SACs</u>
(a)	23 - 30 September 2008	2 383	470
(b)	October 2008	954	445
(c)	November 2008	252	234
(d)	December 2008	89	109
(e)	January 2009	30	78
(f)	February 2009	20	12
(g)	March 2009	18	6

7. After reviews of the declining attendance by the Health Services Sub-group in February and March 2009, HA ceased the operation of its

18 DCs on 1 April 2009. By the closure of their services on that day, the DCs had provided screening for 56 847 children since their operation on 23 September 2008.

8. To attend to earlier referrals made by DCs, the SACs continued their operation until 9 April 2009. As at 9 April 2009, the total number of cases handled at SACs was 27 616 since their operation on 23 September 2008.

9. After the closure of the DCs and SACs, children suspected with renal symptoms related to MTMP may consult private practitioners or attend any of HA's 74 GOPCs for assessment, which will follow the screening criteria used by the DCs. If clinically indicated, the patient may be referred to designated paediatric SOPCs for further assessment. There is a designated paediatric SOPC in each cluster of HA. HA has issued guidelines to GOPCs and SOPCs and made announcements at the DCs and SACs on the detailed arrangements to ensure that the service users are properly informed. All services rendered at GOPCs and SOPCs will follow the normal standard fees and charges of HA, that is, \$45 for each consultation at GOPCs, \$100 for the first consultation and \$60 for each subsequent visit at SOPCs. Indicated cases with abnormal findings will be followed up at the Princess Margaret Hospital. In the period between 1 April and 13 April 2009, two children attended GOPCs for renal problems suspected to be related to MTMP, and both were referred to SOPCs for follow up assessment. HA will continue to monitor the demands for the services concerned until the end of May 2009 and be prepared to meet service demand in case there is upsurge of service requirements. This will be further reviewed in mid May 2009.

Reported cases

10. As at 13 April 2009, CHP has received 15 reported cases of children with renal stones suspected to be related to MTMP. Two cases have been reported by private doctors and the rest by HA. The notification of these cases was received between 20 September 2008 and 13 March 2009. No report was received thereafter. The details concerning these reported cases are provided in the paragraphs 11-19 below.

Demographics

11. Based on the current findings and case definitions, the 15 cases have been classified as six "probable" and nine "suspected". They include five girls and ten boys. Their age ranges from 30 months to

12 years. The median age is six years.

12. Ten of the children were born and reside in Hong Kong. Two were born in Hong Kong but reside in Mainland China. Another two were born in Mainland China but reside in Hong Kong and only one child was born and resides in the Mainland.

Clinical presentation and investigation findings

13. Only four cases presented with mild symptoms including dysuria, urinary frequency, haematuria and/or abdominal pain while the rest were asymptomatic. All of the 15 cases had ultrasound findings of small renal stones between 1.6 mm and 7 mm in size at their first presentation, with no evidence of obstruction. Follow-up ultrasound scan of six cases showed that the stones had already disappeared. Among them, one case had received lithotripsy in a private hospital while five had supportive treatment, including increased oral fluid intake and/or fluid infusion. The other nine children who also had supportive treatment had no significant change in the size of renal stones. No children suffered from acute renal failure. Renal function tests of all the cases were normal. So far, no alternate differential diagnosis could be identified to explain the cause of renal stone formation in these 15 cases.

Exposure history

14. The estimated intake of melamine of all these cases was low, ranging from 0.09 to 0.91 mg/kg body weight/day, with only six cases exceeding the tolerable daily intake (equal to or less than 0.2 mg/kg body weight/day) as stipulated by WHO in December 2008.

15. Levels of exposure was an estimation based on the past consumption history and levels of melamine of these products as reported by food authorities of the Mainland and Hong Kong. Among these 15 cases, there was no obvious relationship between exposure level and size of stones or symptoms.

Treatment and outcome

16. Fourteen cases required hospital admission for investigation and treatment while one case only required outpatient management. No complications (such as infection, obstruction, ongoing symptoms) have been detected. All hospitalized patients have already been discharged home and are in stable condition.

Clinical follow-up

17. Fourteen cases are being followed up regularly by HA at SOPCs (including one case reported by private doctor), while one case is being followed up by a private doctor. Repeat ultrasound scan, blood and urinary examinations and other relevant tests will be conducted as appropriate in the follow-up evaluation.

Observation and conclusion

18. The mass screening programme identified 15 cases so far, with more boys than girls affected. The cases were mostly asymptomatic or presented with only mild symptoms. Their blood profiles were all normal. Most had tiny renal stones and were detected by ultrasound scan. All except one (one patient received lithotripsy performed in a private hospital) received supportive treatment. The renal stones of five patients who received supportive treatment were found to have resolved during subsequent follow-up.

19. In this melamine incident, the number of cases identified in Hong Kong is small and acute health impact is much lower than initially anticipated. This could be explained by the low exposure to MTMP of our local children. Nevertheless, clinical follow-up of these cases to monitor the longer term effects is essential.

HA's Follow-up Protocol for at Risk Children

20. Since this is a novel health problem and there is only scanty scientific evidence on MTMP's effect to children, HA has established an Expert Group on Clinical Management of Disease Associated with MTMP to review scientific evidence and provide recommendations on screening and management. HA's Expert Group has discussed the potential long term sequelae of affected children and has agreed among members that HA would develop a clinical protocol to follow up children "at risk" for at least two years. The aim of the protocol is to facilitate early detection of any late-onset pathology that may be related to the MTMP exposure.

21. The criteria for 'at-risk' cases are defined as children with –

- (a) repeated positive urine tests for protein/red blood cells; or
- (b) impaired renal function; or

- (c) abnormal or inconclusive ultrasound findings with/without the presence of renal stones.

22. Algorithm for specific conditions and follow-up scheme are stipulated to guide clinicians on the investigation, diagnosis and treatment. The Follow-up Protocol has been finalized and disseminated to all concerned HA services on 4 February 2009. A total of seven paediatric SOPCs, one in each cluster, are designated to follow up these cases. A database and a computer interface have been developed and data collected would be reviewed two years later.

23. As for the other children who have visited SACs but not classified as “high risk”, passive surveillance will be conducted and HA is keeping track of their healthcare activities within HA through its electronic clinical information system.

Case surveillance and reporting

24. CHP has since the start of the incident played a pivotal role regarding case surveillance and case investigation, updating of case statistics and communicating with the public. CHP also liaises with WHO and other health authorities concerning the melamine incident and will continue to keep abreast of the scientific developments of the subject.

25. CHP will continue with its existing case reporting criteria and mechanism. HA and private doctors are requested to report cases of renal problems suspected to be related to the consumption of MTMP to CHP. While CHP will maintain vigilance in monitoring the public health impact of the melamine problem and initiate appropriate risk management accordingly, it will formalize an enhanced surveillance mechanism by receiving notification from HA of potential melamine-related renal cases before their clinical studies are completed for formal reporting to CHP.

Telephone enquiry hotline

26. As part of the Administration’s efforts to address the public’s concerns over the incident, CHP had operated a telephone enquiry hotline since 21 September 2008 to provide enquiry service for those who suspected themselves or their children of having consumed MTMP. Besides answering public enquiries on the melamine incident, health advice was also disseminated to the callers when responding to their enquiries. While the number of enquiries handled by the hotline peaked at over 1 000 on 23 to 27 September 2008 each day, it had been

decreasing since. The daily average in each month from October 2008 to March 2009 is as below –

	<u>Month</u>	<u>Daily average number of telephone enquiries</u>
(a)	21 - 30 September 2008	842
(b)	October 2008	62
(c)	November 2008	12
(d)	December 2008	9
(e)	January 2009	4
(f)	February 2009	5
(g)	March 2009	5

27. As reflected in the above table, the CHP hotline only handled a small number of enquiries daily since November 2008. After consulting the Health Services Sub-group, CHP ceased providing a dedicated hotline with effect from 1 April 2009. Thereafter, members of the public can call DH's general hotline for melamine related information. Since its operation on 21 September 2008 and up to the closure of service on 1 April 2009, the CHP hotline had handled a total of 10 969 telephone enquiries.

Immigration data

28. To help monitor the demand for the relevant health services, FHB had received since 28 September 2008 daily summary report on the cross-boundary movement of people, including arrival of children under 11 years of age who were re-entry permit holders at our land and ferry control points. An overall analysis of the data received from the Immigration Department reveals that the average number of re-entry permit holders under 11 years of age arriving from the Mainland has a rather steady pattern, that is, the average number of arrivals was rather steady on weekdays and Saturdays, and the figures peaked on Sundays and local public holidays. According to observations by frontline staff of the Immigration Department, it is believed that many of the re-entry permit holders travelling on weekdays were cross-boundary students. On the other hand, the higher arrival records on Sundays were probably made mostly by local children returning from the Mainland after spending the weekend there.

29. The Mainland's National Day extended holiday in 2008 and the Spring Festival holiday in 2009, however, did not record particularly high number of arrivals. Their figures were within the range and consistent

with the weekday and weekend average. There was also no unusual surge of demand for services at DCs and SACs during these periods. There was therefore no direct link between the number of arrivals and DC attendances. In the light of the above, the daily report to FHB capturing the immigration data ceased on 1 April 2009 with the closure of the DCs on the same day.

Publicity and information dissemination

30. As endorsed by the Group, daily press releases had been issued on the number of enquiries handled by CHP's telephone hotline, attendances at DCs and SACs and the number of cases reported to CHP since September 2008. With the closure of the DCs and CHP's dedicated hotline service on 1 April 2009, HA and CHP had ceased the issue of daily press releases on the same day. To keep the public informed, CHP will issue a press release when a case report is received.

31. Before the closure of the DCs, SACs and CHP's dedicated hotline service, the following publicity arrangements had been implemented to ensure a smooth transition –

- (a) HA made a public announcement on 3 March 2009 to serve as an early alert to avoid a last minute rush at the DCs and SACs.
- (b) Copies of a new poster have been put up at the GOPCs (including the DCs), HA's hospitals and Immigration Department's control points to remind the public of the closure of free assessment at the DCs on 1 April 2009 and the arrangement thereafter. It has been scheduled to remove the poster on 16 April 2009.
- (c) Information on the new poster has also been uploaded onto HA's web-site.
- (d) HA has also informed DH of the arrangement to help answer public enquiries.
- (e) A joint public announcement was made by DH and HA on 26 March 2009 again on the closure of the DCs, SACs and CHP's dedicated hotline service, and the arrangements in future.
- (f) CHP issued a letter to private doctors on 26 March 2009 to inform them of the above (**Annex 1**).

Updates on Scientific Evidence

32. At the early stage of the incident, very little is known about the health effects of MTMP on humans and reference has been taken from animal studies and the pet food incident overseas in 2007. With the development of the incident and accumulation of experience and scientific understanding, a number of studies on the health effects of melamine have been published, some of which are from the Mainland and others from local institutions. Despite the limitations in methodology and data collection, they provide substantial information about the relationship between exposure to melamine and nephrolithiasis in infants and children. Please see **Annex 2** for a summary table of these studies.

Commissioned Research

33. Given the novel nature of melamine related disorders, the Group has recommended, in its First Report, commissioning research studies to assess the potential medium and long term health effects associated with melamine exposure, including laboratory studies and basic science research. Invitations to submit proposals of projects were sent to CUHK, HA and HKU on 18 November 2008. Priority areas as set out in the invitation included –

- (a) Follow-up studies of affected persons, particularly those assessed to be at higher risk of adverse health outcomes;
- (b) Laboratory testing of melamine and analogues; and
- (c) Animal models or other basic science research.

34. These applications were evaluated under a two-tiered peer review system composed of expert reviewers and an Assessment Panel. At the Assessment Panel meeting held on 20 January 2009, 13 grant applications were considered potentially fundable. Because of overlap, the Panel recommended that six fundable projects be combined to form three new applications. This was duly accepted by the principal applicants. After all the questions raised by the Panel were satisfactorily addressed, ten projects were recommended for funding, with projects addressing each of the priority areas. The total amount of funds granted for the ten projects was \$8 million. A summary of the funded projects is at **Annex 3**.

35. Contracts were issued in early March 2009. All projects commenced in March / early April. Duration of the projects ranges from

12 to 33 months while the majority of them will last 18 to 24 months. Researchers are required to submit interim reports for progress monitoring to help ensure the quality of the projects. On completion of the projects, research findings will be made available to the public. Researchers may also publish their results in medical journals.

Food Safety

36. Since the start of the melamine incident, CFS had conducted food surveillance in accordance with the programme endorsed by the Group, monitored international development in the setting of limits on melamine level in food, and operated a telephone hotline to handle public enquiries.

Surveillance and sampling programme

37. Extensive sampling and testing of food available in the local market is one of the important tools adopted by the Government in handling the melamine incident. With the Group's endorsement, CFS had implemented a risk-based surveillance and sampling programme which comprised three phases and lasted about five months –

- (a) First Phase (mid September to late October 2008) : focused on products most directly at risk, in particular infant formula/infant food, milk and milk-related products, including testing every consignment of raw milk and pasteurized/UHT milk from the Mainland since 25 September 2008. Testing results of about 80-100 samples were announced daily.
- (b) Second Phase (late October to mid November 2008) : focused on source control, testing was extended to Mainland raw materials commonly used by local food manufacturers including eggs, flour, baking powder, custard cream powder, egg white powder and cake mix, as well as fresh produce including meat, fish and vegetables. Furthermore, testing of infant formula and food for pregnant/lactating women and every consignment of Mainland milk continued. Testing results of about 60 samples were announced daily.
- (c) Third Phase (mid November 2008 to mid February 2009) : focused on products identified to pose higher risk from the previous testing and any other relevant food types. Items included in the food groups were milk, eggs, frozen confections,

baby food and bakery products. About 100 samples were tested each week and the test results were announced twice weekly, but unsatisfactory results were announced once available.

38. By the time the surveillance and sampling programme ended on 17 February 2009, a total of 5 532 samples were tested, with 40 samples found to contain melamine at levels exceeding the legal limits, meaning an overall unsatisfactory rate of less than 1%. Sale of all relevant products was stopped. There has been no unsatisfactory sample since early December 2008, and a summary of the testing results is at **Annex 4**.

39. As recommended in the Group's Second Report, a review of the surveillance programme was conducted after the completion of the Third Phase. The review concluded that the testing of melamine should be incorporated into CFS's routine surveillance plan and a risk-based approach should continue to be employed with special attention given to products with unsatisfactory results from previous testing. Food items to be covered under routine surveillance include baby food, milk-related snack, bakery products, milk, frozen confection, eggs. About 50 samples are tested per month. Testing of raw milk and pasteurized/UHT milk from the Mainland is conducted on a random basis. In accordance with the recommendation of the Group on regular promulgation of the testing results to the public, press release is issued every two weeks to publish the testing results, with unsatisfactory results to be announced once available. Since the incorporation of the testing of melamine into the routine surveillance programme and up to 7 April 2009, 76 samples have been tested and no failed sample has been found, amounting to a total of 5 608 samples tested since September 2008, with an overall failure rate of 0.71%.

40. Special testing and certification requirement targeting products with previous unsatisfactory results are also in place. For certain products like milk and frozen confections, products with previous unsatisfactory test results of melamine are subject to "hold and test" by CFS until their test results are satisfactory. For others, CFS has written to the relevant importers and sole agents, requiring them to provide quality verification or laboratory certificate before importing the same products into Hong Kong. Among the 40 products tested unsatisfactory under the special surveillance programme, eight had been subject to "hold and test" with satisfactory results, and certification had been provided in relation to seven products before resuming import / returning to the market.

Testing capacity

41. The Group has noted that the Government Laboratory (GL) diverted its resources in the initial stage of the melamine incident to provide urgent analytical services for the laboratory testing of melamine in food. Its testing method has taken reference of the US Food and Drugs Authority's quantitative method in its testing of milk and dairy products. With its staff working almost around the clock, GL managed to ensure analytical results were available within 24 hours and handled about 100 food samples for melamine per day until the extent of contamination in food products was clearer and the situation became more stabilized.

42. To assist the local private laboratories providing similar testing to the local food industry, GL organized a technical seminar on the chemical testing of melamine in dairy products on 23 September 2008. Relevant information on testing methodology has also been uploaded onto GL's web-site to provide ready access.

43. In November 2008, GL organized a proficiency test programme on testing of melamine in milk with a view to assisting the private laboratories seeking accreditation. Fourteen local private laboratories participated. As a result, five laboratories have submitted applications to the Hong Kong Accreditation Service (HKAS) for accreditation for melamine testing. The accreditation process is underway.

44. The Group has also noted the feedback from food traders that in the meantime there is generally no difficulty for them to engage private laboratories for melamine testing. Seven local private laboratories are already offering testing services to the food trade on melamine in food. It is estimated that testing on several tens of samples can be completed by each laboratory per day on average.

45. GL continues to provide testing and advisory service to support CFS's routine surveillance plan. Furthermore, GL has started to outsource part of its routine testing to private laboratories. The resources thus released from outsourcing will be deployed to develop new testing methods to facilitate the enforcement of relevant food legislation, and conduct testing work involving urgent food incidents and litigation.

International development in setting standards for melamine

46. The legal limits of melamine in food have since late September 2008 been provided in the Harmful Substances in Food

Regulation: 1 mg/kg for milk and food for children under the age of 36 months, pregnant and lactating women, and at 2.5 mg/kg for other food.

47. CFS has been monitoring closely international development in the setting of limits by various overseas national authorities for melamine and melamine analogue level in food. There had been no major international development in this regard since the Group's Second Report in late January 2009. The limits adopted in the other jurisdictions are generally similar to the standards set in Hong Kong and are considered by WHO to be providing a sufficient margin of safety. As for melamine analogues, there had been no major international development after WHO's announcement in December 2008 that there were inadequate data to allow the calculation of a health-based guidance value for the co-exposure to melamine and its analogues. CFS would continue to closely monitor the international development.

Telephone enquiry hotline

48. For effective communication with the public on the latest development and the testing results, press releases are issued every time when testing results are announced and all the details are uploaded to CFS's web-site. In addition, an enquiry hotline to answer public enquiries concerning melamine has been running since 16 September 2008. The demand of enquiry service has dropped significantly in the past few months, from a daily average of over 265 calls in the first two weeks to about one call per day in March 2009. As at 13 April 2009, CFS has handled a total of 7 773 telephone enquiries since its establishment. In the light of the decreasing demand, the hotline no longer runs on Saturday mornings since 22 November 2008 and continues to provide service from 9 am to 6 pm on Monday to Friday. The hotline also provides enquiry service for other food safety matters.

Publicity

49. Since the incorporation of the testing of melamine into the routine surveillance programme of the CFS, all of the 76 food samples tested were satisfactory. With the consistently satisfactory testing results, it may not be necessary to continue releasing the results every two weeks. Bearing in mind the Group's recommendation on regular communication, and having consulted the Food Safety, Supply and Control Sub-group, it is proposed that with effect from May 2009, testing results of melamine be published monthly, via the Food Safety Report of CFS, together with the other testing conducted under the routine surveillance programme.

Future action

50. While the melamine incident is largely stabilized and the testing results have been satisfactory, CFS will remain vigilant and will continue to conduct food surveillance at the import, wholesale and retail level, monitor closely the development of food safety issues around the world and maintain close liaison with the food safety authorities of our overseas food supplying countries and places.

Experience Gained and Concluding Remarks

51. MTMP disease is a newly recognised entity in humans, about which very little is known. The melamine incident in the Mainland is reported to have affected 294 000 Mainland infants and young children. In view of the range of milk products found to be contaminated with melamine and the proximity of Hong Kong to the Mainland, parents throughout the territory were very worried about the possible adverse health effects on their children when the problem was first widely known in Hong Kong in September 2008. The Government promptly initiated a territory-wide free screening programme for children, established reporting and clinical management guidelines, set up legal limits for milk products and other food, and mounted an extensive food testing, surveillance and risk communication programmes.

52. After massive screening by ultrasound locally, very few patients with stones, that is, 15 reported cases, have been encountered. The stones identified were small and did not cause urinary obstruction. While further follow-up and research are necessary, it can be ascertained that there is no local epidemic. The marked difference in prevalence and disease severity, in contrast to the situation in the Mainland, is most likely due to the low level of exposure to contaminated milk products of the local population. Further scientific research on melamine and follow-up studies of affected children are warranted to assess the public health impact of melamine. Continued vigilance in food standards is also important to ensure food safety.

53. While the situation has substantially stabilized in the last few months, in the course of dealing with the incident, FHB has worked closely together with the concerned bureaux and departments, the public and private health sectors, experts and academia, the food trade and the media. Concerted efforts have enabled the Government keep abreast of latest development, provide the necessary services and disseminate information to assure the public. The Group considers that the

Government has satisfactorily dealt with the incident in a timely manner and has addressed public concern, protected public health and ensured food safety. The experience and lessons learned are important to the preparedness for future emergency response.

54. In publishing this final report, the Group would highlight the important experience gained from handling of the incident. There are several main areas of work concerned, namely: cross-boundary collaboration, coordination and cooperation within Hong Kong, emergency responses and surge capacity, and communication with the public. The details are set out in the paragraphs below.

Cross-boundary collaboration

55. Given the globalization of food trade, intense cross-boundary goods and people movements, and the fact that Hong Kong relies heavily on imports, particularly those from the Mainland, for its food supply, the Group understands that food and health problems spread quickly and there is the risk of occurrence of similar foodborne incidents in future. To protect public health and to ensure food safety, the Government has to remain highly vigilant, step up its communication and exchange of information with regulatory authorities in the Mainland and other jurisdictions.

56. In this incident, Government officials visited the Mainland and the Group also sent its experts to obtain first hand information. The Government also liaised closely with the Mainland and international authorities. Timely access to accurate information, risk evaluation and risk communication are crucial in ensuring public confidence in the Government's capability in handling the incident and actively managing the situation.

Coordination and collaboration within Hong Kong

57. To ensure effective coordination, the Government set up the Group, chaired by the Secretary for Food and Health, on 26 September 2008 to provide high level steer, coordination across different services and involvement of the major stakeholders. The Group comprised members from both the public and private sectors, namely: academics, medical, public health, food safety and public communication experts and representatives of concerned Government bureaux and departments.

58. Command and information dissemination have been strengthened

with the establishment of the Group, which is underpinned by three Sub-groups focusing on three major different aspects: health services, treatment, food safety, supply and control. Dedicated manpower support within FHB and expert support by HA, CHP, CFS and other relevant bureaux and departments have ensured that the Group's recommendations are promptly taken forward. Cooperation of the food trade, private laboratories and the health sector has provided important support in dealing with the incident.

59. Key contact points within FHB, CHP, HA and CFS have been identified and connected through reliable and effective communication networks. Clear delineation of responsibilities, specific timeframes, guidelines and procedures have been established. They have been reviewed by the Group at its regular meetings and through its submission of reports to the Chief Secretary for the Administration prior to public release.

Emergency response and surge capacity

60. Maintaining vigilance against untoward incidents and threats analysis have facilitated prompt response. In the melamine incident, the Government has pulled resources that can be rapidly mobilized to strengthen relevant services promptly to meet public demands. These measures include HA's redeployment of resources to operate the DCs and SACs to provide screening, assessment and treatment, CFS and GL's intense testing of food samples for melamine and the establishment of CHP's and CFS's telephone hotlines to answer public enquiries on melamine related health and food safety issues respectively. These services have operated for extended hours and even on weekends in view of the huge public demands in the initial stage, with the redeployment and overtime work of the staff involved.

61. Given the novel nature of melamine related disorders, experts' participation was elicited promptly. Resources have been committed to enhance expertise and evidence base of control measures, particularly in risk analysis and risk management. The Treatment Sub-group has drawn together the medical and scientific experts and academia to consider the reporting criteria and a set of case definitions. Hong Kong was the first place in the world to develop such case definitions. The Treatment Sub-group and HA have also collected input from the universities and the private sector to formulate and promulgate screening and clinical management guidelines.

62. Public health and food safety legislation is an important control

measure. Hong Kong was also one of the first places to set the legal limit of melamine at –

- 1 mg/kg for milk, any food intended to be consumed principally by children under the age of 36 months and any food intended to be consumed principally by pregnant or lactating women; and
- 2.5 mg/kg for other food.

63. FHB and CFS expeditiously studied the international practice and available scientific data to set a standard which is appropriate for the local circumstances. The Harmful Substances in Food (Amendment) Regulation 2008 was urgently drafted and gazetted on 23 September 2008, and came into force the same day to give legal effect to the set limit of melamine in milk products and other food. The Amendment Regulation was tabled in the Legislative Council on 8 October 2008, which completed its scrutiny in November 2008. FHB also introduced into the Legislative Council the Public Health and Municipal Services (Amendment) Bill 2008 in November 2008 to empower the authorities to make orders to prohibit the import and supply of problem food and order a recall of such food to protect public health. As at 7 April 2009, the Bills Committee of the Legislative Council has completed scrutiny of the Bill. Resumption of second reading of the Bill is planned for 29 April 2009.

Communication with the public

64. The Group is keenly aware of the public concerns on the incident, especially in its initial stage, and considers it highly important to make prompt and clear announcements to the public. The Government has conducted timely and regular media briefings and issued press releases on CFS's food testing results, HA's screening services for eligible children and CHP's melamine surveillance reports. The CHP and CFS have also operated telephone enquiry hotlines.

65. To provide more in-depth information, the Government has involved experts and major stakeholders to explain to the public the potential health effects of melamine tainted milk and dairy products through the media. HA also organized public health talks and seminars for the healthcare community. FHB and HA have distributed information leaflets through the DCs and Education Bureau's school networks to ensure that information reach parents and students. At the early stage of the incident, CHP also issued letter to schools to survey for possible milk programmes using tainted milk and dairy products for their

school children. All public documents, press releases and information leaflets issued by FHB, HA, CHP, CFS and GIS are uploaded on respective web-pages for public access at all times.

66. As highlighted above, this final report of the Group underscores the importance of the concerted efforts and swift responses of government, public and private agencies, and stakeholders particularly those in the private sectors in a coordinated manner to deal with a public health and food safety emergency situation which cause public anxiety. Equally important is to communicate openly and transparently with the public on the action being taken to ensure public health and food safety to allay their fear. In parallel, the engagement of experts and stakeholders to speak to the public on essential facts and development could also help to allay fear and anxiety. The substance of the communication has to be clear, easy to comprehend, and in a timely manner.

Note of Thanks

67. As the Group has completed its work, the Group Chairman would like to thank the local food trade for their cooperation with the Government on food testing to enhance food safety; the food, medical and scientific experts for their expert advice; the medical profession, clinical staff and other frontline staff, both in the private and public sectors, for their professionalism, dedication and their tireless efforts, especially in the early stages of the incident, in meeting the service needs of the public.

68. The Group Chairman would also like to thank the experts, academics and representatives of government bureaux and departments who have served and supported the work of the Group, contributed advice, and diverted resources to meet the service needs especially at the early stage of the incident.

Expert Group on Melamine Incident
Food and Health Bureau
Government Secretariat
April 2009

監測及流行病學處



Surveillance
And
Epidemiology
Branch

本署檔號 Our Ref.: DH SEB NCD/26/03/2009

26 March 2009

Dear Doctor,

Update on renal diseases associated with consumption of melamine tainted milk products (MTMP)

As of today, CHP has received 15 reported cases of children with renal stones suspected to be related to MTMP. While we shall continue the surveillance function, you are requested to report cases to our Central Notification Office under the existing case definition and reporting criteria via fax (24772770), phone (24772772) or CENO On-line (www.chp.gov.hk/ceno).

CHP has operated telephone enquiry hotlines to answer public enquiries and issued daily press releases since 21 September 2008. With the decreasing demand for the hotline services in recent months, the daily press releases and CHP's hotline service will continue until 31 March 2009. Upon receipt of a new case report, CHP will issue a press release to keep the public informed.

With decreasing demand for the screening service, the Hospital Authority (HA) will have the following arrangements to allow resumption of normal operation at the General Outpatient Clinics (GOPCs) and Specialist Outpatient Clinics (SOPCs):

- The health screening service for children with consumption history of MTMP in the 18 Designated Clinics (DC) will be in operation until 31 March 2009.
- The Special Assessment Clinic services will remain in operation until 9 April 2009 or when all cases referred from the DCs have been provided with further assessment service.
- Thereafter, children suspected with renal symptoms related to MTMP may consult private practitioners or attend any of the 74 GOPCs for assessment by acquiring a medical consultation disc through the usual channel, and if clinically indicated, be referred to an appropriate SOPC for further investigation. These services will be subject to the standard fees and charges.

CHP will remain vigilant of the situation.

Yours faithfully,

(Dr. TH Leung)
Consultant Community Medicine (Non-Communicable Disease)
Centre for Health Protection
Department of Health

Major Articles on Melamine Incident

	Date	Title	Institution	Journal	Major Area of Research
1.	October 2008	The Scare of Melamine Tainted Milk Products	Dr S N WONG, Dr CHIU Man Chun	Hong Kong Journal of Paediatrics	<p>An editorial describing the melamine incident and findings in Mainland China:</p> <ul style="list-style-type: none"> • Preliminary reports suggested that most affected infants in China had renal stones and complications due to obstruction. • The exposure threshold (daily intake and duration) was not clearly identified, yet most of the severe cases having obstruction were associated with ingestion of milk products that were reported to be highly contaminated. • Their screening protocol only looked for renal stones by ultrasound and their consequences, but not interstitial nephritis or renal impairment without stones. • Many of the stones were rather loose, which could be easily broken. • With adequate hydration alone, some of them could be passed out as sand, making urine cloudy and turbid. • As uric acid was identified in the stones, alkali therapy was performed in some centres in China to help dissolve the stones. • For severe cases failing medical treatment, surgical intervention was necessary. Lithotripsy has been recommended only as second line treatment. <p>The authors also made detailed recommendations on the evaluation and treatment of children for melamine-related renal diseases.</p> <p>http://www.hkjpae.org/pdf/2008;13;230-234.pdf</p>

	Date	Title	Institution	Journal	Major Area of Research
2.	November 2008	Melamine related urinary calculus and acute renal failure in infants 婴幼儿三聚氰胺相关泌尿系结石致急性肾衰竭诊疗分析	Division of Urology & Dept of Pediatric Surgery, Beijing Children's Hospital (affiliated to Capital Medical University, Beijing)	Zhonghua Er Ke Za Zhi 中华儿科杂志	<p>Case review of 34 infants with urinary calculus and acute renal failure due to melamine tainted milk formula admitted to the Beijing Children's Hospital and the Xuzhou Children's Hospital in 2008. Major findings were:</p> <ul style="list-style-type: none"> • Stones were composed of melamine and uric acid, molecular ratio was 2:3. • Renal failure was relieved in all 34 patients, after different modes of treatment. • Stones usually widely distributed in the urinary tract, bilateral, sand and sediment like. • 2 major treatments were regulation of hyperkalemia and electrolyte disturbance and relief of urinary obstruction. <p>http://www.cma.org.cn/uploadfiles/20081014/sanlu3.doc</p>
3.	December 2008	Melamine-tainted milk product (MTMP) renal stone outbreaks in humans	Dr CHIU Man Chun, Princess Margaret Hospital	HK Medical Journal	<p>An editorial describing the screening programme in Hong Kong. The author discussed that:</p> <ul style="list-style-type: none"> • After mass screening by ultrasound, only very few patients with stones were encountered. • Considering the background rate of symptomatic paediatric renal stones admitted to local hospitals, Hong Kong had no outbreak. • Current testing of melamine in urine and stones were too sensitive, making interpretation difficult; • It was postulated that melamine served as a nidus for deposition of other chemicals such as uric acid. <p>http://www.hkmj.org/article_pdfs/hkm0812p424.pdf</p>

	Date	Title	Institution	Journal	Major Area of Research
4.	December 2008	Renal screening in children after exposure to low dose melamine in Hong Kong: cross sectional study	Dept of Paediatrics & Dept of Radiology, CUHK	British Medical Journal	<p>Cross-sectional study of 3170 children seen at SACs of New Territories East. Major findings were:</p> <ul style="list-style-type: none"> • Prevalence of suspected melamine related abnormalities on ultrasound was only 0.2%. • Overall prevalence of microscopic haematuria was less than 1%. • There were no adverse renal outcomes. • Estimated melamine intake was low and did not exceed tolerable daily intake. • Large scale and urgent screening programmes might not be informative and cost effective for populations who have been exposed to low dose melamine. <p>http://www.bmj.com/cgi/content/full/337/dec18_4/a2991?q=rss_home</p>
5.	January 2009	Diagnosis and Spectrum of Melamine-related Renal Disease: Plausible Mechanism of Stone Formation in Humans	Dept of Chemical Pathology, HKU	Clinica Chimica Acta	<p>Collaborative case-control study on 15 exposed children in Mainland China, showing that:</p> <ul style="list-style-type: none"> • More than 50% of cases had predisposing urinary metabolic risk factors on urinalysis which may serve as triggers of stone formation. • Strong correlation between renal stone size and urinary melamine concentration. • The threshold was determined as 7.1 ug melamine / mmol creatinine in urine. • Urinary cyanuric acid was not significantly different between cases and controls. • The spectrum and severity of disease appeared to be dose-related. • Urine melamine level might be an indicator of residual melamine load in the body and thus is useful for follow-up and monitoring of the confirmed cases.

	Date	Title	Institution	Journal	Major Area of Research
					http://www.sciencedirect.com/science?_ob=ArticleURL&_udi=B6T57-4VBDKM7-3&_user=10&_rdoc=1&_fmt=&_orig=search&_sort=d&_view=c&_acct=C000050221&_version=1&_urlVersion=0&_userid=10&_md5=99ab5911de5127663fd983788cc67114
6.	February 2009	Melamine-Contaminated Milk Products Induced Urinary Tract Calculi in Children	The Children's Hospital of Zhejiang University School of Medicine	World Journal of Pediatrics	<p>Case control study of 846 children screened at the Children's Hospital of Zhejiang University School of Medicine, showing that:</p> <ul style="list-style-type: none"> • Positive rate of stones on ultrasound screening was 3.61%. • Most had small and multiple calculi, with good response to conservative therapy. • Incidence of stone was increased with increased concentration of melamine in the milk formula. • Long duration of formula feeding, high melamine contained formula, and minimal water intake were the risk factors for calculi. • Children in the calculus group had lower body weight and head circumference scores. <p>http://www.wjpch.com/article.asp?article_id=304&article_id1=304&type_i=2#Melamine-contaminated%20milk%20products%20induced%20urinary%20tract%20calculi%20in%20children_1</p>
7.	February 2009	Melamine-Contaminated Milk Formula and Urolithiasis in Young Children	Peking University First Hospital, Research Center of Clinical	New England Journal of Medicine	<p>Multi-disciplinary cross-sectional study on 589 children 36 months of age or younger, brought to Peking University First Hospital for screening. Results showed that:</p> <ul style="list-style-type: none"> • Overall prevalence of renal stones was 8.5%. • Most children with melamine-associated urolithiasis were asymptomatic or had non-specific symptoms and urinary findings.

	Date	Title	Institution	Journal	Major Area of Research
			Epidemiology of Peking University Third Hospital		<ul style="list-style-type: none"> • Screening for urinary stones should be based on the history of exposure rather than on symptomatology. • Incidences of hematuria, leukocyturia and proteinuria did not differ significantly among children who had stones, suspected stones or no stones. • Urinalysis was not adequate for screening for melamine-related urinary stones. • Diagnosis of melamine-related urinary stones required ultrasound examination. Most melamine-related stones were not characterized by shadowing on ultrasound. Most were small and sand-like. • The incidence of glomerular dysfunction gave unclear answers. It was not sure whether there were other factors at play in those children with suspected stones. • Pre-term birth (3.7 to 4.5 times more likely) and high melamine content in the formula (5.4 to 7 times more likely) were significantly associated with presence of stones. • Children exposed to moderate melamine formulas did not have an increased likelihood of stone formation. <p>http://content.nejm.org/cgi/reprint/NEJMoa0809550v1.pdf</p>
8.	February 2009	Ultrasonographic Evaluation of Melamine-exposed Children in Hong Kong	CUHK	New England Journal of Medicine	<p>A letter to the editor, reporting cross-sectional findings of 2140 children screened at Prince of Wales Hospital. Result showed that:</p> <ul style="list-style-type: none"> • Only 1 out of 2140 screened children had renal stone. • The author concluded that the adverse effect of melamine-tainted milk products did not appear to be as severe as first anticipated. • The author suggested that in populations exposed to doses of melamine similar to those among the children in Hong Kong,

	Date	Title	Institution	Journal	Major Area of Research
					<p>screening by means of ultrasound is likely to identify few findings and findings of unclear clinical relevance.</p> <p>http://content.nejm.org/cgi/content/full/NEJMc0809955</p>
9.	February 2009	Melamine and Nephrolithiasis in Children in Taiwan	Taipei Hospital, Department of Health	New England Journal of Medicine	<p>A letter to the editor, reporting a case control study on 1129 children screened in Taiwan. Results showed that:</p> <ul style="list-style-type: none"> • Among screened children who were exposed to highly contaminated milk products, 20.45% developed renal stones. The rate for those exposed to low level contamination was 0.33%. • Most were asymptomatic and laboratory findings were non-specific. • The author concluded that consumption of melamine-contaminated dairy products appeared to be a major factor for stone development. • Due to lack of symptoms and signs, the author recommended ultrasound to be performed in children exposed to melamine-contaminated formula. <p>http://content.nejm.org/cgi/content/full/NEJMc0810070</p>
10.	February 2009	A Position Statement on Kidney Disease from Powdered Infant Formula-based Melamine Exposure in Chinese Infants	International Paediatric Nephrology Association	Pediatric Nephrology	<p>An editorial commentary, which is a clinical guideline for management of exposed children in America. It suggested:</p> <ul style="list-style-type: none"> • The key diagnostic criteria include both demographics and supporting clinical and laboratory data. • Evaluation protocol of infants, including physical examination, urinalysis, blood tests and ultrasound scan. Referral to a pediatric nephrologist was necessary upon abnormal findings. CT scan and radionuclei scans might be indicated but not intravenous urography. • A conservative approach in asymptomatic infants and opined that

	Date	Title	Institution	Journal	Major Area of Research
					<p>only infants from Mainland China who have been exposed to powdered formula and who have unexplained symptoms should undergo screening and management.</p> <p>http://www.springerlink.com/content/1v1710xp2u418287/fulltext.pdf</p>
11.	February 2009	Melamine Toxicity and the Kidney	CUHK and Tuen Mun Hospital	Journal of the American Society of Nephrology	<p>This review article:</p> <ul style="list-style-type: none"> • Described the toxicology of melamine in animals. • Reviewed the epidemiology, clinical features, and investigative findings of the outbreak of melamine poisoning in humans in Mainland China. • Examined the renal toxicities of melamine and cyanuric acid - a by-product of its synthesis - and the associated risk factors on exposure. • Described the tolerable levels in foods. <p>With the best available evidence in human exposures and animal studies, the authors concluded that:</p> <ul style="list-style-type: none"> • High dosage melamine will result in urinary stones, crystalluria, and acute renal failure in both humans and animals. • Stone formation is likely enhanced by smaller body size, higher dosage of melamine, and smaller amounts of fluid intake. • Animal studies show that males are more affected than females. • Toxicity of melamine is further aggravated by the presence of impurities associated with melamine synthesis, particularly cyanuric acid. • Tubular damage with obstruction from crystals and chronic inflammation of the kidney can occur.

	Date	Title	Institution	Journal	Major Area of Research
					<ul style="list-style-type: none"> • Toxicity may not be limited to stone formation in animal studies if melamine is present in high dosages or in combination with cyanuric acid. <p>http://jasn.asnjournals.org/cgi/content/abstract/ASN.2008101065v1</p>
12.	February 2009	Ultrasonographic diagnosis of urinary calculus caused by melamine in children	Diagnostic Imaging Center, Department of Pathology, Beijing Children's Hospital Affiliated to Capital Medical University	Chinese Medical Journal	<p>This is a cross-sectional study of 28,332 children who ingested milk powder possibly contaminated with melamine between March and October 2008 attending Beijing Children's Hospital and receiving ultrasound examination. Results showed that:</p> <ul style="list-style-type: none"> • 395 of the children were diagnosed by ultrasound as having urinary calculus (of which 231 cases had lump-like calculi; 164 had sand gravel-like calculi) • Most of the patients had no symptoms. • The whole profile of echogenicity could be seen in most cases. Echogenicity was weaker as compared with calcium containing calculi, features included comet tail sign and lack of sharp or acoustical shadowing. • Percutaneous renal biopsy was performed for 1 case. Histopathological examination showed flocculent, fine, strip-like, ellipse and circular deeply stained sand gravel-like material in the renal tubules; and the circular calculi were found to be attached to the walls of the tubules. • Chemical analysis of the expelled renal stones from 12 cases showed that the main contents were uric acid and melamine. • Short-term ultrasound re-examination in 116 patients showed that the gravel-like calculi disappeared in 80.4% of the cases. • Most of the gravel-like calculi could be expelled within a short period

	Date	Title	Institution	Journal	Major Area of Research
					<p>of time; while the lump-like calculi can hardly be expelled.</p> <ul style="list-style-type: none"> • Ultrasound is an accurate and reliable method of diagnosis. <p>http://www.cmj.org/Periodical/PDF/200912134994260.pdf</p>
13.	February 2009	Blood purification therapy in treatment of acute renal failure in infants with melamine-induced stones	Department of Nephrology, Beijing Children's Hospital Affiliated to Capital Medical University	Chinese Medical Journal	<p>This is a case-control study. 13 infants with acute renal failure induced by urinary multiple obstruction caused by melamine-containing stones who had been admitted to Beijing Children's Hospital were investigated. Results showed that:</p> <ul style="list-style-type: none"> • These 13 infants had blood urea levels of 30.9 +/- 7.9 mmol/L; creatinine levels of 572 +/- 173 umol / L. • 8 were treated with peritoneal dialysis (PD) and 5 with hemodialysis (HD). • 10 infants recovered to urinate in 24 to 72 hours after dialysis. • 3 infants with persistent ureteral obstruction were further treated with cystoscopic retrograde catheterization into the ureter for drainage; and urination resumed soon after the operation. • The average time of PD and HD were 2.1 +/- 0.8 days and 1.2 +/- 0.4 days respectively. The total average time of PD and HD was 1.77 +/- 0.83 days. • The recovery time of renal function after dialysis was 3.08 +/- 1.2 days, comparable to that of the 2 control groups. • Melamine contaminated milk formula may cause urinary stones and obstructive acute renal failure in infants. • Dialysis is suggested to treat life-threatening complications such as hyperkalemia, oliguria or anuria if surgical interventions fail. • If possible, PD or HD can be performed early. • Surgical measures can be taken to remove obstruction if necessary.

	Date	Title	Institution	Journal	Major Area of Research
					http://www.cmj.org/Periodical/PDF/200912135327670.pdf
14.	February 2009	A worldwide food safety concern in 2008 - melamine-contaminated infant formula in China caused urinary tract stone in 290000 children in China	Prof CHEN Jun Shi, Institute of Nutrition and Food Safety, Chinese Center for Disease Control and Prevention, Beijing	Chinese Medical Journal	<p>This is an editorial:</p> <ul style="list-style-type: none"> • Since the spring of 2008, an increase of urinary tract stones in infants and young children were noticed by pediatricians in Gansu, Hebei, Beijing and other cities and provinces. • This was followed by an epidemic of urinary tract stones in more than 10 provinces. • In Sept 2008, the cause of this epidemic was identified. • When melamine concentration was high enough in the infant formula, because of its low solubility, it formed crystals or stones in the urinary tract of infants and young children. • The Sanlu company was identified as the one who had most seriously violated the law. • By the end of Nov 2008, 294,000 infants and young children in China had been diagnosed to have urinary tract stone. • Although most patients have no symptoms and signs, acute renal failure did occur in a small proportion of patients; and 6 deaths have been confirmed. • Raw milk collection and infant formula production were subject to intensive regulatory control and inspection. • Free check up was provided by the hospitals for any children who have consumed those "problematic milk powder". Free hospitalisation and treatment were provided to those diagnosed cases. • Within 3 months, more than 20 million children have been examined by ultrasound. By the end of Nov 2008, most hospitalized patients recovered and were discharged.

	Date	Title	Institution	Journal	Major Area of Research
					<ul style="list-style-type: none"> ● Honesty and credibility of food industry is the key to safe food. ● Food safety covers a long chain, from farm to table, and the final safe food product is the result of many safe steps. Government food safety control system should cover the whole food chain without any possible holes or gaps. ● Proper risk communication among all the stakeholders relevant to food safety is very important in crisis management. ● Continuous information release during the crisis from the government made the consumers aware and reduced unnecessary concerns. ● The author believed that the quality and safety of their dairy products are now much improved ● The government will improve food safety legal system, including the new food safety law and standards, and strengthen the regulatory control and inspection of the whole food chain ● Public health scientists have improved their capability in laboratory analysis, epidemiological study and risk assessment ● Clinicians have learned new knowledge about the diagnosis and treatment of urinary tract stones, a rare disease in infants and young children. <p>http://www.cmj.org/Periodical/PDF/200912134025550.pdf</p>

Summary of Commissioned Studies Related to Melamine Incident

Follow-up studies of affected persons, particularly those assessed to be at higher risk of adverse health outcomes		
Project Title	Institution	Objectives
Medium and long-term follow up of children with history of melamine exposure in Hong Kong: a multicentre study	The Chinese University of Hong Kong	To investigate the medium to long term renal outcomes of children with a history of melamine exposure in Hong Kong.
Case-control study of Sichuan and Hong Kong children with melamine associated renal stones - renal ultrasounds and urinary IL-8 and MCP-1	The University of Hong Kong	To compare the renal ultrasound findings and urinary cytokines in Sichuan children suffering from melamine-associated renal stones with Hong Kong children suspected to have such stones.
Prevalence of melamine incident and follow-up studies in Hong Kong school children	The Chinese University of Hong Kong	<ol style="list-style-type: none">1) To determine prevalence of melamine in Hong Kong Chinese children and adolescents;2) To explore correlation between urinary melamine concentration and dairy product consumption; and3) To identify subjects with high urinary melamine concentrations and follow up with investigations for renal stones.

Laboratory testing of melamine and analogues		
Project Title	Institution	Objectives
Urinary free to complex melamine ratio: a confirmatory test of melamine-induced urinary calculus	Hospital Authority	To establish a urine diagnostic test to distinguish urinary stone caused by melamine from other causes.
Development of laboratory diagnostic tools for supporting clinical and animal researches on melamine and its analogue intoxication	The Chinese University of Hong Kong	1) To develop new extraction methods for melamine and cyanuric acid from human biological samples; and 2) To evaluate a urine enzyme assay (NGAL) as a biomarker for early detection of kidney injury.

Animal models or other basic science research		
Project Title	Institution	Objectives
Measuring melamine and its effects on urine crystallisation kinetics and cell responses	The Chinese University of Hong Kong	1) To study the effects of melamine in a human urine crystalliser with other known stone-forming ions; and 2) To investigate the effects of melamine on renal and intestinal cellular biochemistry and gene expression.
Impact of chronic tolerable daily intake of melamine and related compounds on renal and vascular function in pregnant and neonatal rats	The Chinese University of Hong Kong	To determine whether melamine and cyanuric acid lead to fetal and neonatal vascular and renal dysfunction.
Melamine toxicity in fetus and infant	The Chinese University of Hong Kong	To establish the pharmacokinetic, pharmacodynamic and teratogenicity data for melamine and cyanuric acid in foetal and infant rats.
The melamine milk – kidney and developmental toxicity: impact on the foetus and the disease development later in life	The University of Hong Kong	1) To study the interactive toxicity of melamine and analogues using a cell culture model; 2) To examine the ability to induce renal inflammation and kidney stone

		<p>formation in vivo;</p> <p>3) To evaluate maternal-foetal transplacental passage of melamine and analogues using an ex vivo human placenta model; and</p> <p>4) To investigate the short and long term implications of exposure to melamine and analogues in utero and during the early stages of life.</p>
Mechanism of melamine-induced human urinary bladder carcinoma	The University of Hong Kong	<p>1) To assess the ability of melamine or melamine-stones to initiate cancer in human bladder epithelial cells; and</p> <p>2) To identify the mechanism of melamine-induced human bladder cancer.</p>

Summary of Surveillance and Testing Results
(as at end of special surveillance programme on 17 February 2009)

Food group	Sample Tested	Satisfactory Samples
Infant formula (all origins) - <i>Some 78 infant formula products involving 19 brands, none originated from Mainland China</i>	173	173 (100%)
Baby food (all origins)	250	249 (99.6%)
Raw milk, Pasteurized/ UHT milk and milk beverage (Mainland)	884	879 (99.4%)
Pasteurized/ UHT milk and milk beverage (Local Milk Factories)	72	72 (100%)
Milk and Milk Beverages (Overseas)	291	291 (100%)
UHT Cream (all origins)	80	80 (100%)
Milk powder/ Evaporated Milk/ Condensed Milk (Mainland)	67	67 (100%)
Milk powder/ Evaporated Milk/ Condensed Milk (Overseas)	159	159 (100%)
Other major dairy products (all origins)	184	184 (100%)
Frozen Confections (Mainland)	117	112 (95.7%)
Frozen Confections from Local Frozen Confection Manufacturers	165	165 (100%)
Frozen Confections (Overseas)	485	485 (100%)
Bakery Products and Milk-related Snack Food (mainly Mainland and Southeast Asia origins)	1 422	1 397 (98.2%)
Beverage and Drinks (mainly Mainland and Southeast Asia origins)	169	169 (100%)
Raw Material (except eggs) (all origins)	162	162 (100%)
Egg (all origins)	356	352 (98.9%)
Meat and Meat Products (all origins)	90	90 (100%)
Poultry (all origins)	93	93 (100%)
Fish and Fish Products (all origins)	172	172 (100%)
Vegetables (Mainland)	30	30 (100%)
Others (e.g. prepackaged mixed dishes, salad dressing, condiments and sauces)	111	111 (100%)
Total	5 532	5 492 (99.3%)