

FAQ for PCDs participate in management programme of affected persons with health concern from drinking water containing raised level of lead and other five metals

For lead

Q1. Is blood lead level (BLL) testing required for the “more easily affected” groups (namely children <6 years, pregnant women and lactating women) who have consumed drinking water with elevated level of lead?

Based on the experience in the incident of lead in drinking water in 2015, universal screening for BLL for subjects exposed to drinking water with mildly elevated lead level is not very helpful for clinical management. In the exercise in 2015, the Government conducted 5,655 BLL testing and a total of 165 (2.9%) persons were found to have mildly elevated BLL ranging from 5-16.7 µg/dL. The observed mild elevation of BLL is not expected to result in observable clinical features. For most people with elevated BLL, their BLL gradually returned to normal after stopping exposure to contaminated water; for a few exceptional cases, in general their BLL showed a downward trend but was still mildly elevated. They were still receiving follow up in the Hospital Authority (HA). None of these persons with mildly elevated BLL required chelation therapy or any other specific treatment. Reduction of exposure by avoidance of such water is the primary measure in clinical management.

In case BLL testing is really required (e.g. clinical signs and symptoms of lead poisoning; subjects and/or parents remained anxious after counseling), BLL testing can be done by point-of-care test (POCT) or inductively coupled plasma mass spectrometry (ICP-MS). POCT is relatively simple by using capillary blood sample and venous blood taking is not required while ICP-MS can be used as confirmatory testing. Typically, blood sample for POCT can be collected directly from a fingerstick and results can be available within minutes. You can refer to the following link to US Food and Drug Administration (FDA) for more information on POCT for blood lead.

https://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfClia/analyteswaived.cfm?start_search=L

You can also refer to the following links for more information on private laboratories in Hong Kong that provide BLL testing service:

- The Hong Kong Association of Medical Laboratories Limited

<http://www.hkaml.org/index.php/network>

- Hong Kong Laboratory Accreditation Scheme under Innovation and Technology Commission

(http://www.itc.gov.hk/en/quality/hkas/doc/common/directory/hoklas_mt_en.pdf)

Q2. Why is it that in 2015, BLL checking was offered to children under 6 but now the government advises there is no need for BLL checking even for household with exceedance of lead in drinking water?

The BLL checking was provided under a Voluntary Programme which was established to understand the impact of the excessive lead in drinking water on the blood lead level in the more easily affected groups in Hong Kong as such data were lacking at that time. Based on the experience in the 2015 lead in drinking water incident, universal screening for lead in blood for subjects exposed to drinking water with mildly elevated lead level did not change the clinical management. Reduction of exposure by avoidance of such water is the primary measure in clinical management.

Q3. For affected children >6 years old presented with development/ academic/ behavioral problems, what are the referral channels?

- i. Advise to continue follow up in existing service providers+ if already receiving services
(e.g. Specialist clinic, Child Assessment Centre, Special Education Support in special school or Student Support Team 學生支援小組 in mainstream school)
- ii. If concern on learning and academic problem (e.g. reading and writing problem, delayed intellectual development, speech and language impairments, adjustment difficulties), may approach teachers or coordinators of the Student Support Team in schools for advice and support
- iii. If multiple developmental problems (e.g. suspected ADHD, autism spectrum disorder, physical impairment), consider referral to Child Assessment Centre

In addition, advise to enrol in Student Health Service (SHS) through school and attend annual visit in Student Health Service Centres (SHSCs) with appointment as scheduled

Pamphlet:

<http://www.edb.gov.hk/attachment/tc/edu-system/special/resources/serc/download/dev%20disorder%20leaflet-chi.pdf>

- Q4. Is there any medical co-morbidities I should look out for to identify cases of suspected lead poisoning?

Although significant exposure to lead is associated with a wide range of effects, including neurodevelopmental effects, anaemia, high blood pressure, impaired renal function neurological impairment, impaired fertility and adverse pregnancy outcomes, our observations from the lead in drinking water incident in 2015 showed that even the more easily affected groups did not demonstrate observable clinical effects. Subjects who do not belong to the “more easily affected groups” are therefore not expected to have any observable clinical effects associated with the exposure.

- Q5. For patients diagnosed with chronic renal problems who had consumed drinking water with raised lead level, what advice should I give if they request for BLL checking in order to ascertain if their renal problems are related to the consumption?

Chronic renal problems have many different causes. Based on the data from the lead in drinking water incident in 2015, the blood lead levels observed are not expected to cause renal failure or worsen pre-existing renal problems. Other organ toxicities are also not expected. People with renal problems should undergo evaluation by a doctor. Routine screening for blood lead level is unlikely to be helpful in clinical management.

- Q6. If the BLL results by POCT are $\geq 20\mu\text{g/dL}$ for patients not belonging to the ‘more easily affected’ groups, shall we still refer them to specialists direct?

For patients not belonging to the “more easily affected” groups, if the BLL result by POCT is $>50\mu\text{g/dL}$, please recheck the patient’s BLL by POCT immediately. If the POCT retest also indicates a BLL $>50\mu\text{g/dL}$, please refer the case to HA Toxicology Clinic in PWH or UCH immediately.

If BLL testing by POCT has been performed and the result is $\geq 20\mu\text{g/dL}$ but $\leq 50\mu\text{g/dL}$, we suggest you to recheck his/her BLL by POCT immediately. If the

POCT retest also indicates a BLL $\geq 20\mu\text{g/dL}$ but $\leq 50\mu\text{g/dL}$, please also discuss with the patient to identify potential source of exposure and advise the patients to reduce exposure, such as by avoidance of such water. If the patient is clinically indicated and warranted a specialist's further follow up upon your clinical assessment, you may refer the patient directly. If the patient is clinically well and doesn't consider requiring immediate specialist follow up, you may further proceed on arranging the confirmatory BLL test e.g. by ICP-MS.

If the patient's BLL is confirmed by ICP-MS to be $\geq 20\mu\text{g/dL}$ but $\leq 50\mu\text{g/dL}$, please discuss with the patient to identify potential source of exposure and advise the patients to reduce exposure, such as by avoidance of such water. If the patient is clinically indicated and warranted a specialist's further follow up upon your clinical assessment, you may refer the patient.

- Q7. For patients not belonging to the 'more easily affected' groups and if the first BLL result by POCT is $\geq 10\mu\text{g/dL}$ but $< 20\mu\text{g/dL}$, is it mandatory to have 2nd confirmatory blood test?

If BLL is elevated ($\geq 10\mu\text{g/dL}$ for subjects not belonging to the "more easily affected" groups), confirmatory testing of BLL using ICP-MS is needed. If BLL result persistently $\geq 10\mu\text{g/dL}$ (recheck in 3 months is advisable), referral would be made based on clinical assessment. It is important to discuss with the patients on the possible source of exposure and advise the patient to avoid further exposure.

- Q8. For all patients, is there a level of POCT or BLL result or symptoms/signs that I should refer the patient to AED directly as an emergency?

No referral to AED should be made unless the patient's clinical condition is critical and require urgent medical attention.

Referral should normally be made to specialist for further follow up. For patients belonging to the more easily affected groups with BLL $> 44\mu\text{g/dL}$ or other patients with BLL $> 50\mu\text{g/dL}$, they should be referred to HA Toxicology Clinic at PWH or UCH directly.

- Q9. Will the Hospital Authority treat referrals differently for patients of the more easily affected groups versus others?

The referral cases would be triaged according to prevailing practice of HA and appropriate appointment and treatment will be given according to the clinical conditions of individual case.

For other 5 Ms

Q10. Is blood and/or urine testing for metal required for subjects who have consumed drinking water with mildly elevated levels of antimony, cadmium, chromium, copper or nickel?

The WHO defined drinking water limits for antimony, cadmium, chromium, copper and nickel are stringent and substantially lower than the levels causing clinical poisoning. Universal screening for these metals in blood and urine samples for subjects exposed to drinking water with mildly elevated levels of antimony, cadmium, chromium, copper or nickel will not be helpful in clinical management; such practice is not seen in the rest of the world. Reduction of exposure by avoidance of such water is the primary measure in clinical management.

Q11. How to arrange testing in blood and/or urine for antimony, cadmium, chromium, copper or nickel?

Although such metals can be measured technically, it is strongly discouraged to arrange such testing for subjects exposed to drinking water with mildly elevated levels of antimony, cadmium, chromium, copper or nickel. Nevertheless, under special circumstances where such tests are indicated for clinical management, referral to specialists for thorough workup and management may be considered.

Q12. For the other 5 metals, is there a similar concept of “more easily affected groups” or vulnerable groups as those for lead?

No. The “more easily affected groups” for the other 5 metals are different from those for lead and may even not be identified.

Q13. What advice should I give if a child has consumed water with raised level of one of the 5 Ms and his/her parents request for blood/urine tests to determine whether the M has accumulated in the child’s body?

It is considered that universal screening of human biological specimens (blood and urine) of the five metals concerned would not be helpful to guide the management of the affected households. Literature review also revealed that the health risk associated with drinking water contaminated with these five metals should likely be minimal. Instead, most documented poisoning cases due to these five metals were results of occupational or industrial exposure, or using the metal as drugs. Moreover, there is currently no human screening programme for these five metals in overseas jurisdictions in subjects exposed to water contaminated with these metals.

Q14. What advice should I give if a child has consumed water with raised level of one of the 5 Ms and is not doing well in school, his/her parents request for tests to determine if his/her academic performance is affected?

There are a wide variety of factors which may affect the academic performance of a child. The child should receive routine developmental surveillance through regular channel available as listed in Q3. A single blood/urine test to evaluate metal level is highly unlikely to confirm the underlying cause or to guide the management.

Neurotoxicity has not been reported for high oral intake of contaminated water of the 5 Ms. It is extremely unlikely that the academic performance is related to the exposure to the 5 Ms. (Ref: The WHO guideline (Guidelines for Drinking-water Quality 4th edition World Health Organization 2011))

For children under 6 years / studying K3 or below, if parents have concern on the child's learning problems / academic performance/ development, they could receive services in MCHCs for development surveillance.

General questions

Q15. How to make poisoning case notification to the Department of Health?

Notification of poisoning cases is a voluntary reporting system and should be made through the Central Notification Office (CENO) of the Centre for Health Protection (CHP). Doctors can refer to the following link for notification form, personal information collection statement and contact details under “Report to Department of Health on poisoning or communicable diseases other than those specified in the Prevention and Control of Disease Ordinance (Cap. 599)”:

<http://www.chp.gov.hk/tc/notification/13/33.html>

Q16. What are the essential information or remarks to be included in referral letter (for lead and other 5 Ms) to the specialist clinic of the Hospital Authority?

The name of tests (for BLL, please also indicate if it is measured by POCT or confirmatory test), the date of sample collection and the results (the full laboratory report should be attached where available) should be clearly indicated on the referral letter.

Q17. What advice should I give if someone who is a neighbour of an affected household where water is confirmed to have raised level of lead or one of the other 5 Ms? Should I request for blood test of his/her child to exclude any health impact?

Based on the experience in the 2015 lead in drinking water incident, universal screening for lead in blood samples for subjects exposed to drinking water with mildly elevated lead level did not affect the clinical management. Testing of blood/urine levels of the other 5 metals is unlikely to affect the clinical management plan. Reduction of exposure by avoidance of such water is the primary measure in clinical management.

Also refer to advice on safe use of drinking water issued by WSD (incorporating DH input) under different scenarios (e.g. individual household with confirmed contaminated water, neighbouring households when the index household is being investigated into the source and extent of contamination, etc.)

Q18. Which part(s) of the care protocol can be carried out by nurse or clinic assistant?

The PCD should be responsible to decide which part of the consultation would be delegated to the clinic nurse / assistant depending on the clinic situation and training of these personnel. Simple health education on avoidance of lead exposure and counseling may be carried out by a nurse with the relevant training.

Q19. What are the pros and cons of arranging POCT versus ICP-MS for BLL testing and how should doctor choose between them?

POCT and ICP-MS have its own pros and cons. Results of POCT can be available in a shorter period (theoretically in minutes) than ICP-MS (e.g. report in days or 1 week). POCT only requires minute amount of capillary blood which also makes it more suitable for patients with difficult blood taking e.g. infant. This is also likely to be cheaper than ICP-MS. However, further confirmatory test with ICP-MS would be required for abnormal POCT results necessitating a further trip to the laboratory, and possibly the clinic on the patient's part. Doctors should discuss the pros and cons of the two tests with the patients before choosing between POCT and ICP-MS for BLL test according to needs of different patients, service availability, clinical judgment, and patient preference, etc.

Q20.If a patient cannot ascertain the type of metal exceedance in water samples collected from his/her home or neighbourhood, what are the possible ways for doctors to find out or verify?

In the event that the water sample with exceedance is collected from the patient's home, WSD will issue a letter to the owner detailing type of metal exceedance and specific advice on water use. Doctors may ask for the letter from the patient for more accurate information.

In the event that the water sample with exceedance is collected from patient's neighbourhood e.g. in the same building or housing estate, doctors may ask the patient to seek clarification with the respective property management office which would probably also be informed of the results by WSD. Depending on the cause and extent of the problem giving rise to metal exceedance in the affected unit, households in the neighbourhood may or may not be affected.

Finally, relevant information will be posted on WSD's designated web page: <http://www.wsd.gov.hk/en/core-businesses/water-quality/action-plan-for-enhancing-of-drinking-water-safety/index.html>. However, water test results as to identify the name of the affected household unit may not be provided. .

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