Department of Health

Mount Isa Lead Health Management Committee

Interim Report –Blood Lead Testing Results for children less than 5 years of age in Mount Isa

Year	Total under five years children tested	All under five years geometric mean (GM)	Indigenous under five years geometric mean[1]	% BLL ≥ 5 µg/dL overall (total number in brackets)	% BLL ≥ 10 µg/dL overall (total number in brackets)
Voluntary Testing					
QML lab 2012	43	3.2 µg/dL		21% (9)	-
QML lab 2013	83	3.2 µg/dL		23% (19)	2.4% (2)
QML lab 2014	98	2.6 µg/dL	3.0 µg/dL	11% (11)	0% (0)
QML and other private labs 2015	49	3.0 µg /dL	3.9 µg /dL	14% (7)	6% (3)
QML lab 2016 (until 30 June)	18	2.5 µg /dL	Not available	17% (3)	0% (0)
Routine (opportunistic) testing Mount Isa Hospital					
Mount Isa Hospital 2014 (***Aug-Dec***)	57	3.2 µg/dL	3.5 µg/dL	16% (9)	2% (1)
Mount Isa Hospital 2015	101	3.2 µg /dL	3.7 µg /dL	16% (16)	2% (2)
Mount Isa Hospital 2016 (til 6 September)	114	2.4 µg/dL	2.8 µg/dL	11% (12)	4% (4)

Note - the analysis data are truncated at 2.1 µg/dL for QML as the lowest level for laboratory reporting. This means that the geometric mean cannot be lower than 2.1 µg/dL. For 2016, the lower truncated level for Path Queensland (Mount Isa Hospital) data is 1.0 µg/dL.

[1] Indigenous status is not always available

Queensland Government

Number of children under five years of age tested

Year	QML	Mount Isa Hospital	Total Tested
2012	43	-	43
2013	83	-	83
2014	98	57	155
2015	49	101	150
2016	18 (to 30 June)	114 (to 6 Sept)	132*
Note : 1925 total number of children in Mount Isa (under 5 years of age) based on 2011 Census Data			

Note:

1. Results for 2012-2015 provided by Townsville Public Health Unit on behalf of North West Hospital and Health Service
2. 2016 Results to date obtained directly from QML and Queensland Pathology pending the preparation of the final report by Townsville Public Health Unit.
3. All 2016 blood lead tests undertaken by Queensland Pathology for Mount Isa Hospital were assigned as routine (opportunistic) testing at Mount Isa Hospital.

Queensland Government

Mount Isa Lead Health Management Committee

Minutes of Meeting

Date	2.00pm – 4.00pm: Friday 30 September 2016
Location	Level 3, Mount Isa Hospital, Mount Isa
Members present	Dr Jeannette Young, Chief Health Officer, Department of Health – Chair Joyce McCulloch, Mayor, Mount Isa City Council Paul Woodhouse, Chair North West Hospital and Health Service (NWHHS) Katherine du Preez, Deputy Director General, Mine Safety and Health, Department of Natural Resources and Mines Tammy Williams, Interim Principal Commissioner, Queensland Family and Child Commission Julie Harcourt, Queensland Family and Child Commission Maryann Wipaki, Glencore Assets Australia Dean Ellwood, Deputy Director General, Department of Environment and Heritage Protection
Apologies	Sophie Dwyer, Executive Director, Health Protection Branch, Department of Health Honourable Bob Katter, Federal Member for Kennedy Rob Katter, State Member for Mount Isa Greg Ashe, Chief Operating Officer Zinc, Glencore Assets Australia
Guests	Michelle Garner, District Executive Director of Nursing, NWHHS David Wainwright, Director, Air Quality Sciences, Department of Science Information Technology and Innovation (DSITI) Lisa Davies Jones, Chief Executive Officer, NWHHS
Secretariat	Uma Rajappa, Director Environmental Hazards Unit, Department of Health – Secretary Toni Granville, Project Officer, Living with Lead Alliance (LWLA) – Minutes Secretary

AGENDA ITEM	DISCUSSION AND OUTCOME
Agenda item 1	**Welcome**
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Agenda item 2	Minutes of the previous meeting

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Agenda item 3	Business arising – Action Log

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Agenda item 4	s.73

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Agenda item 5	s.73

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Agenda item 6	Update - NWHHS Update – Lead Surveillance Program

Michelle Garner, District Executive Director of Nursing, provided the Committee with an update of the two testing programs for blood lead surveillance in Mount Isa. The two testing programs are QML's voluntary blood lead testing program and Mount Isa Hospital's routine child blood lead testing program.

Results from voluntary testing at QML show the geometric mean (GM) BLL is trending down to 2.5µg/dL, with the number of children being tested also reducing; in 2016 only 18 children were tested to 30 June.

The hospital testing program included all children that attend the hospital, wards and / or clinics. These tests use the residual blood that is available after other tests have been performed. Results show that the GM is also trending down, from 3.2µg/dL in 2015 down to 2.4µg/dL in 2016 with 114 children opportunistically tested in 2016.

The Committee was advised that the preparations for the PoCT program commenced in July 2016. A Project Manager was engaged to provide a start-up mechanism, including preparation of protocol, the procedures and training of staff.

Therapeutic Goods Administration, the national body for the approval of therapeutic goods has approved only one blood lead level PoCT unit which is LeadCare II Blood Lead Analyzer. Four (4) machines were delivered to NWHHS in September 2016.

The provision of PoCT service is resource intensive. The PoCT machine requires twice daily calibration and careful preparation of the child and the parent being tested (to prevent any inadvertent contamination). A protocol for the correct use of the machine including calibration, capillary testing procedure and referral guidelines has been developed and is with the public

health physician for review.

The PoCT for blood lead levels will be undertaken at routine 'Well Child Health Checks' completed at six (6), twelve (12), eighteen months (18) and two (2), three and half (3.5) and four (4) years. All 'Well Child Health Checks' have had to be adapted to incorporate PoCT for blood lead levels as part of the standard check. The PoCT for blood lead levels will be performed through the Maternal Child Youth Health Service NWHHS, and this service will provide the support and education to the partner organisations which include NWHHS Paediatric Outpatient clinics, Gidgee Healing and Sonic Health Plus. Service Level Agreements have been set up with the two (2) partnering non-government organisations (Gidgee Healing and Sonic Health Plus).

The NWHHS Community and Primary Healthcare database, Communicare, has been adapted for recording of results for data collection. The data will be available to the Public Health Unit for analysis.

Gidgee Healing and Sonic Health Plus - Mount Isa GP Super Clinic will provide data through their own electronic management systems, but will also have the option to access Communicare for recording purposes. Referral pathways have been developed for increased lead levels. These pathways are with the Director of Public Health Townsville HHS, to review and provide feedback on guidelines for reference ranges and notification.

Staff training to perform PoCT blood lead level testing and calibration of the LeadCare II machine has been completed with NWHHS Maternal Child Youth Health and Gidgee Healing staff. Training has commenced with NWHHS Paediatric Outpatient staff and Sonic Health Plus - Mount Isa GP Super Clinic.

Maternal Child Youth Health Service (NWHHS) has commenced an initial trial to inform future progress of the program. In the trial phase approximately seventeen (17) mothers have been asked to take part in the program. Sixteen (16) children have been tested. Of these sixteen, five (5) have tested higher than 5 micrograms per decilitre with highest being 7.2 micrograms per decilitre. These children have been referred to a General Practitioner for venous blood testing. The five (5) children who have tested high are known to the service and previously the guardian or parent was unwilling to engage in venous blood sampling for lead.

The project manager and NWHHS Community and Primary Health Care Team have commenced a communication and engagement strategy. This has included media releases, an Australian Broadcasting Corporation (ABC) radio interview and collaboration with Lead Alliance on brochures and posters. Meetings have also been convened with all key stakeholders.

The Committee noted the progress made in relation to the introduction of the PoCT and commended NWHHS for its efforts in the satisfactory introduction of the PoCt in Mount Isa.
It was also noted that Jamie's Ministry of Food Australia van was scheduled to visit Mount Isa in March 2017. The Chair proposed that the PoCT testing could be offered at the site of the Jamie's Ministry of Food Australia van as this program would attract mothers of young children.

Outcome:

- The Committee noted the update and commended the progress made by NWHHS in the introduction of PoCT in Mount Isa.
- The PoCT testing could be temporarily offered at the site of the Jamie's Ministry of Food Australia van.

Agenda item 7	s.73

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Agenda item 8	s.73

s.73

Agenda item 9	MLHMC Other Business

Next meeting scheduled for February 2017

Final 2016 Report (March):

Testing Mount Isa Blood Lead Levels in Children less than 5 Years of Age

Final 2016 data – 14 March 2017

Geometric means have been calculated on QML and SNP data and Mount Isa Hospital ward and clinic data (Queensland Health Laboratories) for Mount Isa Blood Lead Levels in Children less than 5 Years of Age.

year	Total under 5 years children tested	All under 5 years geometric mean (GM)	Indigenous‡ under 5 years geometric mean	% BLL ≥ 5 µg/dL overall (total number in brackets) *	% BLL ≥ 10 µg/dL overall (total number in brackets)
2006-7 **survey**	400	5 µg/dL	7 µg/dL	-	11% (45)
2010 **survey**	167	4.3 µg/dL	5.4 µg/dL	-	5% (8)
QML lab 2010	182	3.6 µg/dL		28% (50)	-
QML lab 2011	96	3.3 µg/dL		21% (20)	-
QML lab 2012	43	3.2 µg/dL		21% (9)	-
QML lab 2013	83	3.2 µg/dL		23% (19)	2.4% (2)
QML lab 2014	98	2.6 µg/dL	3.0 µg/dL‡	11% (11)	0% (0)
Mount Isa Hospital 2014 (***Aug-Dec***)	57	3.2 µg/dL	3.5 µg/dL‡	16% (9)	2% (1)
QML and other private lab testing 2015	49	3.0 µg /dL	3.9 µg /dL‡	14% (7)	6% (3)
Mount Isa Hospital*** 2015	101	3.2 µg /dL	3.7 µg /dL‡	16% (16)	2% (2)
The Blood Lead Level (BLL) notification level dropped from ≥ 10 µg/dL to BLL ≥ 5 µg/dL on 1 January 2016					
QML and other private lab testing F 2016	45	3.0 µg /dL†	3.8 µg /dL†‡ ***	20% (9)	4% (2)
Mount Isa Hospital F 2016**	125	2.2 µg /dL†	2.7 µg /dL†	17% (21)	2% (3)
2016 All Venous BLL F (BLL ≥ 5 µg/dL)	170	2.3 µg /dL†	2.8 µg /dL‡†	18% (30)	3% (5)

‡ Indigenous status is not always available * Includes any ≥ 10 µg/dL ** Program of routine testing & surveillance using residual blood if available after other tests (any department), new Notifications

*** Data consists of very small number of children F Final – all 2016 test results † Lowest limit of truncation moved to 1.04 µg /dL in line with an analysis in July 2015 – June 2016

Important:

Use caution when comparing data, the analysis data prior to June 2016 was truncated at 2.1 µg /dL as the lowest level for laboratory reporting. This lowest limit of truncation moved to 1.04 µg /dL in line with an analysis conducted from July 2015 to June 2016. This means that the geometric mean cannot be lower than 1.04 µg /dL.

The original program involved voluntary free testing at QML lab and this was supplemented with two surveys (2006-7 & 2010). Routine (opportunistic) testing of residual blood, collected for other tests at Mount Isa Hospital was initiated in late 2014. SNP are also conducting lead testing in Mount Isa. As a private laboratory, the SNP data have been combined with the QML data. These programs, private laboratories and Mount Isa Hospital have different sampling methods and cannot be directly compared. They can give a rough indication of trends. The decrease in the numbers tested through private laboratories may be a result of increased testing of children through the Mount Isa Hospital.

Report of results of finger prick testing (which commenced September 2016) – Prepared by Department of Health based on data from NWHHS

Month	Children presented	Children tested *	Children greater than 5μ/dL BLL
September 2016	26	17	5
October 2016	52	33	11
November 2016	34	34	4
December 2016	20	20	4
January 2017	45	44	11
Total	**177**	**148**	**35**

* *Reasons for the difference in the number presented and number tested are due to child distress/uncooperative and parent declining.*

Testing has only commenced at NWHHS Child Health Services and Paediatric Outpatients

From: Morton Bell
To: CHO Admin; Sonya Bennett; Uma Rajappa; David Ward; Sophie Dwyer; Clive Paige; Jim Guthrie; Peter Bristow; Kieran Keyes; Lisa Davies-Jones; NWHHS Chair; Michelle Garner; Alan Sandford; Steven Donohue; Damien Farrington; Jan Humphreys; Irene Jacovos; Ryan Groube; Anna Baccari; Michelle Newman
Subject: Summary of Final 2016 Blood Lead Levels in Mt Isa Children Under 5 Years of Age
Date: Thursday, 16 March 2017 9:55:59 AM
Attachments: Summary of Final 2016 Blood Lead Levels in Mt Isa Children Under 5 Years of Age.doc

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Good morning,

The 2016 Mount Isa Blood Lead analysis is complete, the first page summary is below:

The differences from the interim update table to the final table are:

1. **Number of children tested:**
   - 5 more private laboratory results (from 40 to 45 results)
   - 4 less Mount Isa Hospital results (from 129 to 125 results)
   - Total number of results went from 169 to 170 for full year 2016

2. **Geometric mean changes:**
   - The private laboratory all children geometric mean dropped 0.1 µg /dL (from 3.1 to 3.0 µg /dL)
   - The all children geometric mean dropped 0.1 µg /dL (from 2.4 to 2.3 µg /dL)
   - The Private laboratory Indigenous geometric mean rose 0.1 µg /dL (from 3.7 to 3.8 µg /dL) – This is a ***very small cohort*** of 8 children
   - The Government (MI Hospital) laboratory Indigenous children geometric mean dropped 0.1 µg /dL (from 2.8 to 2.7 µg /dL)
   - The all Indigenous children geometric mean dropped 0.1 µg /dL (from 2.9 to 2.8 µg /dL)

3. **Notifications:**
   - The number of results ≥ 5 µg /dL did not change (total number of notifications remained at 30)

In the end the adjustments have been minimal.

Until we had received the private laboratory testing data, it was not possible to know the number of tests performed nor the impact this data would have on the final results.

Regards,

Morton

Morton Bell
Senior Epidemiologist
Townsville Public Health Unit
Townsville Hospital and Health Service
242 Walker St., Townsville Q. 4810
Ph: 07 - 44336929
Fax: 07 - 44336901
Postal: Locked Mail Bag 4016 Townsville Q. 4810
Email: morton.bell@health.qld.gov.au

Summary of Final 2016 Blood Lead Levels in Mt Isa Children Under 5 Years of Age

For the final blood lead level analysis for 2016, there were 170 eligible Mount Isa children who had suitable venous blood specimens collected.

The preliminary and final summary tables for the 2016 full year blood lead level analysis are attached. As stated in the 2016 interim update table provided in February this year, not all blood lead data had been received or cleaned.

The differences from the interim update table to the final table are:

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3. **Notifications:**
   - The number of results ≥ 5 µg /dL did not change (total number of notifications remained at 30)

In the end the adjustments have been minimal.

We have had good support from the private laboratories, within the limitations of their data sharing criteria. Until we had received the private laboratory testing data, it was not possible to know the number of tests performed nor the impact this data would have on the final results.

It would appear that we have established a sound relationship with the private laboratories; however, the reporting process requires that we be forewarned of the reporting time frames as the private laboratories data requests have a lag time for the provision of the data.

The capture of AUSLAB notifications and QML data results on NOCS has improved markedly.

Prepared by:

Morton Bell
Senior Epidemiologist
Townsville Public Health Unit
Townsville Hospital and Health Service
Townsville - 15 March 2017

Preliminary (February) Update:

Testing Mount Isa Blood Lead Levels in Children less than 5 Years of Age

Update - February 2017

Geometric means have been calculated on QML and SNP data and Mount Isa Hospital ward and clinic data (Queensland Health Laboratories) for Mount Isa Blood Lead Levels in Children less than 5 Years of Age.

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The Blood Lead Level (BLL) notification level dropped from ≥ 10 µg/dL to BLL ≥ 5 µg/dL on 1 January 2016					
QML and other Private lab testing ᴾ 2016	40	3.1 µg /dL†	3.7 µg /dL†‡ ***	23% (9)	5% (2)
Mount Isa Hospital 2016**	129	2.2 µg /dL†	2.8 µg /dL†	16% (21)	2% (3)
2016 All Venous BLL (BLL ≥ 5 µg/dL)	169	2.4 µg /dL†	2.9 µg /dL‡†	18% (30)	3% (5)

‡ Indigenous status is not always available * Includes any ≥ 10 µg/dL ** Program of routine testing & surveillance using residual blood if available after other tests (any department)

*** Data consists of very small number of children new Notifications

ᴾ Presumptive – not all test results may have been sourced at this time † Lowest limit of truncation moved to 1.04 µg /dL in line with an analysis in July 2015 – June 2016

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From: Clive Paige
To: David Ward
Subject: FW: INFO: Summary of Final 2016 Blood Lead Levels in Mt Isa Children Under 5 Years of Age
Date: Thursday, 16 March 2017 12:46:24 PM

From: HProt.corro
Sent: Thursday, 16 March 2017 12:34 PM
To: Uma Rajappa; Clive Paige
Cc: environmentalhazards
Subject: FW: INFO: Summary of Final 2016 Blood Lead Levels in Mt Isa Children Under 5 Years of Age

Hi Team

Please see Dr Young's response.

Thanks

Jan Mycoe

From: Jeannette Young
Sent: Thursday, 16 March 2017 12:05 PM
To: CHO CHO
Cc: HProt.corro; Suzanne Huxley; Uma Rajappa
Subject: Re: INFO: Summary of Final 2016 Blood Lead Levels in Mt Isa Children Under 5 Years of Age

That is great thank you. We can now discuss at the next mt isa lead management committee

Sent from my iPad

On 16 Mar 2017, at 1:02 PM, CHO CHO <CHO_CHO@health.qld.gov.au> wrote:

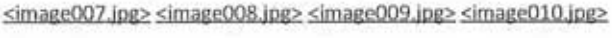
> HI HPROT
>
> Please see below information from Townsville.
>
> Thanks
> Jacqui

Prevention Division Correspondence Team

Donna Wrembeck, Senior Briefings Officer – 3239 0865
Jacqui Collard, Briefings Officer – 3234 0965
Jess Burns, Briefings Officer – 3008 7386
Mel Caves, Briefings Officer – 3227 6617

Office of The Chief Health Officer and Deputy Director-General, Prevention Division, Department of Health

a: 147-163 Charlotte Street, Brisbane QLD 4000
w: Queensland Health | **e:** CHO_CHO@health.qld.gov.au



Queensland's health vision | *By 2026 Queenslanders will be among the healthiest people in the world.*

Queensland Health acknowledges the Traditional Owners of the land, and pays respect to Elders past, present and future.

From: CHO_Admin
Sent: Thursday, 16 March 2017 10:27 AM
To: CHO CHO
Subject: FW: Summary of Final 2016 Blood Lead Levels in Mt Isa Children Under 5 Years of Age

Hi CHO CHO

Leoni has let me know this one is for you.

RS

<image001.gif> Rhonda Safi

Team Leader
Office of the Chief Health Officer and Deputy Director-General, **Department of Health**
p: 07 3405 6093
a: 147-163 Charlotte Street, Brisbane QLD 4000
w: Queensland Health | **e:** rhonda.safi@health.qld.gov.au

<image002.jpg> <image003.jpg> <image004.jpg> <image005.jpg>

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From: Morton Bell
Sent: Thursday, 16 March 2017 9:56 AM
To: CHO_Admin; Sonya Bennett; Uma Rajappa; David Ward; Sophie Dwyer; Clive Paige; Jim Guthrie; Peter Bristow; Kieran Keyes; Lisa Davies-Jones; NWHHS Chair; Michelle Garner; Alan Sandford; Steven Donohue; Damien Farrington; Jan Humphreys; Irene Jacovos; Ryan Groube; Anna Baccari; Michelle Newman
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Regards,

Morton

Morton Bell
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Email: morton.bell@health.qld.gov.au

<Summary of Final 2016 Blood Lead Levels in Mt Isa Children Under 5 Years of Age.doc>

From: Uma Rajappa
To: David Ward; Clive Paige; Rizsa Albarracin
Subject: Fw: Ngukutharti Children and Family Centre Green & Sullivan
Date: Monday, 20 March 2017 2:42:43 PM
Attachments: image001.png
image002.png
image003.png
image004.png
Importance: High

Sent from my BlackBerry 10 smartphone on the Telstra Mobile network.

From: The Lead Alliance <admin@leadalliance.com.au>
Sent: Monday, 20 March 2017 2:37 PM
To: Uma Rajappa; Michelle Garner
Cc: NWHHS Chair; rob.katter@parliament.qld.gov.au; Mayor Joyce McCulloch; Greg Ashe Glencore COO Zinc
Subject: RE: Ngukutharti Children and Family Centre - Green & Sullivan

Hi Uma & Michelle,
To let you know I had a meeting this afternoon with Tracey Groom, Manager Ngukutharti Children & Family Centre. Tracey informed me that there were over 30 parents with children that attended the centre for the POCT on Friday, s.73 s.73 . The researchers ran out of time and did not test the remaining children, s.73 s.73 .
There were several children that had elevated BLL, I do not have access to figures and levels. Tracey is aware of a couple that had elevated levels and will follow up with the parents when they return to the centre to see if they have seen their GP for follow up testing.

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I will do up a full report of this POCT for the MILHMC meeting next month.

Kind regards
Toni

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s.73

Mount Isa Lead Health Management Committee (MLHMC)

10 April 2017 **Out of Session Agenda Paper**

Title: Mount Isa Blood Lead Research Study at the Ngukuthati Children & Family Centre

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Based on the information received by the Lead Alliance, there were 30 parents with children that attended the blood testing on Friday, 17 March 2017, which was undertaken by Dr Marquez from Sonic Health Clinic. Only 13 out of 30 clients were tested. s.73 s.73 . Whilst no specific details were provided, the Centre manager informed the Lead Alliance that there were a couple of children that had elevated blood lead levels. s.73 s.73

s.73

s.73

s.73

Prepared by:	Mount Isa Lead Health Management Committee Secretariat (Health Protection Branch)
Contact officer:	Uma Rajappa – Director Environmental Hazards Unit
E-mail:	Uma.Rajappa@health.qld.gov.au
Phone No:	3328 9338
Date	12 April 2017

Department of Health

Media response

Queensland Government

Enquiry received: Tuesday 18 April 2017

Journalist: James Purtill

Organisation: *Triple J 'Hack' program*

Contact number/s: s.73

Contact email: s.73

Deadline: 3pm Tuesday 18 April 2017

Subject: Lead testing in Mt Isa

Questions:

Thanks for getting back to us. A written response would be fine, thanks.

One part of the story is about rates of lead testing in Mount Isa. According to the Lead Alliance's most recent report, 150 children under five were tested in 2015. According to the 2011 Census, there are 1925 children under five in Mount Isa. We can conclude the rate of lead testing of children under five in Mount Isa is under 10 per cent.

This compares with more than 50 per cent in Port Pirie, and 80 per cent in Broken Hill – the two other towns that have lead smelters and public lead testing programs.

For the written response:

1. Is there a need to improve the rate of blood lead testing in Mount Isa?
2. How is QH looking to improve the rate of blood lead testing in Mount Isa to levels similar to Port Pirie or Broken Hill?
3. Of the 150 tested in 2015, what proportion were Indigenous?
4. What was the number tested in 2016?

We would appreciate a response by 3pm Tuesday April 18.

Response:

Please attribute the following to Dr Mark Elcock, Chief Health Officer and Acting Deputy Director-General, Prevention Division

Mount Isa remains a safe place to live. However, it is important to ensure that the community health risks from the harmful impact of lead in the environment are effectively controlled.

This is particularly the case for young children under five years who are most vulnerable to lead health risks.

The management of the health impacts of environmental lead in Mount Isa is a priority for the Queensland Government.

Department of Health

Media response

Queensland Government

There are a number of blood lead testing programs already operating in Mount Isa. These include free testing by QML pathology and opportunistic testing of young children at Mount Isa Hospital as well as the recently introduced Point of Care Testing (POCT) by North West Hospital and Health Services.

In September 2016, POCT involving quick and easy finger prick testing of young children was introduced in Mount Isa to supplement venous blood lead testing (taking blood from the vein).

This form of testing is currently being offered at Child Health Services and Paediatrics Outpatients. POCT is offered at the same time as scheduled immunisations i.e. at six months, 12 months, 18 months and three-and-half years, but all children can be tested up to five years of age.

Exact numbers or proportion of the children tested who were Indigenous is not known. This is because this information is provided on a voluntary basis by participants offering to be tested.

In 2016 a total of 170 young children were tested via venous testing. The blood lead testing programs in Mount Isa indicate average blood lead levels recorded in children under five have gradually declined since the initial children's blood lead level survey in 2006-2007. Despite this downward trend, Queensland Health is committed to improving the rate of blood lead testing in Mount Isa including a focus on encouraging participation of young Indigenous children in blood lead testing programs. This focus includes follow-up of those with elevated blood lead levels.

While the environmental lead levels in Mount Isa, Broken Hill and Port Pirie are different, lead health management strategies are consistent. All of the three sites focus on reducing environmental lead levels, community lead health education and awareness strategies complemented by blood lead testing programs.

To ensure ongoing protection of young children from environmental lead exposure, Queensland Health is seeking to expand the POCT to other locations to maximise participation of young children in Mount Isa.

Background (not attributable to Queensland Health)

Further, a wide range of initiatives have been developed to promote living safely in a lead environment such as Mount Isa.

These include greening Mount Isa, promotional activities at local primary and childcare centres/kindergarten and development of guidance material.

The Lead Alliance was established in 2008 and has been instrumental in community education and awareness programs to protect from lead health risks.

Further information about the Lead Alliance is available at http://www.leadalliance.com.au/

ENDS

Media contact: 3234 1439

1. **Is there a need to improve the rate of blood lead testing in Mount Isa?**

   Mount Isa remains a safe place in which to live, however, it is important to ensure that the community health risks from the harmful impact of lead in the environment are effectively controlled. This is particularly the case for young children under 5 years who are most vulnerable to lead health risks.

   The management of the health impacts of environmental lead in Mount Isa is a priority for the state government.

   There are a number of blood lead testing programs already operating in Mount Isa. These include free testing by QML pathology and opportunistic testing of young children at Mount Isa Hospital as well as the recently introduced Point of Care Testing (POCT) by North West Hospital and Health Services.

   In September 2016, POCT involving quick and easy finger prick testing of young children was introduced in Mount Isa to supplement venous blood lead testing (taking blood from the vein). This form of testing is currently being offered at Child Health Services and Paediatrics Outpatients. POCT is offered at the same time as scheduled immunisations i.e. at 6 months, 12 months, 18 months and 3 and half years, but all children can be tested up to five years of age.

   The blood lead testing programs in Mount Isa indicate average blood lead levels recorded in children under five have gradually declined since the initial children's blood lead level survey in 2006-2007. Despite this downward trend, Queensland Health is committed to improving the rate of blood lead testing in Mount Isa.

2. **How is QH looking to improve the rate of blood lead testing in Mount Isa to levels similar to Port Pirie or Broken Hill?**

   While the environmental lead levels in Mount Isa, Broken Hill and Port Pirie are different, lead health management strategies are consistent. All of the three sites focus on reducing environmental lead levels, community lead health education and awareness strategies complemented by blood lead testing programs.

   To ensure ongoing protection of young children from environmental lead exposure, Queensland Health is seeking to expand the POCT to other locations such as Gidgee Healing, Sonic Health Plus- Mount Isa GP Super Clinic and other locations to maximise participation of young children in Mount Isa.

   Further, a wide range of initiatives have been developed to promote living safely in a lead environment such as Mount Isa. These include greening Mount Isa, promotional activities at local primary and childcare centres/kindergarten and development of guidance material. The Lead Alliance was established in 2008 and has been instrumental in community education and awareness programs to protect from lead health risks. Further information about the Lead Alliance is available at http://www.leadalliance.com.au/

3. **Of the 150 tested in 2015, what proportion were Indigenous?**

Exact numbers or proportion of the 150 children that were tested who were Indigenous is not known. This is because this information is provided on a voluntary basis by participants offering to be tested.

Queensland Health is continuing to focus efforts in encouraging participation of young Indigenous children in blood lead testing programs including follow-up of those with elevated blood lead levels.

4. **What was the number tested in 2016?**

In 2016 a total of 170 young children were tested via venous testing. Of the 170 children tested, the average blood lead level of all children tested was 2.3 µg/dL .

Pathology Queensland
K Ungerer - May 3, 2017

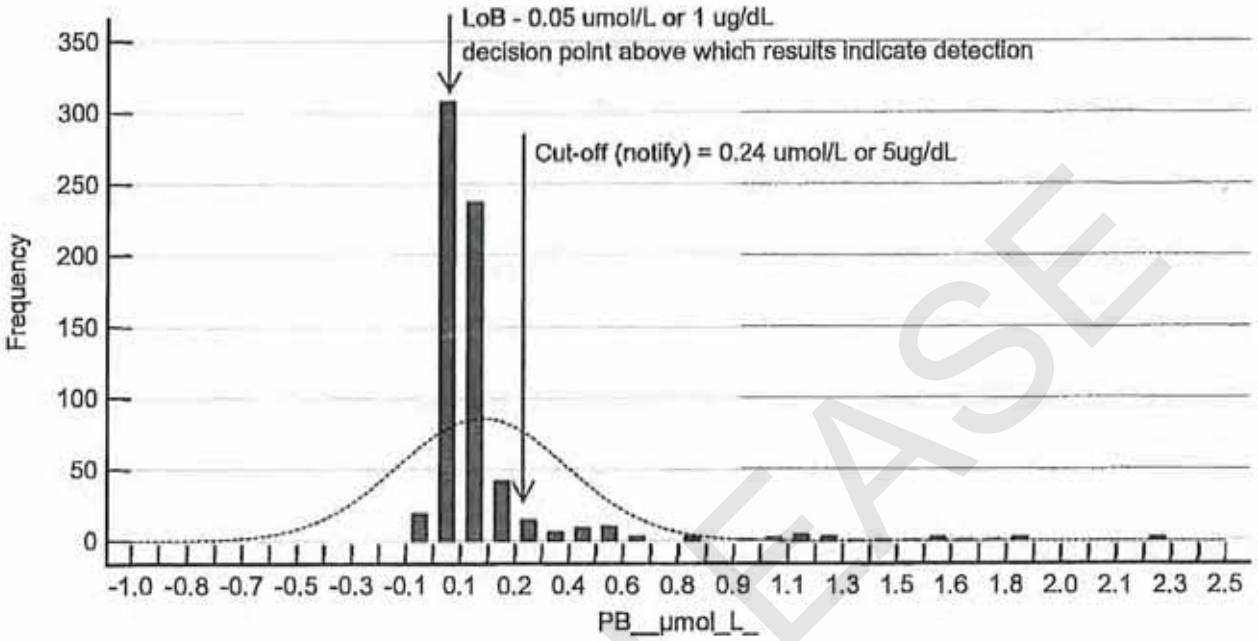

Figure:
Blood lead concentrations in children 16 y and younger performed in the Department of Chemical Pathology from 04-01-2016 to 08-04-2017. Total number of tests = 673.

Pathology Queensland
K Ungerer - May 3, 2017

Summary statistics

Variable	PB__µmol_L_
Sample size	673
Lowest value	-0.06000
Highest value	2.3100
Arithmetic mean	0.1179
95% CI for the mean	0.09723 to 0.1386
Median	0.05000
95% CI for the median	0.04000 to 0.05000
Variance	0.07472
Standard deviation	0.2733
Relative standard deviation	2.3180 (231.80%)
Standard error of the mean	0.01054
Coefficient of Skewness	4.7408 (P<0.0001)
Coefficient of Kurtosis	25.7923 (P<0.0001)
D'Agostino-Pearson test for Normal distribution	reject Normality (P<0.0001)

Percentiles		95% Confidence interval
2.5	-0.04000	-0.04000 to -0.03000
5	-0.02000	-0.03000 to -0.02000
10	-0.01000	-0.02000 to 0.0000
25	0.02000	0.01000 to 0.02000
75	0.1000	0.09000 to 0.1100
90	0.2220	0.1600 to 0.3111
95	0.5000	0.4000 to 0.7991
97.5	1.1335	0.6329 to 1.4148

Blood lead concentrations in children 16 y and younger performed in the Department of Chemical Pathology from 04-01-2016 to 08-04-2017.

From: Cushla Coffey
To: David Ward
Subject: Capillary testing results
Date: Friday, 23 June 2017 3:45:00 PM
Attachments: image001.gif
image002.jpg
image003.jpg
image004.jpg
image005.jpg
image007.png
image009.png

Dear David,

The preliminary results for the capillary testing are summarised below.

- Between September and May 2017, there were 484 capillary blood tests were undertaken or attempted to be undertaken on Mount Isa children. This represents 26% of the Mount Isa population under five years;
- Of the attempted tests, 438/471 (93%) produced a blood lead result;
- Of the samples where a lead result is available, 26% percent of the tests were higher than the notifiable level;
- Indigenous children represented 16% of the children tested. However, the percentage of results above the notifiable level (38%) and geometric mean was higher (4.6 µg/dl versus 4.2 µg/dl) than for non-Indigenous children.

In order to reach the target of 80%, approximately 1,000 more children need to be tested. It is unclear why more Mount Isa children have not been tested. The Alliance appears to have strong community support, testing is free (minimising accessibility barrier), integrated into immunisation appointments etc. Research indicates that additional strategies to optimise participation include reporting regularly on annual screening rates and undertaking a formal evaluation where evidence is lacking. It would be an interested mini project to undertake a basic evaluation of why more children have not been tested.

See below for the results table. Please note this is a preliminary analysis only. It is unable to be determined if there are repeat results for individuals included. Including individual identifiers (e.g. ID number names) would overcome this. In addition to names can you please also ask for the sex variable in the next set of data?

I am leaving early today however can talk further regarding this on Monday.

Regards,

Queensland Government

Cushla Coffey

Master of Philosophy (Applied Epidemiology) Scholar
Health Protection Branch, **Department of Health**
p: 07 33289308 | **m:** s.73
a: 3/15 Butterfield Street Herston QLD 4006
w: Queensland Health | **e:** cushla.coffey@health.qld.gov.au

Dear David,

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Table 1: Blood level results (ug/dL) in all children, 2016–2017

Blood level µg/dl	Total	non-Indigenous	Indigenous	Not stated
<5 µg/dl	325 (74%)	249 (76%)	46 (62%)	30 (81%)
5+ µg/dl	112 (26%)	77 (24%)	28 (38%)	7 (19%)

Table 2: Geometric mean blood level (µg/dl/dL) in children by age, 2016–2017

	Total	non-Indigenous	Indigenous	Not stated
0-4 years	4.3 (438)	4.2 (327)	4.6 (74)	4.0 (37)
Age group				
0	3.8 (124)	3.9 (90)	4.0 (21)	3.7 (13)
1	4.5 (195)	4.5 (152)	4.5 (26)	4.4 (17)
2	4.2 (30)	4.0 (20)	4.8 (7)	4.5 (3)
3	4.5 (39)	4.3 (28)	5.7 (9)	3.3 (2)
4	4.2 (50)	4.1 (37)	4.9 (11)	3.4 (2)
5-9	3.3 (11)	3.3 (8)	3.3 (2)	3.3 (1)

Note: Number of children in brackets

I am leaving early today however can talk further regarding this on Monday.

Regards,

Queensland Government

Cushla Coffey

Master of Philosophy (Applied Epidemiology) Scholar

Health Protection Branch, **Department of Health**

p: 07 33289308 | **m:** s.73

a: 3/15 Butterfield Street Herston QLD 4006

w: Queensland Health | **e:** cushla.coffey@health.qld.gov.au

Evaluation of the acceptability and accessibility of the Mount Isa Capillary Blood Lead Screening Program

The Capillary Blood Lead Screening Program in Mount Isa, Queensland is systematic, active surveillance of children aged less than five years at-risk of elevated blood lead levels (BLL). Screening at-risk populations is an important component of lead control programs to detect and support individuals who may benefit from advice and interventions. Linking BLL screening with well-accepted mainstream child health services has been shown to be an effective strategy for improving participation in blood lead screening programs.

Between 1 September 2016 and 30 June 2017 there were 549 children aged less than five years who presented for capillary blood lead testing in Mount Isa. This represents approximately 29% of the eligible 1,878 Mount Isa population aged less than five years (ABS 2015 ERP). With approximately 70% of eligible children not attending capillary blood lead testing to date, there is a need to gain a better understanding of who are not attending and the reasons for non-attendance. There are various community- and family-level factors which influence the decision by parents and carers to undertake BLL screening of children in mining communities.

An evaluation of the Capillary Blood Lead Screening Program will be undertaken by the Health Protection Branch, Queensland Health in partnership with key stakeholders, including members of the Mount Isa Lead Health Management Committee. The evaluation strategy will employ both qualitative and quantitative methods. Two levels of semi-structured interviews will occur including interactor and participant interviews. Interactor interviews will include those individuals who have interaction with the Mount Isa community and perform capillary blood lead screening, and participant interview will include parents and carers of children in the target group who have and have not participated in screening. Quantitative analysis will be undertaken using existing data. Preliminary analysis will occur in August 2017 in Mount Isa.

Screening programs must be both acceptable and accessible to the community. The accessibility and acceptability of the Capillary Blood Lead Screening Program will be evaluated to guide future strategies to identify at-risk children in Mount Isa and formulate recommendations to improve participation rates.

Data/information request for Mt Isa Lead Management Committee

Analysis 7 July 2017

Mount Isa Capillary Testing Program: Results Sept 2016 – 30 June 2017

Table: Number of children in Mount Isa who presented and tested for elevated blood lead levels (BLL) using capillary blood lead fingerstick test, September 2016 – 30 June 2017
Data supplied North West Hospital and Health Service 6 July 2017

Date BLL tested	All children			Children aged less than 5 years			Children aged 5 years and over		
	Children presented	Children tested *	Children ≥ 5µ/dL BLL	Children presented	Children tested *	Children ≥ 5µ/dL BLL	Children presented	Children tested *	Children ≥ 5µ/dL BLL
Sep-16	26	17	6	25	16	6	1	1	0
Oct-16	53	33	16	49	30	16	4	3	0
Nov-16	34	34	7	34	34	7	0	0	0
Dec-16	21	21	5	20	20	5	1	1	0
Jan-17	45	44	11	44	43	11	1	1	0
Feb-17	86	86	14	84	84	14	2	2	0
Mar-17	68	67	12	66	65	12	2	2	0
Apr-17	68	67	22	67	66	22	1	1	0
May-17	77	74	18	77	74	18	0	0	0
Jun-17	71	71	20	70	70	20	1	1	0
Total	549	514	131	536	502	131	13	12	0

* Reasons for the difference between the number of children who presented for testing and those who were tested included the sample not collected due to child distress, test declined by parent/guardian and others or issues with the sample collected.

Queensland Government

Mount Isa Lead Health Management Committee

Minutes of Meeting

Date	3.00 pm – 5.00 pm: Monday 10 July 2017
Location	Level 3, Mount Isa Hospital, Mount Isa
Members present	Dr Jeannette Young, Chief Health Officer, Department of Health - Chair Joyce McCulloch, Mayor, Mount Isa City Council Honourable Rob Katter, State Member for Mount Isa Paul Woodhouse, Chair, North West Hospital and Health Service (NWHHS) Katherine du Preez, Commissioner, Mine Safety and Health, Department of Natural Resources and Mines Julie Harcourt, Manager, Family and Child Research, Queensland Family and Child Commission (QFCC) Greg Ashe, Chief Operating Officer Zinc, Glencore Assets Australia Dean Ellwood, Deputy Director-General, Department of Environment and Heritage Protection (T) Lisa Davies-Jones, Chief Executive Officer, North West Hospital and Health Service(T) (T)-Teleconferenced
Apologies	Honourable Bob Katter, Federal Member for Kennedy Sophie Dwyer, Executive Director, Health Protection Branch, Department of Health Tammy Williams, Principal Commissioner, Queensland Family and Child Commission
Guests	Joanne Shaw, Nursing Director Community & Primary Health Care, NWHHS Kerri O'Connor, Nurse Unit Manager Child Health, NWHHS Maryann Wipaki, Glencore Assets Australia
Secretariat	Uma Rajappa, Director, Environmental Hazards Unit, Department of Health – Secretary Toni Granville, Project Officer, Living with Lead Alliance (LWLA) – Minutes Secretary

AGENDA ITEM	DISCUSSION AND OUTCOME
Agenda item 1	**Welcome**
s.73	
Agenda item 2	**Minutes of the previous meeting**
The Committee reviewed the minutes of the previous meeting held 30 September 2016, and	

endorsed the minutes as an accurate and true account of discussions at the meeting. The Committee noted that Tammy Williams is now the Principal Commissioner and not Interim.

Agenda item 3	**Business arising – Action Log**

The Committee reviewed the Action Log arising from the previous meeting and noted the progress of the pending actions as completed.

Agenda item 4	s.73

s.73

s.73

Agenda item 5	Update - NWHHS Update – Lead Surveillance Program

Kerri O'Connor, Nurse Unit Manager Child Health and Joanne Shaw, Nursing Director Community & Primary Health Care provided an update of the testing programs for blood lead surveillance in Mount Isa.

Point of Care Testing

The number of children tested at Maternal, Child Youth & Health Service from September 2016 to June 2017 is 543, of which 111 children had blood lead levels between 5 and 10µg/dL (micrograms per decilitre), 23 children greater than 10µg/dL and 77 children were Indigenous.

QML Voluntary Testing

The geometric mean (GM) BLL is trending down to 3µg/dL. The number of children tested was 45 in 2016 and there were 9 children from this testing program that recorded an elevated BLL result (≥5 µg/dL) of which 2 children were ≥ 10 µg/dL.

Hospital Testing Program

These tests use the residual blood that is available after other tests have been performed. Results show that the GM is also trending down to 2.2µg/dL with 125 children opportunistically tested throughout 2016. There were 21 children from this testing program that recorded an elevated BLL result (≥5 µg/dL) of which 3 children were ≥ 10 µg/dL.

Overall Results 2016

Blood lead testing from these programs showed the GM for children less than five years of age trending down from the 2006/7 blood lead survey to 2.3µg/dL in 2017. A total of 170

children were tested in 2016, of which 30 children recorded an elevated BLL result (≥5 µg/dL) and 5 children were ≥ 10 µg/dL.

The Committee noted that its strategy to introduce the POCT in Mount Isa was working and yielding results. It also noted that the POCT program may need to be evaluated to assess barriers and opportunities to increasing the participation in the program. The Department of Health is actively looking at this project.

Outcome:

The Committee noted the update and the progress made by NWHHS in conducting the POCT in Mount Isa and commended the significant increase in the number of children tested at POCT centres.

Agenda item 6	s.73

s.73

s.73

Agenda item 8	s.73

s.73

s.73

Agenda item 9	MLHMC Other Business

s.73

From: Clive Paige
To: David Ward
Subject: FW: Mount Isa High lead children - likely source paint
Date: Tuesday, 12 September 2017 10:52:20 AM
Attachments: image001.gif
image002.jpg
image003.jpg
image004.jpg
image005.jpg

From: Uma Rajappa
Sent: Friday, 8 September 2017 6:12 PM
To: Clive Paige
Subject: Fwd: Mount Isa High lead children - likely source paint

This was not picked up in your review?

Sent from my iPhone

Begin forwarded message:

> **From:** Sophie Dwyer <Sophie.Dwyer@health.qld.gov.au>
> **Date:** 8 September 2017 at 4:38:36 pm AEST
> **To:** Uma Rajappa <Uma.Rajappa@health.qld.gov.au>
> **Subject: Fwd: Mount Isa High lead children - likely source paint**
>
> FYI
> Can we please discuss on Monday
> Regards
> Sophie
>
> Sent from my iPhone
>
> Begin forwarded message:
>
> > **From:** Peter Aitken <Peter.Aitken2@health.qld.gov.au>
> > **Date:** 8 September 2017 at 2:14:50 pm AEST
> > **To:** Jeannette Young <Jeannette.Young@health.qld.gov.au>
> > **Cc:** Sophie Dwyer <Sophie.Dwyer@health.qld.gov.au>
> > **Subject: FW: Mount Isa High lead children - likely source paint**
> >
> > Hi
> > Just keeping you in the loop
> > Mark Little will catch up with Sophie on Monday
> > Cheers
> > Peter
> >
> > ---
> >
> > **From:** Mark Little
> > **Sent:** Friday, 8 September 2017 12:22 PM
> > **To:** Sophie Dwyer
> > **Cc:** Peter Aitken
> > **Subject:** FW: Mount Isa High lead children - likely source paint

Hi Sophie

Here are the details I have. s.47(3)(b) s.47(3)(b) As you can see it started with children having raised BLL, and the tested the paint for lead as the property had been recently repainted. The EHO then tested the paint chips.

For me you have a source, an opportunity for the children to ingest the chips/dust and evidence of lead in the children's bodies.

Michelle Newman is the EHO – Anna is excellent and has been there for years.

I will give you a call Monday.

Regards

Mark

From: Anna Baccari
Sent: Friday, 25 August 2017 5:07 PM
To: Mark Little
Cc: Steven Donohue; Michelle Newman; Cam Pope; projectofficer@livingwithlead.com.au
Subject: Mount Isa High lead children - likely source paint

Hi Mark,

Lovely to meet you today in Mt Isa. Thanks for talking to us.
I've CC'd our team in to the conversation.

We investigated a family July 2016. s.47(3)(b) s.47(3)(b) s.47(3)(b) = 11.6 µg/dL = 5.8 µg/dL

Michelle and I did a home visit as when I spoke to the parents on the phone they told me that the house was recently renovated and there was paint all though the yard which is mainly dirt.
House is rented out to s.47(3)(b)
House recently renovated by contract painters. The paint had been sanded back inside and outside. Outside yard was littered throughout with paint pieces. Dust all through house.
The s.47(3)(b) tested a paint chip with a kit from Bunnings and it tested positive for lead.
gave us samples from yard that were lying on the ground for us to have tested. Michelle can discuss this further with you.
This case was interesting in that it identified something we guessed

about the state of Housing in Isa but couldn't prove, as we were never given permission to collect samples from homes before.

We would appreciate you discussing this with Jeanette Young to see if she could perhaps have some sway in the matter.
It's well and good that we are doing so much work on Lead prevention in Isa, but we need to ensure that the housing for the target groups identified are also lead safe.
I look forward to hearing from you.

Kind regards,

Queensland Government

Anna Baccari
Acting Public Health Nurse
Mount Isa Public Health Unit, THHS, **Department of Health**
p: 07 4744 7186| **f:** 07 4744 7192
a: 26 – 28 Camooweal St, Mt Isa, QLD 4825
w: Queensland Health | **e:** anna.baccari@health.qld.gov.au

Queensland's health vision | *By 2026 Queenslanders will be among the healthiest people in the world.*

Queensland Health acknowledges the Traditional Owners of the land, and pays respect to Elders past, present and future.

International Journal of
Environmental Research and Public Health

MDPI

Article

A Pilot Study of Children's Blood Lead Levels in Mount Isa, Queensland

Donna Green [1,2,*], Marianne Sullivan [3], Nathan Cooper [1,2], Annika Dean [1] and Cielo Marquez [4]

1 Climate Change Research Centre, University of New South Wales, Kensington, Sydney, NSW 2052, Australia; n.cooper@unsw.edu.au (N.C.); annika.dean@unsw.edu.au (A.D.)
2 The ARC Centre of Excellence for Climate Systems Science, University of New South Wales, Kensington, Sydney, NSW 2052, Australia
3 Department of Public Health, William Paterson University, Wayne, NJ 07470, USA; sullivanm19@wpunj.edu
4 Sonic HealthPlus Super Clinic, Ryan Road, Mount Isa, QLD 4825, Australia; sky_cielo01@yahoo.com
* Correspondence: donna.green@unsw.edu.au; Tel.: +61-293-858-956

Received: 21 November 2017; Accepted: 8 December 2017; Published: 13 December 2017

Abstract: Mount Isa, Queensland, is one of three Australian cities with significant lead emissions due to nonferrous mining and smelting. Unlike the two other cities with lead mines or smelters, Mount Isa currently has no system of annual, systematic, community-wide blood lead level testing; and testing rates among Indigenous children are low. In previous screenings, this group of children has been shown to have higher average blood lead levels than non-Indigenous children. The first aim of this study was to assess whether parents and children would participate in less invasive, rapid point-of-care capillary testing. The second aim was to measure blood lead levels among a range of children that roughly reflected the percentage of the Indigenous/non-Indigenous population. This pilot study is based on a convenience sample of children between the ages of 12 and 83 months who were recruited to participate by staff at a Children and Family Centre. Over three half-days, 30 children were tested using capillary blood samples and the LeadCare II Point-of-Care testing system. Rapid point-of-care capillary testing was well tolerated by the children. Of 30 children tested, 40% (n = 12) had blood lead levels ≥5 µg/dL and 10% had levels ≥10 µg/dL. The highest blood lead level measured was 17.3 µg/dL. The percentage of children with blood lead levels ≥5 µg/dL was higher among Indigenous children compared to non-Indigenous (64.2% compared to 18.8%) as was the geometric mean level (6.5 (95% CI, 4.7, 9.2) versus 2.4 (95% CI, 1.8, 3.1)), a statistically significant difference. Though based on a small convenience sample, this study identified 12 children (40%) of the sample with blood lead levels ≥5 µg/dL. Due to historical and ongoing heavy metal emissions from mining and smelting in Mount Isa, we recommend a multi-component program of universal blood lead level testing, culturally appropriate follow-up and intervention for children who are identified with blood lead levels ≥5 µg/dL. We further recommend focused outreach and assistance to the Indigenous community, and further control of emissions and remediation of existing environmental lead contamination in children's play and residential areas.

Keywords: children's blood lead level; Mount Isa; lead smelter; Indigenous; LeadCare II Point of Care

1. Introduction

The city of Mount Isa is the most important industrial, commercial, and administrative centre in outback Queensland. Founded nearly a century ago on land belonging to the Kalkadoon Aboriginal tribe, the large inland city's economy depends on the employment and industry that exists around the lead and copper smelter, as well as several mines from which the ore that feeds the smelters is extracted. The city developed in proximity to the smelters and mines (see Figure 1). According to the National Pollution Inventory, the Mount Isa Mines emitted 81,000 kg of lead in 2013/2014 [1] and

18,000 kg in 2015/2016 as air releases [2]. The mining and smelting complex is also a significant source for other toxic metals [3].

Int. J. Environ. Res. Public Health **2017**, *14*, 1567 2 of 14

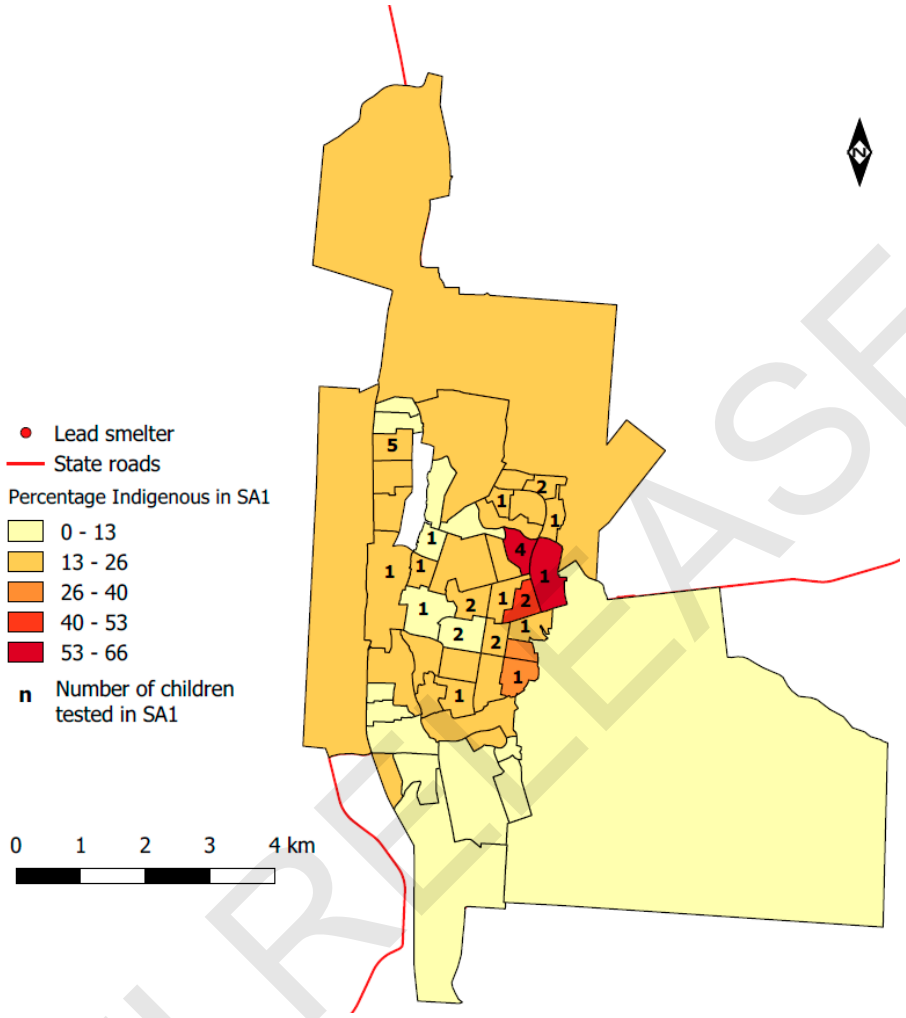

Figure 1. Map of Mount Isa with percentage of residents of Indigenous status and the number of children tested for blood lead levels in this study by Statistical Area 1 (SA1).

Figure 1. Map of Mount Isa with percentage of residents of Indigenous status and the number of children tested for blood lead levels in this study by Statistical Area 1 (SA1).

Starting with a handful of the early prospectors who found ore in 1923, Mount Isa has grown to a city of over 22,000 people, just over 8% of whom are children between the ages of 0 and 4, and 16% of whom are children aged 0–9 [4]. Mount Isa is an important service centre for several Indigenous communities spread across a very large region of the state. The city is situated on, and surrounded by, Indigenous land. As a result, there is a higher than average Indigenous population in the city compared to the rest of the state. Almost 20% of the city is Indigenous, compared to the state average of 5% [5,6]. The 'gap' for Indigenous people in terms of social, economic and health and well-being observed in Australia is clearly seen in Mount Isa [7]. For example, the difference between Indigenous and non-Indigenous median age at death is 13 years (53 and 66 years, respectively) [6].

Starting with a handful of the early prospectors who found ore in 1923, Mount Isa has grown to a city of over 22,000 people, just over 8% of whom are children between the ages of 0 and 4, and 16% of whom are children aged 0–9 [4]. Mount Isa is an important service centre for several Indigenous communities spread across a very large region of the state. The city is situated on, and surrounded by, Indigenous land. As a result, there is a higher than average Indigenous population in the city compared to the rest of the state. Almost 20% of the city is Indigenous, compared to the state average of 5% [5,6]. The 'gap' for Indigenous people in terms of social, economic and health and well-being observed in Australia is clearly seen in Mount Isa [7]. For example, the difference between Indigenous and non-Indigenous median age at death is 13 years (53 and 66 years, respectively) [6].

Childhood lead exposure in nonferrous mining and smelting communities worldwide has been an ongoing concern since its recognition by public health researchers in the early 1970s [8]. Decades of research have shown that children living near nonferrous mines and smelters are at risk of lead exposure and that proactive environmental and public health strategies are needed to monitor and reduce exposure [8–14]. Research in Mount Isa has documented elevated concentrations of lead in soil, dust and air as a result of mining and nonferrous metal smelting [15].

Childhood lead exposure in nonferrous mining and smelting communities worldwide has been an ongoing concern since its recognition by public health researchers in the early 1970s [8]. Decades of research have shown that children living near nonferrous mines and smelters are at risk of lead exposure and that proactive environmental and public health strategies are needed to monitor and reduce exposure [8–14]. Research in Mount Isa has documented elevated concentrations of lead in soil, dust and air as a result of mining and nonferrous metal smelting [15].

Both Australia and the US have lowered the blood lead level in children at which public health intervention should begin, from 10 to 5 ug/dL due to the accumulating body of scientific evidence on the effects of low-level lead [16,17]. A 2012 review of the scientific literature published by the US National

Both Australia and the US have lowered the blood lead level in children at which public health intervention should begin, from 10 to 5 μg/dL due to the accumulating body of scientific evidence on the effects of low-level lead [16,17]. A 2012 review of the scientific literature published by the US National Toxicology Program concluded that there is "sufficient evidence that blood Pb levels <10 and <5 μg/dL are associated with adverse health effects in children and adults" [18]. Health effects associated with childhood lead exposure at blood lead levels <5 μg/dL include "increased diagnosis of attention-related behavioral problems, greater incidence of problem behaviors, and decreased cognitive performance" [18]. At blood lead levels <10 μg/dL, lead exposure is associated with "delayed puberty and reduced postnatal growth" [18]. Among pregnant women, blood lead levels <5 μg/dL are associated with reduced fetal growth, and blood lead levels <10 μg/dL are associated with increased "spontaneous abortion and preterm birth" [18]. A recent US EPA Integrated Science Assessment determined that there is a causal relationship in children between lead exposure and IQ decrements and behavioral problems such as "attention and impulsivity and hyperactivity" [19].

There is a strong scientific consensus that exposure to low-level lead has serious adverse effects on children's health and development and should be prevented [17]. Nonferrous mines and smelters are well-recognised sources of exposure [20]. Preventing and ameliorating childhood lead exposure near these sources requires a strong regulatory framework and enforcement, monitoring and remediation of pollution, and universal blood lead testing of children to identify children in need of public health and/or medical intervention.

Concerns about childhood lead exposure in Mount Isa are long-standing. For example, a Queensland Health report noted that a government testing effort in 2006–2007 was conducted in response 'to concerns about community exposure to lead' [21]. Other concerns have centered on low rates of testing [22,23], high blood lead levels in some children [24], perceived 'complacency' of governmental health leadership [25], disproportionate impacts on Indigenous children [26], and the accuracy of health education information provided to the community and its cultural appropriateness [27].

Despite these concerns, a large-scale, annual, and systematic screening program has not been implemented in Mount Isa unlike in Port Pirie and Broken Hill. For example, in Broken Hill, blood lead levels are tested annually in a significant proportion of the 1–4 population, and the results are published in a detailed annual report. In 2015, 77% (n = 679) of all children ages 1–4 were screened in Broken Hill, and the screening rates for Indigenous children exceeded 100% (potentially due to under-identification of Indigenous status in the Census which serves as the denominator, or in-migration of Indigenous child residents) [28].

South Australia Health publishes detailed reports on a quarterly and annual basis on children's blood lead levels in Port Pirie. In 2016, 641 children under the age of 5 were tested, including 113 children 24 months of age [29]. Because of limitations of census data, it is not possible to determine precisely, but approximately two-thirds of the 0–4 population of Port Pirie is tested annually.

In Mount Isa, the proportion of children tested annually is much lower. For example, based on testing and denominator data provided by Queensland Health, in 2012, only 2.2% of the under 5 population was tested. The highest rate of testing was in 2014 (8%), and in the most recent data available (2015), 7.7% of Mount Isa children ages 1–4 were tested [22]. More recently, based on a media report, it appears that approximately 25% of Mount Isa children were tested in the past year; however, these data have not been publicly released [30].

The limited blood lead level data for Mount Isa children make it difficult to assess the dimensions of the problem. Despite this, the data show a persistence of blood lead levels ≥5 μg/dL in the community since the early 1990s when testing began. The earliest screening, conducted by the Mount Isa Mines between 1992 and 1994, was based on a non-random sample of 101 children. More than one-third (36.7%) of tested children had blood lead levels greater than 10 μg/dL, and 15.6% of children tested had blood lead levels greater than 15 μg/dL [31] as can be seen in Table 1.

Table 1. Reported blood lead levels for children in Mount Isa, 1992–2017.

	Geometric Mean Blood Lead Levels, 95% CI (1–4 Year Olds); Children and Family Centre Testing (This Study) Includes 1–6 Year Olds			Percent 5.0 µg/dL or Greater	Percent 10.0 µg/dL or Greater	Minimum Maximum Blood Lead Level Values
	All Children	Non-Indigenous	Indigenous	All Children	All Children	All Children
Mount Isa Mines 1992–1994	10.9 (unspecified if geometric or arithmetic mean) (n = 101)	NA	NA	NA	36.7%	2–29
Queensland Health 2006/2007	5.0 (4.7, 5.2) (n = 400)	4.5 (4.3–4.8) (n = 315)	7.0 (6.2, 8.0) (n = 83)	NA	11.3%	1.3–31.5
Queensland Health 2010	4.27 (3.96, 4.61) (n = 167)	3.98 (3.68, 4.32) (n = 130)	5.44 (4.53, 6.53) (n = 37)	NA	4.8%	1.9–22.4
Queensland Medical Laboratory 2012	3.2 (n = 43)	NA	NA	21%	NA	NA
Queensland Medical Laboratory 2013	3.2 (n = 83)	NA	NA	23%	2.4%	NA
Queensland Medical Laboratory 2014	2.6 (n = 98)	NA	3.0	11%	0%	NA
Mount Isa Hospital 2014 (Aug.–Dec.)	3.2 (n = 57)	NA	3.5	16%	2%	NA
Queensland Medical Laboratory and other private labs 2015	3.0 (n = 49)	NA	3.9	14%	6%	NA
Mount Isa Hospital 2015	3.2 (n = 101)	NA	3.7	16%	2%	NA
Testing at Children and Family Centre March & May 2017	3.8 (2.9; 5.0) (n = 30)	2.4 (1.8, 3.1) (n = 16)	6.5 (4.7, 9.2) (n = 14)	40%	10%	1.6–17.3

Source: Data for Mount Island Mines was reported by Queensland Health [32]. All other data (excepting data from testing at the Children and Family Centre in March and May 2017) was reported by Queensland Health [22]. Queensland Medical Laboratory testing is reported as 'Children under 5'. The lowest possible value for Queensland Medical Laboratory and Mount Isa Hospital is 2 µg/dL. The lowest value for Queensland Health 2006–2007 testing is 1.3 µg/dL. The lowest value for Queensland Health 2010 testing is 1.9 µg/dL. The lowest detectable value in the Children and Family Centre testing is <3.3 µg/dL; 1.6 µg/dL used in our analysis for all values <3.3 µg/dL. The number of Indigenous children tested is not available for Queensland Medical Laboratory and Mount Isa hospitals. Ninety-five percent confidence intervals reported where available. NA denotes data not available.

The largest testing effort in Mount Isa occurred in 2006–2007 and was conducted by Queensland Health. This screening included 400 children ages 1–4 who 'were not randomly selected but were invited to participate' [31] but whose age, gender, and Indigenous status matched that of the overall population of children in that age group in Mount Isa. Venepuncture was the method used for blood collection in this study. Eighty-three of those tested were Indigenous children, 11.3% of whom had blood lead levels ≥10 μg/dL and Indigenous children had a statistically significantly higher geometric mean blood lead level (7 μg/dL compared to non-Indigenous children (4.5 μg/dL)) [31].

A smaller Queensland Health screening, again based on self-selection, in 2010, included 167 children, 37 of whom were identified as Indigenous. Blood samples were collected through venepuncture. In this sample, 4.8% of children had blood lead levels ≥10 μg/dL and Indigenous children were again found to have statistically significantly higher geometric mean blood lead levels compared to non-Indigenous children (5.4 μg/dL compared to 4 μg/dL) [21].

Aside from these two detailed reports on children's blood lead levels in Mount Isa [21,31], more recent publicly available data are based on a limited number of children tested, and lack important details such as the number of Indigenous participants, the distribution of blood lead levels in Indigenous and non-Indigenous children, the highest blood lead level measured, and blood lead levels by age and gender. No testing data were reported for 2011, but in each year of data since 2012, the number of Indigenous children tested has not been reported, making it impossible to assess rates of screening in this population. Geometric mean blood lead levels in these opportunistic samples have ranged from 2.6 to 3.2 μg/dL in the overall population of children tested and from 3.0 to 3.9 μg/dL among Indigenous children [22].

In the first seven months of 2017, two newspaper articles reported on blood lead level screening results in Mount Isa. The first from February 2017 stated that according to Queensland Health, in 2016 the mean blood lead level was 2.4 μg/dL overall and 2.9 μg/dL among Indigenous children. Five children (3% of those tested) were said to have blood lead levels >10 μg/dL and 25 (6.6%) were reported to have blood lead levels >5 μg/dL [32]. From these data, we infer that the total number of children tested in 2016 was 166. In July 2017, a North West Star article reported that Dr Jeanette Young, Queensland's Chief Health Officer, provided data for September 2016–June 2017. Five hundred and seventy children were tested during this time period, approximately 25% of the 1–4 year old population of Mount Isa. The mean blood lead level was reported as 2.3 μg/dL and no data were provided for Indigenous children. One hundred thirty-one children (23%) were reported to have blood lead levels >5 μg/dL, and no data were provided on children with blood lead levels ≥10 μg/dL. We have been unable to find an official Queensland Health report on these recent data. Despite the fact that nearly one-quarter of children tested were reported to have blood lead levels >5 μg/dL, the article headline read "Good Results in Latest Round of Mount Isa Testing" [30].

There are four important problems with current blood lead level screening in Mount Isa: due to the small proportion of the population of 1–4-year-olds tested and the lack of random sampling, the approach does not allow for valid inferences to be drawn about whether or not children's blood lead levels are improving, staying the same, or worsening; Indigenous children appear to be under-represented and there is evidence they are at highest risk of blood lead levels ≥5 μg/dL; and, not all children with blood lead levels ≥5 μg/dL are being identified, which means that critical intervention to reduce blood lead levels and prevent further exposure is not occurring. Finally, data are not fully and publicly reported in detailed technical reports as they are in Port Pirie and Broken Hill. Despite these problems with data, Queensland Health says blood lead levels in Mount Isa children are 'falling' [32,33].

A range of governmental and non-governmental representatives have called for increased blood lead level testing in Mount Isa. In an annual report, the Living with Lead Alliance "recommends that all Mount Isa residents children and adults know their BLLs" [34], and the Commissioner for Children and Young People has also called for increased testing [22]. The recently published 'Lead Pathways Study-Air' [35] also stressed the importance of increased screening, as have other public health and

environmental experts [36]. Despite the reported increase in testing in the past year, an important improvement over other years, testing rates in Mount Isa remain low.

The first aim of this study was to assess whether parents and children would participate in less invasive, rapid capillary testing at a community location (a Children and Family Centre). The second aim was to measure blood lead levels among a range of children that roughly reflected the percentage of the Indigenous/non-Indigenous population.

2. Materials and Methods

Study Design

This pilot study tested blood lead levels in a convenience sample of children ages 1–6 years who had lived in Mount Isa for at least three months prior to the time of testing. The study was carried out at a community Children and Family Centre in Mount Isa which is located in an area of the city with a large Indigenous population. We used capillary sampling and the LeadCare II Point-of-Care testing system to provide rapid blood lead level results. LeadCare II is a US Food and Drug Administration (FDA)-approved blood lead testing device waived by the Clinical Laboratory Improvement Amendments (CLIA) of 1988. The CLIA waiver indicates that, due to its low complexity and accuracy, it can be used at non-traditional testing sites [37,38]. LeadCare II uses anodic stripping voltammetry to measure lead in blood samples. The limits of detection for LeadCare II are 3.3–65 µg/dL. The reliability and validity of LeadCare II has been established in other studies, and it is used worldwide for blood lead screening [37,38]. Prior to testing children, all study personnel completed online training and earned the LeadCare training completion certificate.

Recruitment was conducted by Centre staff using word of mouth. Prospective parent participants were told that blood lead testing would involve a 'finger prick' test, and results would be available immediately. A $50 gift card would be given at the end of the test as compensation for their time. Blood lead testing occurred on three mornings, one in March 2017 and two on days in May 2017.

Prior to testing, the study was explained to parents, and all parents provided written informed consent. All tests took place in a clinical examination room. We took steps to minimise the possibility of external lead contamination in the examination room. Surface areas on which blood lead testing supplies were kept during testing sessions were cleaned, and a clean barrier cloth was laid down prior to testing. Alcohol prep pads and gauze were unopened until use, and capillary tubes and sensor strips were kept in the manufacturer's containers with lids closed until use.

To minimise the possibility of external contamination from the children's skin during capillary sampling, all children's hands were thoroughly washed with soap and water immediately prior to puncturing the skin. After handwashing, a clean, disposable white paper towel was used to dry the children's hands. Then, the child's finger was wiped with alcohol and dried with sterile gauze. Non-reusable 1.8 mm lancets were used to puncture the skin, and the first drop of blood was wiped away. Capillary blood was drawn by the same local doctor, wearing lead-free examination gloves during all three testing sessions. Blood samples were collected in LeadCare provided capillary tubes and were mixed by inverting the tubes multiple times in LeadCare reagent tubes. Once the blood–reagent mixture turned brown, it was tested in the LeadCare machine. Only one lot of testing supplies was used in this study. Two sets of controls were run three times to verify that the machine was working properly and after the machine was moved prior to testing (twice). Manufacturer's instructions were followed for running controls; all three sets of controls were within the manufacturer's provided acceptable limits.

While the child's blood sample was being tested, parents/guardians were asked a short set of questions about: their child's age, gender, Indigenous status, and history of previous blood lead level testing, their type of residence, the time their children spent playing outdoors, and their garden characteristics (grass, bare earth, etc.).

The result of the child's lead test was immediately reported to the parent by the doctor, recorded for research purposes, and provided to the parent in writing along with lead health education resources. The doctor answered any questions parents had about their child's blood lead level at the time the blood lead result was provided. Children with blood lead levels ≥5 μg/dL were advised to take their child for confirmatory venous testing within a month. The doctor also kept a record of blood lead levels ≥5 μg/dL and followed up with parents/guardians to recommend confirmatory testing or other medical follow-up.

To calculate the percentage of residents of Indigenous status within each SA1, we downloaded census data for Mount Isa from the most recent census. The total number of Indigenous residents in each SA1 was determined by calculating the sum of people who were listed as 'Aboriginal', 'Torres Strait Islander', or both in the census' Indigenous status question. We calculated the total population by summing the calculated Indigenous population with the population listed as 'Non-Indigenous' on the Indigenous status question, and used this figure to calculate the proportion of the total population in each SA1 that consisted of Indigenous residents.

Of the 50 geographic units in Mount Isa, only one did not have census counts for either Indigenous or non-Indigenous residents and therefore, a percentage could not be calculated. This SA1 was not categorised in the colour scheme used for all other SA1s in Figure 1 to designate the percentage of residents of Indigenous status. Each SA1 also contained a number of people who did not answer the Indigenous status census question. Since we could not determine their status, we did not include them in our calculation.

Data were entered into Excel and then imported into SPSS and R for analysis. The analysis consisted of descriptive statistics, calculating geometric mean blood lead level, and testing population variables for statistical significance with blood lead levels. Levels below LeadCare's limits of detection were reported as <3.3 μg/dL. For the summary statistics, blood lead levels recorded as <3.3 μg/dL were replaced with the value 1.6 (limit of detection/2), appropriate in this case, as our data are highly skewed [39]. The geometric mean was calculated for the entire dataset of blood lead levels, as well as for each categorical variable. The geometric mean is a better representation of the average value of a dataset compared to the arithmetic mean when the dataset is highly skewed and therefore does not follow a normal distribution.

This research was approved by the HREA Panel E: HC16398, University of New South Wales, Australia and the Institutional Review Board of William Paterson University of New Jersey, USA.

3. Results

In three half-days of testing, we measured blood lead levels in 30 children. Sample characteristics are described in Table 2. The majority of the sample (93%) was between 1 and 4 years of age; the youngest child was 12 months and the oldest was 6 years. Sixty percent of children who participated were female, and 47% were self-identified as Indigenous.

Thirty-six percent of those tested (11 children) had blood lead levels below the limits of detection (<3.3 μg/dL), and 60% (18 children) had blood lead levels <5 μg/dL. However, 12 children, or 40% of the sample, had blood lead levels ≥5 μg/dL. Ten percent of those tested had blood lead levels ≥10 μg/dL. The highest blood lead level measured in this study was 17.3 μg/dL. Of the 14 Indigenous children who participated, 9 (64.2%) had blood lead levels ≥5 μg/dL. Among non-Indigenous children the percentage was lower, 18.8% had blood lead levels ≥5 μg/dL (see Table 3).

Table 2. Sample characteristics.

Age Distribution	Percent	*n*
1–2	20	6
2–3	30	9
3–4	26.7	8
4–5	16.7	5
5–6	3.3	1
6–7	3.3	1
Gender		
Male	40	12
Female	60	18
Indigenous Status		
Indigenous	46.7	14
Non-Indigenous	53.5	16
Type of Housing		
House	90	27
Apartment	10	3
Other	0	0
Child Previously Tested for Lead?		
Yes	6.7	2
No	93.3	28
Length of Time in Mount Isa (Months)		
Mean	33.1	30
Min–Max	10–53	30
Regular Play Outdoors		
Yes	90	27
No	10	3

The geometric mean blood lead level in the overall sample was 3.8 µg/dL (95% CI, 2.9, 5.0) and was statistically significantly higher for Indigenous children (6.5 µg/dL (95% CI, 4.7, 9.2)) than for non-Indigenous children (2.4 µg/dL (95% CI, 1.8, 3.1)). The majority of children who participated in this study (93%) had not previously been tested for lead exposure.

With respect to the acceptability of capillary testing, the method was well received by parents who appeared to appreciate receiving immediate results and having the opportunity to discuss them with the doctor. Additionally, recruitment for the study was relatively easy—on the first morning of testing, we had more participants than we could accommodate. Anecdotally, several parents reported that they would not take children for venous sampling but appreciated the less invasive capillary blood draw. The procedure also appeared to be well tolerated by most of the tested children.

Table 3. Blood lead level results.

Blood Lead Level Distribution	Percent	*n*
<3.3 μg/dL	36.7	11
3.3–4.9	23.3	7
5.0–9.9 μg/dL	30.0	9
10.0–14.9 μg/dL	6.7	2
15.0–19.9 μg/dL	3.3	1
Blood Lead Level by Indigenous Status	Geometric Mean (μg/dL)	
Overall sample	3.8 (2.9, 5.0)	30
Indigenous	6.5 (4.7, 9.2)	14
Non-Indigenous	2.4 (1.8, 3.1)	16
Blood Lead Level by Gender	Geometric Mean (μg/dL)	
Male	3.8	12
Female	3.8	18
Children with Blood Lead Levels ≥5 μg/dL	Percent	
Overall	40	12
Non-Indigenous	18.8	3
Indigenous	64.2	9
Male	41.6	5
Female	38.8	7
Ages 1–2	66.6	4
Ages 2–3	33.3	3
Ages 3–4	12.5	1
Ages 4–5	80	4
Ages 5–6	0	0
Ages 6–7	0	0

Ninety-five percent confidence intervals reported where available.

4. Discussion

This is a small pilot study based on a convenience sample of children living in Mount Isa. The geometric mean blood lead level among Indigenous children was nearly three-fold higher than that among non-Indigenous children. Additionally, the overall geometric mean in our sample (3.8 μg/dL (95% CI, 2.9; 5.0)) was higher than the geometric means reported by Queensland Medical Laboratory (3.0 μg/dL) and Mount Isa Hospital (3.2 μg/dL) in 2015, the most recent sampling for which results are available. Because our data are based on a non-representative convenience sample and a small number of observations, the geometric means reported here should be interpreted with caution. A larger, representative sample of Mount Isa children might find a higher or lower geometric mean blood lead level. It should also be noted, however, that Queensland Medical Laboratory and Mount Isa hospital data are also based on non-representative convenience samples and that the most recent Queensland Medical Laboratory data from 2015 is also based on a small number of tested children (n = 49). It is also not known how many Indigenous children have been tested in recent years, and a high proportion of Indigenous children in our sample with higher blood lead levels increases the overall geometric mean.

Despite the limitations of our sample, our findings should be considered in the context of limited information on blood lead levels in Mount Isa, particularly among Indigenous children. These findings are important from a public health perspective as they indicate that there are likely a significant number of children with blood lead levels ≥5 μg/dL in Mount Isa (40% in this sample), and most of these children have likely not been identified due to the low rate of blood lead level screening. Notably, of the 30 children who participated, 93% (28) of our sample reported never having been tested for lead despite many being, long-term residents in Mount Isa. All children with blood lead levels ≥5 μg/dL should be identified and provided with targeted public health intervention to reduce their exposure to lead.

There are also likely to be additional children in Mount Isa with blood lead levels ≥10 μg/dL—our study identified three. These children urgently need to be identified so that public health intervention can occur. Priority should be placed on outreach, testing and public health intervention for Indigenous families as the majority of Indigenous children had blood lead levels ≥5 μg/dL.

The findings of this study support recommendations made by Forbes & Taylor [36] for a more proactive approach to reducing environmental lead exposure in Mount Isa. This should include the following elements: annual universal blood lead level testing of children followed by publicly reported results; culturally appropriate follow-up and intervention for children who are identified with blood lead levels ≥5 μg/dL; stack and fugitive emissions reductions; and other environmental strategies to reduce exposure to lead including remediation of soil contamination in children's play and residential areas.

There is a compelling need to make annual universal screening of children standard practice in Mount Isa. Though increasing screening has been called for in Mount Isa for at least a decade, progress has been slow. The current approach to testing children (convenience sampling of a proportion of the population) is not a valid method for determining whether or not blood lead levels are increasing or decreasing in Mount Isa children. Ensuring that children's health is being protected requires detailed and scientifically valid data on blood lead levels. Detailed reporting of results from universal screening would inform efforts to reduce environmental contamination and blood lead levels in the community.

Queensland Health leaders could look to the experience of Broken Hill where blood lead screening was incorporated with immunisation visits in 2011. Since then, there has been a marked increase in the proportion of children tested. Since 2012, approximately three out of four children in Broken Hill are tested on an annual basis, and detailed annual data reports guide public health efforts to reduce exposure [28].

The use of rapid point-of-care capillary testing, which is less invasive and provides immediate results, may reduce parental concerns about the discomfort to children from venous blood lead testing. Capillary testing can be used at clinic sites to screen all children annually at immunisation visits, which has been a successful approach in Broken Hill [40]. Screening can also be conducted annually at community daycare centres, and blood lead testing can be required for annual entrance to these locations. In September 2016, Queensland Health invested in four point-of-care test machines in Mount Isa (currently we understand these machines are in use at the Mount Isa Hospital, Gidgee Healing, and the Queensland Medical Laboratory). They credit the use of point-of-care screening for the increase in participation in blood lead testing in the past year. As the proportion of children screened increases, Queensland Health should be able to publish detailed results that can contribute to public health and environmental efforts to reduce children's exposure.

Screening rates are likely to increase if parents do not feel stigmatised if their child has a blood lead level ≥5 μg/dL, and if parents perceive that there is real benefit to having their child tested—that is, if detection of blood lead levels ≥5 μg/dL is paired with tangible help. Stigma impeding testing has been an ongoing issue in mining and smelting communities, particularly when parents feel that they are to blame if their children have blood lead levels ≥5 μg/dL [41,42]. This may be attributable to health and industry officials' over-reliance on health education messages related to personal hygiene, diet, and home cleaning, none of which have been shown to be efficacious in preventing lead exposure [43,44].

A concerted effort should be made to test all Indigenous children in Mount Isa as previous screenings have consistently found that Indigenous children are more likely to have blood lead levels ≥5 μg/dL, both in Mount Isa and in Broken Hill. In Broken Hill, the program partnered with Maari Ma, an Indigenous community health provider, and integrated testing into immunisation visits. These measures resulted in dramatically increased screening in the population with nearly all Indigenous children being tested annually.

Our prior research [27] found that public health messages aimed at reducing environmental lead exposure among children in Mount Isa do not have a strong focus on the Indigenous population and are not tailored to Indigenous families' social and cultural backgrounds. Indigenous parents may have

difficulty implementing all of the recommendations regarding cleaning, garden maintenance, and nutrition due to poverty and poor living conditions. Targeted and tangible assistance to Indigenous families, such as remediating contaminated residential soil and reducing bare earth in gardens, should be made available. Indigenous residents identified the lack of such tangible assistance as a barrier to blood lead level screening in Broken Hill [45].

The current focus on testing children ages 1–4 years old is limited and may provide a false sense of security to parents with younger and older children. While this is an at-risk age group, older children may also have blood lead levels ≥5 μg/dL. For example, in Herculaneum, Missouri, (US lead smelting city) in 2001, 8% of children ages 6–17 tested had blood lead levels >10 μg/dL [46]. Younger children aged 6–12 months should also be included in universal screening. Pregnant women, and women who intend to become pregnant, should also be tested.

Blood lead testing is secondary prevention—as it will not prevent lead exposure; however, it will provide health and environmental officials with valid data on the scope of the problem and can identify those at high risk so that assistance can be provided. Primary prevention approaches include reducing emissions and remediating existing contamination. These approaches must underpin efforts to reduce lead exposure.

Mount Isa's lead emissions are considerable. Furthermore, allowable levels of lead in air exceed health-based standards set nearly a decade ago in the US. The current lead in air standard in Mount Isa is 0.5 μg/m^3 averaged on an annual basis [47]. Annual averaging does not prevent short-term peak exposures, and an air lead level of 0.5 μg/m^3 does not provide a margin of safety for protecting children's health. For comparison purposes, after extensive scientific review, in 2008, the US EPA adopted a new lead in air standard of 0.15 μg/m^3 (based on a three month rolling average) to protect children's developing nervous systems and to prevent IQ loss, among other health effects [48]. In addition to an ambient standard for lead, in 2011 US EPA set an overall emissions limit for main stack emissions from primary lead smelters of 0.97 pounds or 0.4 kg of lead per ton of lead produced [49].

Pollution control devices at the Mount Isa smelting complex include a baghouse installed in 1992 at the lead smelter and an electrostatic precipitator for the copper smelter installed in 1994 [2]. Lead emissions in 2018 are projected to total as much as 83,544 kg or over 90 tons, with 93% coming from stack sources [50]. Upgrades to current pollution controls to reduce stack emissions are needed.

With respect to fugitive emissions, a 2015 emissions inventory shows—in order of decreasing contribution—that ore loading, unloading, and stacking, conveying transfer points, ore crushing, and wheel-generated dust are the activities resulting in the most fugitive lead emissions at the site [50]. All could be further controlled using the best available technology [51].

To address children's exposure in homes and gardens, remediation of contaminated soil in residential areas, in children's play areas and including school and daycare playgrounds is needed. In the US, removal and replacement of contaminated soil in residential gardens and areas regularly used by children is commonplace in communities near non-ferrous mining and smelting sites. For example, over 7000 properties have been 'cleaned up' in the Silver Valley of Idaho around a now disused lead–zinc mining and smelting complex. Clean-up has largely consisted of removing the top 6–12 inches of lead-contaminated soil and replacing it with uncontaminated soil [52]. Children's blood lead levels have been substantially reduced due to environmental remediation efforts, with success attributed to cleaning individual gardens and neighbouring community properties [53,54]. In Broken Hill, a remedial approach with a focus on Indigenous children is being piloted. The 2015–2016 project plan dedicated $2.45 million toward a range of activities including remediation. The funding is part of a five-year $13 million NSW government commitment to addressing environmental lead exposure in Broken Hill [55].

5. Conclusions

This pilot study found that 40% of the children tested had blood lead levels ≥5 μg/dL. The proportion with blood lead levels ≥5 μg/dL was higher among Indigenous children as was the

geometric mean blood lead level of these children. While our small sample size and reliance on convenience sampling do not permit extrapolation to the population of children in Mount Isa, it is clear that children with blood lead levels ≥5 μg/dL and ≥10 μg/dL are not being identified due to low rates of screening. Indigenous children appear to be at highest risk. Compared with other mining and smelting communities in Australia and in the US, there is an over-reliance on behavioural strategies (personal hygiene, diet, and in-home cleaning) that have not been found to be effective for preventing lead exposure [43,44]. A multi-component program of primary prevention (emissions reductions and environmental remediation) and secondary prevention (universal blood lead testing and culturally appropriate public health intervention) will help to address the chronic problem of lead exposure in Mount Isa.

Author Contributions: Donna Green and Marianne Sullivan contributed equally to the development of the research question, study design, and analysis and should be considered lead co-authors. Marianne Sullivan wrote the initial draft with all authors commenting on and revising the manuscript. Marianne Sullivan assisted with study protocol, Marianne Sullivan and Nathan Cooper carried out the statistical analysis, and Annika Dean, Nathan Cooper, and Cielo Marquez carried out the on-site blood collection work.

Conflicts of Interest: The authors declare no conflict of interest.

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Blood lead testing Mount Isa 2017

Lead Alliance report 22nd January 2018

Compile data from Point Of Care (capillary) blood lead testing results from Child Health and Venous blood lead testing results from Townsville Public Health Unit.

This aim of this report is to examine the blood lead testing in Mount Isa and ensure that elevated BLL results from POCT are followed up by venous testing to confirm actual results.

The Lead Alliance has been involved and encouraged the introduction of POCT be made available to Mount Isa residents as an early indicator of child BLL. Following up with Child Health Unit on the progression of POCT The Alliance noted there was limited follow up with parents/guardians of children with elevated POCT BLL. Child Health have started to notify PHU and are including the Alliance of elevated BLL tests, this allows the Alliance to follow up with parents and recommend that children with high levels greater than 5ug/dl are venous tested for accurate results and that PHU can also follow up on elevated levels. It is essential that children with elevated POCT are encouraged to follow up with a venous test, this is the aim of the Alliance combining these results of all blood lead testing in Mount Isa.

The Alliance obtained the 2017 BLL results from both Child Health POCT testing and TPHU venous testing results. Attached is a data base consisting of all BLL results from both departments, showing the total number of children under 5 years of age tested in Mount Isa.

Summary of results

Total number of children under 5 years of age blood lead tested is **752** for 2017.
200 venous BLL test
608 POCT

BLL TESTING MOUNT ISA QLD

DEPT	*Children tested*	*BLL < 5ug/dL*	*BLL > 5ug/dL*	*BLL > 10ug/dL*	*Venous follow up from POCT*
CHILD HEALTH	608	463	125	20	
QML	63	34	19	10	25
SN	1		1		
Kids MIH	23	21	1	1	3
Nursery MIH	15	15			
ED MIH	82	12	68	1	7
UQB MIH	12		11	1	
PATH MIH	1	1			
PEADS MIH	3	3			

BLOOD LEAD TEST	BLL > 10ug/dL	%	BLL > 5ug/dL	%	BLL < 5ug/dL	%
Venous	13	6.9%	36	18%	151	75.1%
POCT	20	3.3%	125	20.5%	463	76.2%

3 children venous tested had BLL greater than 15ug/dl

Combining both data bases for all blood lead testing in Mount Isa has allowed us to see the number of children presenting POCT and venous testing. Of the 752 children who had their BLL tested, **55** utilised both POCT and venous tests, 35 (4.6%) followed up with venous testing after POCT, with 10 presenting at MIH - ED/KIDS for other testing.
25 children presented to QML for follow up venous testing after POCT;

- 5 children with elevated POCT results greater than 10ug/dl, follow up QML venous test also greater than 10ug/dl.
- 2 children with POCT levels results between 5 -10ug/dl, follow up QML venous test was greater than 10ug/dl
- 8 children with POCT results greater than 10ug/dl, follow up QML venous between 5 – 10ug/dl, 1 venous greater than 5ug/dl
- 9 children with POCT between 5-10ug/dl, all 9 follow up QML venous between 5-10ug/dl

Of the 608 children utilising the POCT facility, 125 children had levels between 5 - 10ug/dl, 10 (8%) followed up with venous testing (9 at QML, 1 at MIH)

20 children with POCT levels greater than 10ug/dl, 13 (65%) followed up with venous testing (12 at QML and 1 at MIH)

Ministerial Brief for Noting

RM folder reference No:	
Division/HHS:	
File Ref No:	

SUBJECT: Mount Isa - Point of Care blood lead testing kits

Recommendation/s

It is recommended the Minister:

1. **Note the Therapeutic Goods Administration (TGA) safety alert in relation to the LeadCare II Blood Lead Testing System**
2. **Note that the use of LeadCare II Blood Lead Testing System in Mount Isa has been suspended pending further investigation by TGA.**

Ministerial Office comments

Issue/s

1. Department of Health has asked North West Hospital and Health Service (NWHHS) to cease the use of the LeadCare II Blood Lead Testing System in response to the TGA advice that the machine may underestimate results.
2. The TGA initiated its investigation on the basis of advice from the US Food and Drug Administration (FDA) in May 2017. The Investigation has revealed repeated underestimation of results of blood lead levels in venous blood samples and insufficient evidence to support the accuracy of results of capillary blood samples using the machine. The TGA advice is attached (Attachment 1).
3. However, a review of FDA's website has revealed that the agency's concerns relate to the use of these machines for testing of venous blood samples. FDA has advised that the LeadCare II Blood Lead Testing System can continue to be used for lead testing of capillary blood samples.
4. NWHHS uses LeadCare II Systems at two sites (Maternal Child Youth Health Centre and the Ngukuthati Outreach Clinic) for capillary blood lead testing in Mount Isa. Since commencement of testing in September 2016, approximately 739 Mount Isa children, less than 5 years of age, have been tested using this machine.
5. TGA has given the Australian Sponsor, Point-of-Care Diagnostics till 23 February 2018 to respond to its findings. The ongoing use of the LeadCare II Blood Lead Testing System will be reassessed once TGA has completed its investigation.

Vision

6. The development of health protection legislation and policy is designed to safeguard the community from potential harm of illness caused by exposure to environmental hazards, diseases and harmful practices. This is a key strategy for promoting wellbeing of individuals and communities and ensuring safety in the area of hazardous chemicals innovation.

Background

Michael Walsh
Director-General
/ /2018

RM folder reference No:	
Division/HHS:	
File Ref No:	

7. Young children (0 to 5 years) are most at risk from lead in the environment due to their hand to mouth behaviour. Lead exposure can affect a child's mental and physical development. There is no safe level of exposure to lead.
8. Due to historic mining and other industrial activities, the Mount Isa community lives in an area where there are elevated levels of exposure to lead and other airborne contaminants.
9. The Mount Isa Lead Health Management Committee (MLHMC) is a ministerial committee established in 2012 to provide strategic management of environmental health risks arising from lead and other airborne contaminants in Mount Isa.
10. On the recommendation of the NHMRC, blood lead level of equal or greater than 5 µg/dL has been prescribed as notification level under the Public Health Act 2005. Queensland Health investigates blood lead notifications to identify the source and mitigate of exposure including health promotion advice to manage the health impacts of lead.
11. Broken Hill in NSW and Port Pirie, SA are the other two lead impacted communities in Australia. Broken Hill uses LeadCare II Blood Lead Testing System for blood lead analysis and is yet to react to TGA's notice. Port Pirie uses laboratory based testing of its blood samples.

Sensitivities

12. There are three blood lead testing programs offered in Mount Isa. These are: Free venous blood lead testing at QML pathology in Mount Isa; Opportunistic (venous) blood lead testing at the Mount Isa base hospital and Point of Care testing (capillary) using the LeadCare II Blood Lead Testing System.
13. The participation of young children in blood lead testing program has increased significantly since the introduction of point of care testing using LeadCare II Blood Lead Testing System.
14. In 2017, the number of children testing using venous testing was 200 compared to 608 children tested using the LeadCare II Blood Lead Testing System.

Results of Consultation

15. NWHSS has been informed of the TGA advice and are happy to cease using the machine until further notice.
16. NWHHS has advised that the use of the LeadCare II Blood Lead Testing System can be very resource intensive with tests taking up to 30minutes per child.

Resource Implications (including Financial)

17. The Department of Health provides funding to NWHHS to for capillary blood lead testing to increase participation of young children particularly indigenous children in blood lead testing programs in Mount Isa.

Attachments

18. Attachment 1 – TGA Advice.

Department/HHS Contact Officer

Ms Sophie Dwyer, Executive Director, Health Protection Branch, Prevention Division, contact phone numbers - 3328 9266 / s.73

RM folder reference No:	
Division/HHS:	
File Ref No:	

Author	Cleared by: (SD/Dir)	Content verified by: (CEO/DDG/Div Head)
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Director	Executive Director	Chief Health Officer and Deputy Director-General
Environmental Hazards Unit	Health Protection Branch	Prevention Division
3328 9338	3328 9266	3708 5190
	s.73	s.73
XX February 2018	XX February 2018	XX February 2018

Media summary **last updated 20180411**

Between 8 September 2016 and 13 February 2018, there were 1,028 presentations to the Mount Isa health service by children less than five years of age where a capillary blood lead test was undertaken.

This represents 778 individual children aged less than five years.

The geometric mean lead level in the overall sample was 4.3 microgram per deciliter (ug/dL) (95% CI 4.1-4.4). The geometric mean was higher for Indigenous children (4.7 ug/dL; 95% CI 4.3-5.0) than non-Indigenous children (4.3 ug/dL; 95% CI 4.1-4.4).

Comments

- The geometric mean was calculated for the dataset as are considered a better representation of the average value when the data is highly skewed.
- Data cleaning is currently ongoing based on the addition of new data. Please contact the Hazards Team for the updated results if figures are to be released.

Limitations

- Statistical tests comparing the geometric mean between Indigenous and non-Indigenous children have not been included.
- The figures are likely to over-estimate the number of children who presented for lead testing. There were 27 children aged less than five years who did not have a name recorded. These have been counted in the total number of children less than five years. No sensitivity analysis has been taken.
- Levels of blood lead recorded below LeadCare's limit of detection have not been addressed.
- The geometric mean is calculated on the highest recorded lead level per individual over the time period.

Mount Isa Capillary Blood lead **last updated 20180412**

The following document outlines the data from the Mount Isa capillary blood lead program.

Summary

Between 8 September 2016 and 13 February 2018, there were 1,028 presentations to the Mount Isa health service by children aged less than five years where a capillary blood lead test was undertaken.

This represents 775 individual children.

The geometric mean lead level in the overall sample was 4.3 micrograms per deciliter (ug/dL) (95% CI 4.2–4.4). The geometric mean was higher for Indigenous children (4.7 ug/dL; 95% CI 4.3– 5.0) than non-Indigenous children (4.2 ug/dL; 95% CI 4.1– 4.4). The highest blood lead level recorded was 19 ug/dL.

Table 1. Highest blood lead (ug/dL) in individual children (n=775) in Mount Isa aged less than five years, by Indigenous status, 08 September 2016–13 February 2018

Lead categories	non-Indigenous	Indigenous	Not stated	Total
	No. (%)	No. (%)	No. (%)	No. (%)
<5 ug/dL	471 (84)	144 (80)	24 (75)	639 (82)
5–9.9 ug/dL	71 (13)	35 (19)	7 (22)	113 (15)
≥10 ug/dL	20 (4)	2 (1)	1 (3)	23 (3)

* Individuals are assigned a lead category based on their highest blood lead level over the time period. Blood results with ID missing are included as individuals in the analysis

Table 2. Highest blood lead (ug/dL) in individual children (n=587) in Mount Isa aged less than five years, by Indigenous status, 2017

Lead categories	non-Indigenous	Indigenous	Not stated	Total
	No. (%)	No. (%)	No. (%)	No. (%)
<5 ug/dL	359 (85)	114 (81)	18 (78)	491 (84)
5–9.9 ug/dL	53 (13)	25 (18)	5 (22)	83 (14)
≥10 ug/dL	12 (3)	1 (1)	0 (0)	13 (2)

Of the 23 children with a BLL ≥10 ug/dL, X were reported in the notifiable conditions register.

Comments

- The geometric mean was calculated for the dataset as are considered a better representation of the average value when the data is highly skewed.
- Data cleaning is currently ongoing based on the addition of new data. Please contact the Hazards Team for the updated results if figures are to be released.

Limitations

- Statistical tests comparing the geometric mean between Indigenous and non-Indigenous children have not been calculated.
- The figures are likely to over-estimate the number of children who presented for lead testing. There were 27 children aged less than five years who did not have a name recorded. These have been counted in the total number of children less than five years. No sensitivity analysis has been taken.
- Levels of blood lead recorded below LeadCare's limit of detection have not been addressed. How was geometric mean calculated for results that were the limit of detection??..
- The geometric mean is calculated on the highest recorded lead level per individual over the time period.

Can we also replicate above information just for calendar year 2017?

Department RecFind No:	CH014045
Division:	Prevention
File Ref No:	

Brief for Approval

Requested by:

☐Department

SUBJECT: Mount Isa - Point of Care blood lead testing kits

Recommendation/s

It is recommended that the Chief Health Officer and Deputy Director-General:

1. **Approve** the recommencement of the LeadCare II Blood Lead Testing System for capillary blood lead testing in Mount Isa

   APPROVED / ~~NOT APPROVED~~ **~~PLEASE DISCUSS~~**

2. **Subject to 1, Sign** – the attached correspondence to North West Hospital and Health Service (Attachment 1).

   APPROVED / ~~NOT APPROVED~~ **~~PLEASE DISCUSS~~**

Dr Jeannette Young **Date: 19 / 04 / 2018**
Chief Health Officer and Deputy Director-General, Prevention Division

Comments

Issue/s

1. North West Hospital and Health Service (NWHHS) suspended its point of care testing (POCT) using LeadCare II Systems on 13 February 2018, following Therapeutic Goods Administration (TGA) advice that there is a potential for the device to underestimate results and that a precautionary approach needs to be taken to testing, pending the outcome of its investigation (Attachment 2).
2. This is based on advice from the United States' Food and Drug Administration of May 2017, which indicated testing problems from venous rather than capillary blood samples. Food and Drug Administration has not recommended discontinuing the testing of capillary samples.
3. Recent correspondence with the TGA indicated that it will release a statement on their website shortly. Their investigation into the device is on-going.
4. The NWHHS has recalibrated the LeadCare II Systems and is under pressure from the community to continue the program, highlighting that the program is gaining acceptance within the community.
5. As the concerns regarding the LeadCare II Systems are related to venous testing, it is recommended that the capillary blood lead testing in Mount Isa be resumed to ensure ongoing POCT testing service to the community.
6. As a precautionary measure, the community should be reminded that the POCT testing using the LeadCare II Systems is a screening program, and that a venous test is recommended to any child whose blood lead level is ≥ 8µg/dL rather than the current level of ≥ 10µg/dL.

Department RecFind No:	CH014045
Division:	Prevention
File Ref No:	

Vision

7. The development of health protection legislation and policy is designed to safeguard the community from potential harm of illness caused by exposure to environmental hazards, diseases and harmful practices. This is a key strategy for promoting wellbeing of individuals and communities, and ensuring safety in the area of hazardous chemicals.

Results of Consultation

8. The NWHHS was consulted and provided advice that, although they were happy to cease using the machine until further notice, they are under pressure from the community to re-start the capillary testing program.
9. The NSW Health - Lead Health Program, Child and Family Health Centre at Broken Hill, advised that capillary testing program utilising the LeadCare II Systems at Broken Hill is continuing, but has delayed its proposal to use the machine to analyse placental cord blood samples.

Resource Implications (including Financial)

10. The Department of Health provides funding to NWHHS for capillary blood lead testing to increase participation of young children, particularly indigenous children, in blood lead testing programs in Mount Isa.

Background

11. NWHHS operates LeadCare II Systems at two sites (Maternal Child Youth Health Centre and the Ngukuthati Outreach Clinic) for capillary blood lead testing in Mount Isa. This testing began in September 2016 but was suspended in 13 February 2018 following the TGA's investigation into the device.
12. There are three blood lead testing programs offered in Mount Isa. These are: free venous blood lead testing at QML pathology in Mount Isa; opportunistic (venous) blood lead testing at the Mount Isa base hospital; and Point of Care testing (capillary) using the LeadCare II Blood Lead Testing System.
13. Broken Hill in NSW and Port Pirie, South Australia, are the other two lead impacted communities in Australia. Broken Hill uses LeadCare II Blood Lead Testing System for blood lead analysis and is yet to react to TGA's notice. Port Pirie uses laboratory based testing of its blood samples.

Sensitivities

14. The participation of young children in blood lead testing program has increased significantly since the introduction of point of care testing using LeadCare II Blood Lead Testing System.

Attachments

15. Attachment 1: Letter to North West HHS
    Attachment 2: Therapeutic Goods Administration – Safety Information Release

Department Contact Officer

Ms Sophie Dwyer, Executive Director, Health Protection Branch, Prevention Division, contact phone numbers - 3328 9266 / s.73

Department RecFind No:	**CH014045**
Division:	**Prevention**
File Ref No:	

Author	Cleared by: (**Director**)	Content verified by: (**Executive Director**)
Uma Rajappa	Suzanne Huxley for Sophie Dwyer	Dr Jeannette Young
Director	Executive Director	Chief Health Officer and Deputy Director-General
Environmental Hazards Unit	Health Protection Branch	Prevention Division
3328 9338	3328 9266	3708 5190
	s.73	s.73
19 April 2018	19 April 2018	XX April 2018

Department RecFind No:	**CH014045**
Division:	**Prevention**
File Ref No:	

Henry Petracci Manager, Business Services CHO and Prevention Division Comments

Delegation Check:
Purchasing Arrangements Check :
Request within approved Funding Plan :
Sufficient Support Documentation :
General Comments:

Queensland Government

Department of Health

Enquiries to: Uma Rajappa
Director
Environmental Hazards Unit,
Health Protection Branch
Telephone: 3328 9338
File Ref: CH014045

Ms Lisa Davis Jones
Health Service Chief Executive
North West Hospital and Health Service
PO Box 27
MOUNT ISA QLD 4825

Email: NWHHS.CE@health.qld.gov.au

Dear Ms Jones

I refer to the advice dated 13 February 2018 from Ms Sophie Dwyer, Executive Director, Health Protection Branch, that the capillary blood lead testing program using the LeadCare II Systems be suspended, based on advice from the Therapeutic Goods Administration (TGA) that there was a potential for the device to underestimate results. I am advised that the need for the devices to be calibrated coincided with this advice and the impact was not significant.

I am advised that the TGA investigation is ongoing, and its recommended precautionary approach is based on advice from the United States' Food and Drug Administration of May 2017, which indicated testing problems from venous rather than capillary blood samples using the LeadCare II Systems. Food and Drug Administration has not recommended discontinuing the testing of capillary samples using the device.

Considering the current uptake and importance of screening young children for elevated blood level in Mount Isa, I would recommend that the capillary blood lead testing in Mount Isa be resumed. However, as a precautionary measure, it should be reiterated to parents and guardians that the point of care testing is a screening program only, and that the results should be validated using a venous test for blood lead results ≥ 8µg/dL rather than the current level of ≥ 10 µg/dL. Additionally, records of the children tested should be accurately maintained and followed-up as appropriate.

I will keep updated on any further information from TGA once it is available.

I would like to take this opportunity to thank you for your continued support of the Mount Isa Lead Health Management Committee and the successful implementation of the capillary blood lead testing program.

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Department of Health
Level 7
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BRISBANE QLD 4000

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(07) 3708 5190

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CHO_CHO@health.qld.gov.au

If you require any further information in relation to this matter, please contact Ms Uma Rajappa, Director, Environmental Hazards Unit, on telephone 3328 9338 or via email at uma.rajappa@health.qld.gov.au.

Yours sincerely

Dr Jeannette Young
Chief Health Officer
and Deputy Director-General
Prevention Division
19 / 04 / 2018

Australian Government
Department of Health
Therapeutic Goods Administration

The following therapeutic goods information is released to the Chief Health Officers of States and Territories and the Australian Commission on Safety and Quality in Health Care by Dr Tim Greenaway, Chief Medical Adviser of the Therapeutic Goods Administration, and delegate of the Secretary to the Department of Health under subsection 61(7) of the *Therapeutic Goods Act 1989* (Act).

Subsection 61(7) of the Act relevantly provides that the Secretary, or her delegate, may release therapeutic goods information where that release is necessary to ensure the safe use of particular therapeutic goods or the information relates to the reasons for withdrawal of therapeutic goods from supply in Australia.

Release of safety information

The release of this information is necessary to ensure safe use due to the potential for false negatives, which could have an adverse impact on public health.

The Magellan Diagnostics LeadCare II Blood Lead Testing System consists of the LeadCare II Blood Lead Analyzer and the LeadCare II Test Kits, and is supplied in Australia by Point of Care Diagnostics Australia Pty Ltd. It is currently included in the Australian Register of Therapeutic Goods (ARTG) under entries 255472 and 255473 for use in both adults and children.

The US Food and Drug Administration released a safety communication regarding Magellan Diagnostics LeadCare Testing Systems in May 2017. The communication warned of inaccurate blood lead results obtained with venous blood using the various Magellan LeadCare Test Systems, including LeadCare II.

Following the communication, the Therapeutic Goods Administration (TGA) conducted a post-market review of the LeadCare II Testing System. The review revealed repeated underestimation of blood lead levels in venous blood samples, and insufficient evidence to support the accuracy of results in relation to blood lead levels with capillary blood samples.

As a result, the TGA cannot confidently conclude that only venous blood samples are affected by the underestimation of blood lead levels and, due to the uncertainty of the accuracy of the device with respect to capillary blood samples, the TGA recommends that a precautionary position is taken regarding its continued use, both in relation to venous blood and capillary samples.

PO Box 100 Woden ACT 2606 ABN 40 939 406 804
Phone: 02 6232 8444 Fax: 02 6203 1605 Email: info@tga.gov.au
https://www.tga.gov.au

TGA Health Safety Regulation

The relevant sponsor has been notified by the TGA of these findings and has been afforded the legislated opportunity to respond to the notification. The release of this information is provided as an early alert to the Chief Health Officers and the Australian Commission on Safety and Quality in Health Care, and further information will be provided as it becomes available.

12 February 2018

From: Jim Guthrie
To: Uma Rajappa; David Ward
Subject: lead tables updated
Date: Tuesday, 15 May 2018 8:32:50 AM
Attachments: Lead level summary table Mount Isa children 2006-2017.pdf

HI Uma and David,

Just got the latest lead testing table from Steven and Morton.

Looks like overall downward trend for private lab/Mount Isa Hospital testing continued in 2017. But far fewer children being tested at private labs, compared with Mount Isa Hospital. The lower numbers have resulted in slightly higher than 2016 results.

Will finalise media release with these figures.

Regards, Jim

TPHU Final 2017 Report (May 2018):

Testing Mount Isa Blood Lead Levels in Children less than 5 Years of Age – by year

Final data: 1 January – 31 December 2017

Geometric means have been calculated on QML and SNP data and Mount Isa Hospital ward and clinic data (Queensland Health Laboratories) for Mount Isa Blood Lead Levels in Children less than 5 Years of Age.

year	Total under 5 years children tested	All under 5 years geometric mean (GM)	Indigenous‡ under 5 years geometric mean (*n*)	% BLL ≥ 5 µg/dL overall (total number *n* in brackets) *	% BLL ≥ 10 µg/dL overall (total number *n* in brackets)
2006-7 **survey**	400	5 µg/dL	7 µg/dL	51% (203)	11% (45)
2010 **survey**	167	4.3 µg/dL	5.4 µg/dL	44% (73)	5% (8)
QML lab 2010	187	3.8 µg/dL	-	29% (55)	3% (5)
QML lab 2011	97	3.3 µg/dL	-	22% (21)	1% (1)
QML lab 2012	46	3.5 µg/dL	-	26% (12)	7% (3)
QML lab 2013	83	3.2 µg/dL	-	23% (19)	2.4% (2)
QML lab 2014	98	2.6 µg/dL	3.0 µg/dL‡ (41)	11% (11)	0% (0)
Mount Isa Hospital 2014 (***Aug-Dec***)	57	3.2 µg/dL	3.5 µg/dL‡ (23)	16% (9)	2% (1)
QML and other private lab testing 2015	49	3.0 µg /dL	3.9 µg /dL‡ (17)	14% (7)	6% (3)
Mount Isa Hospital*** 2015	101	3.2 µg /dL	3.7 µg /dL‡ (51)	16% (16)	2% (2)

The Blood Lead Level (BLL) notification level dropped from ≥ 10 µg/dL to BLL ≥ 5 µg/dL on 1 January 2016					
QML and other private lab testing [F] 2016	45	3.0 µg /dL[†]	3.8 µg /dL[†‡] (8)***	20% (9)	4% (2)
Mount Isa Hospital [F] 2016**	125	2.2 µg /dL[†]	2.7 µg /dL[†] (47)	17% (21)	2% (3)
2016 All Venous BLL [F] (BLL ≥ 5 µg/dL)	170	2.3 µg /dL[†]	2.8 µg /dL[‡†] (55)	18% (30)	3% (5)

[‡] Indigenous status is not always available

[*] Includes any ≥ 10 µg/dL

[**] Program of routine testing & surveillance using residual blood if available after other tests (any department e.g. ED & Wards); new notifications

[***] Data consists of very small number of children [F] Final – all 2016 test results

[†] Lowest limit of truncation moved to 1.04 µg /dL in line with an analysis in July 2015 – June 2016

Table continued:

year	Total under 5 years children tested	All under 5 years geometric mean (GM)	Indigenous[‡] under 5 years geometric mean	% BLL ≥ 5 µg/dL overall (total number in brackets) *	% BLL ≥ 10 µg/dL overall (total number in brackets)
The Blood Lead Level (BLL) notification level dropped from ≥ 10 µg/dL to BLL ≥ 5 µg/dL on 1 January 2016					
QML and SNP private lab testing [F] 2017	64	3.9 µg /dL[†]	6.5 µg /dL[†‡] (16) ***	41% (26)	13% (8)
Mount Isa Hospital [F] 2017**	189	2.0 µg /dL[†]	2.0 µg /dL[†] (105)	11% (20)	1% (2)
2017 All Venous BLL [F]	253	2.3 µg /dL[†]	2.3 µg /dL[‡†] (121)	18% (46)	4% (10)

‡ Indigenous status is not always available
* Includes any ≥ 10 µg/dL
** Program of routine testing & surveillance using residual blood if available after other tests (any department e.g. ED & Wards), new Notifications
*** Data consists of very small number of children F Final – all 2017 test results
† Lowest limit of truncation moved to 1.04 µg /dL in line with an analysis in July 2015 – June 2016

Important:

Use caution when comparing data, the analysis data prior to June 2016 was truncated at 2.1 µg /dL as the lowest level for laboratory reporting. This lowest limit of truncation moved to 1.04 µg /dL in line with an analysis conducted from July 2015 to June 2016. This means that the geometric mean cannot be lower than 1.04 µg /dL.

The original program involved voluntary free testing at QML lab and this was supplemented with two surveys (2006-7 & 2010). Routine (opportunistic) testing of residual blood, collected for other tests at Mount Isa Hospital was initiated in late 2014. SNP are also conducting lead testing in Mount Isa. As a private laboratory, the SNP data have been combined with the QML data. These programs, private laboratories and Mount Isa Hospital have different sampling methods and cannot be directly compared. They can give a rough indication of trends. The decrease in the numbers tested through private laboratories may be a result of increased testing of children through the Mount Isa Hospital. As the number of children tested through private laboratories decreases, the potential for high test results within that subset to bias the geometric means increases.

To answer the question, "what were the results from all children tested for Lead in 2017?", we could combine results from the Mount Isa Hospital and the private laboratory results. This is shown in the 'ALL' rows above, however combining disparate groups and indications is not representative of the whole population. For a better representation of the underlying groups and population trends they should be examined separately.

Blood Lead Levels in Mount Isa Children under 5 Years - trends

Data series and year	Total under 5 years children tested	All under 5 years geometric mean	Indigenous[‡] under 5 years geometric mean	% BLL ≥ 5 µg/dL overall (total number in brackets)	% BLL ≥ 10 µg/dL (total number in brackets)
Voluntary survey 2006 -7	400	5 µg/dL	7 µg/dL	-	11% (45)
Voluntary survey 2010	167	4.3 µg/dL	5.4 µg/dL	-	5% (8)
QML lab 2010	182	3.6 µg/dL		28% (50)	-
QML lab 2011	96	3.3 µg/dL		21% (20)	-
QML lab 2012	43	3.2 µg/dL		21% (9)	-
QML lab 2013	83	3.2 µg/dL		23% (19)	2.4% (2)
QML lab 2014	98	2.6 µg/dL	3.0 µg/dL[‡]	11% (11)	0% (0)
QML and other private lab 2015	49	3.0 µg /dL	3.9 µg /dL‡	14% (7)	6% (3)
QML and other private lab[F] 2016	45	3.0 µg /dL[†]	3.8 µg /dL[†‡] ***	20% (9)	4% (2)
QML and SNP private lab[F] 2017	64	3.9 µg /dL[†]	6.5 µg /dL[†‡] ***	41% (26)	13% (8)
Mount Isa Hospital 2014 (*Aug-Dec*)	**57**	**3.2 µg/dL**	**3.5 µg/dL[‡]** (23)	**16%** (9)	**2%** (1)
Mount Isa Hospital 2015**	**101**	**3.2 µg /dL**	**3.7 µg /dL[‡]** (51)	**16%** (16)	**2%** (2)
Mount Isa Hospital 2016**	**125**	**2.2 µg /dL[†]**	**2.7 µg /dL[†]** (47)	**17%** (21)	**2%** (3)
Mount Isa Hospital 2017**	**189**	**2.0 µg /dL[†]**	**2.0 µg /dL[†]** (105)	**11%** (20)	**1%** (2)

[‡] Indigenous status is not always available

** Program of routine testing & surveillance using residual blood if available after other tests (any department e.g. ED & Wards), new notifications

*** Data consists of very small number of children

[†] Lowest limit of truncation moved to 1.04 µg /dL in line with an analysis in July 2015 – June 2016

Comment from Dr Donohue: Population trends

The Lead testing at private laboratories is no longer a good indicator of trends. Originally the free service at QML Mt Isa (used by relatively affluent non-indigenous parents) was for parent-initiated testing. Now, this and other private laboratories are increasingly being used for doctor-referred testing and follow-ups of children previously over the notification level, or their siblings. It has been impossible to separate these tests performed for different purposes. Medically indicated tests will bias the geometric means in this group toward higher levels.

The complimentary testing of children under five at the hospital is a much better indicator over time. This is deliberately constructed sentinel surveillance system for the Mt Isa population. The criteria remain:

1. Mt Isa resident children admitted or attending for reasons unrelated to Lead
2. Consistent, more representative of the whole population including poor and indigenous children (some intermittently Mt Isa residents)
3. Who have not had another Lead test in the past year
4. Earliest result if several samples tested on the same child
5. Where blood was taken for another purpose and residual sample is available to test

The hospital data is obtained without any additional blood collection and no refusals have been recorded. The data show a gradual and statistically significant decline in both the whole population and indigenous children, levelling off toward the lower limits of detection at the state laboratories. This correlates with a decline in smelter Lead emissions and the gradual removal of other lead sources in the environment.

The Mt Isa hospital data series does not support a goal of population-wide lead screening. Rather, more focused monitoring and interventions are required for poor and indigenous households, such as remediation of contaminated soil and exposed lead paint in social housing.

Talking points – MLHMC 30 May 2018

General

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[redacted]

Blood lead level testing results for Mount Isa

- A free voluntary blood lead level testing program has been in place for all Mount Isa residents since 2010, initially through QML laboratories, and subsequently through other private laboratories.
- A free blood lead level testing program for children under five also has been in operation at Mount Isa Hospital since August 2014.
- In September 2016, finger-prick testing for blood lead levels also was introduced in Mount Isa, to supplement the existing venous blood lead tests available through Mount Isa Hospital, QML and other private laboratories.
- This form of testing is quicker and much less invasive than a venous blood test and allows primary health care providers in Mount Isa, such as Gidgee Healing, to offer tests to children.
- The results of the various VENOUS blood testing programs in 2016 and 2017 indicate a STEADY REDUCTION in average blood lead levels recorded in tested children under five since extensive community surveys undertaken in 2006–2007 and again in 2010.
- 2017 data for all 253 children under five tested either at Mount Isa Hospital or through QML and other private pathology services indicates an average BLL of 2.3 µg/dL, with Indigenous children alone also averaging 2.3 µg/dL.
- In 2017, a total of 46 children out of the 253 tested had results equal to or above 5 µg/dL. This included 10 children who were above the old mandatory reporting level of 10 µg/dL.

- In 2016, the 170 children under five tested either at Mount Isa Hospital or through QML and other private pathology services, recorded an average BLL of 2.3 µg/dL, with Indigenous children averaging 2.8 µg/dL.

- In 2016, a total of 30 children out of the 170 tested had results equal to or above 5 µg/dL. This included five children who were above the old mandatory reporting level of 10 µg/dL.

- In 2006–2007, Mount Isa children under five who were tested had an average BLL of 5 µg/dL, with Indigenous children tested recording an average of 7 µg/dL.

- In 2006–2007, there is no data for the number of children with blood lead levels equal to or above 5 µg/dL as this was not a reporting level at the time. However, a total of 45 children had blood lead levels above the old mandatory reporting level of 10 µg/dL.

- In 2010, the survey recorded an average BLL of 4.3 µg/dL for all children under five who were tested, with an average of 5.4 µg/dL for Indigenous children.

- The minimum detectable lead level of laboratory analysed venous blood samples is 1.04 µg/dL.

- These results indicate that the intervention and information strategies we have put in place are having some effect and we will continue building on these.

- Furthermore, there have been no recorded cases of acute lead toxicity in children for more than 20 years.

- We now also have results supplied by the North West Hospital and Health Service for the Point of Care Testing (POCT) finger-prick testing program between September 2016 and February 2018.

- A total of 757 children less than five years of age were tested under the POCT program during the given period, 112 of them identified as Indigenous.

- 604 of these children were tested under POCT in 2017 alone.

- The average blood lead level (geometric mean) for ALL Mount Isa children aged under five – Indigenous and non-Indigenous – tested under the POCT program between September 2016 and February 2018 was 4.3 µg/dL. The average specifically for Indigenous children was a little higher at 4.7 µg/dL.

- Of the 757 children tested under the POCT program, 179 recorded a blood lead level of between 5 and 9.9 µg/dL and a further 32 recorded a blood lead level equal to or above 10 µg/dL.

- The highest blood lead level recorded amongst POCT-tested children was 19 µg/dL.

- However, it is well recognised that POCT is not as accurate as venous blood lead testing and can only be regarded as indicative.

- The minimum detectable lead level of capillary samples analysed using the lead care II machine is 3.3 µg/dL.

- Insufficient cleaning of the skin prior to the finger-prick and the environment in which the tests are undertaken may severely affect results.

- Where levels at or above 8 µg/dL are recorded through a finger-prick test, a referral to a GP is provided for a venous blood test to be ordered to confirm the result. If the result of the venous test remains above 5, it is referred to public health clinicians for follow-up as already happens with venous blood test results above the mandatory reporting level.

- Such more focused monitoring and interventions targeting at risk households are the key to reducing exposure to lead and are far more effective than trying to achieve a population-wide lead screening target.

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Department of Health

Media statement

Queensland Government

30 May 2018

Mount Isa children's blood lead levels

Average venous blood lead levels in tested children under five in Mount Isa continue to fall gradually.

Queensland Chief Health Officer Dr Jeannette Young said 857 children under five had their blood lead levels tested during 2017 under various testing programs in Mount Isa.

"This represents about 47 per cent of the estimated 1801 or so cohort of children aged under five in Mount Isa," she said.

Dr Young – who is also Chair of the Mount Isa Lead Health Management Committee – said this was a good outcome for the free voluntary testing programs in the city.

"The results for 2017 indicate average venous blood lead levels recorded in children under five who have been tested have continued to decline since the initial Mount Isa children's blood lead level survey in 2006-2007," she said.

"These results indicate that the intervention and information strategies we have put in place are having some effect and we will continue building on these.

"Furthermore, there have been no recorded cases of acute lead toxicity in children for more than 20 years."

Dr Young said Queensland Health had an extensive and free voluntary blood lead level testing program in Mount Isa that was available to everyone, both adults and children.

"This has been available since 2010, initially through QML and then also other private pathology laboratories in Mount Isa, and has been well promoted and is well understood in the general community," she said.

"We encourage all Mount Isa residents to be tested regularly and to have their children tested."

Dr Young said the free private laboratory venous blood testing program was supplemented in August 2014 with the introduction of venous blood lead level testing for children under five at Mount Isa Hospital.

"The testing program at Mount Isa Hospital has proved increasingly popular and many more children are now being tested there than through the private laboratory testing program," she said.

"In addition, Point of Care Testing (POCT) was introduced in Mount Isa in September 2016 by the North West Hospital and Health Service at a number of locations in the city.

"POCT is offered at the same time as scheduled immunisations, i.e. at six months, 12 months, 18 months and three-and-half years, but all children can be tested up to five years of age.

Department of Health

Media statement

Queensland Government

"POCT involves quick and easy finger-prick testing of young children and was introduced to supplement the existing venous blood lead testing (taking blood from the vein).

"However, it is well recognised that POCT is not as accurate as venous blood lead testing and can only be regarded as indicative.

"Insufficient cleaning of the skin prior to the finger-prick and the environment in which the tests are undertaken may severely affect results.

"As such, we have a procedure in place in Mount Isa for all POCT results above 5 µg/dL (micrograms per decilitre) to be referred to the Mount Isa Public Health Unit for follow-up.

"Depending on the circumstances of the case and the actual blood lead level recorded, this follow-up process can include a recommendation that the child should have a venous blood lead test to confirm the POCT result.

"Due to limitations with the analysis method used in the finger-prick testing machine, only results at or above 8 µg/dL are considered for referral for the more accurate venous testing.

"Should the follow-up venous blood test continue to report a higher level of exposure, the public health unit will work with the family involved to see what further measures can be taken to minimise the child's exposure to lead in the domestic or surrounding environment.

"Such more focused monitoring and interventions targeting at risk households are the key to reducing exposure to lead and are far more effective than trying to achieve a population-wide lead screening target."

Dr Young said a total of 253 children under five had undergone venous blood lead level tests in Mount Isa during 2017 – 189 children at Mount Isa Hospital and 64 at private laboratories.

A further 604 children under five were screened through the POCT program in 2017 alone.

In total, the POCT program screened 757 children under five between its introduction in September 2016 and the latest data available in February 2018.

Dr Young said the health impacts of environmental lead in Mount Isa were widely recognised and their management had been a priority for the State Government.

"While these impacts cannot be entirely removed, various steps can and have been taken to mitigate and minimise them," she said.

"This is particularly important in the case of young children under five years who are most vulnerable to lead health risks.

"So long as people are well informed and take the appropriate and recommended protective and mitigation measures to minimise their and their children's exposure to lead, I believe Mount Isa remains a safe place in which to live."

Department of Health

Media statement

Queensland Government

Mount Isa venous blood lead level testing program highlights

- 2017 data for ALL 253 children under five tested either at Mount Isa Hospital or through QML and other private pathology services indicates a geometric mean blood lead level (BLL) of 2.3 µg/dL, with Indigenous children alone also averaging 2.3 µg/dL.
- In 2017, a total of 46 children out of the 253 tested had results equal to or above 5 µg/dL. This included 10 children who were above the old mandatory reporting level of 10 µg/dL.
- In 2016, the 170 children under five tested either at Mount Isa Hospital or through QML and other private pathology services, recorded an average BLL of 2.3 µg/dL, with Indigenous children averaging 2.8 µg/dL.
- In 2016, a total of 30 children out of the 170 tested had results equal to or above 5 µg/dL. This included five children who were above the old mandatory reporting level of 10 µg/dL.
- In 2006–2007, Mount Isa children under five who were tested had a geometric mean BLL of 5 µg/dL, with Indigenous children tested recording an average of 7 µg/dL.
- In 2006–2007, there is no data for the number of children with blood lead levels equal to or above 5 µg/dL as this was not a reporting level at the time. However, a total of 45 children had blood lead levels above the old mandatory reporting level of 10 µg/dL.
- The minimum detectable lead level of laboratory analysed venous blood samples is 1.04 µg/dL

Mount Isa finger-prick (POCT) blood lead level testing highlights

- The average blood lead level for ALL Mount Isa children aged under five – Indigenous and non-Indigenous – tested under the POCT program between September 2016 and February 2018 was 4.3 µg/dL. The average specifically for Indigenous children was a little higher at 4.7 µg/dL.
- Of the 757 children tested under the POCT program throughout that period, 179 recorded a blood lead level of between 5 and 9.9 µg/dL and a further 32 recorded a blood lead level equal to or above 10 µg/dL.
- The highest blood lead level recorded amongst POCT-tested children was 19 µg/dL.
- The minimum detectable lead level of capillary samples analysed using the lead care II machine is 3.3 µg/dL.

ENDS

Media contact: 3708 5376

Queensland Government

Mount Isa Lead Health Management Committee

Minutes of Meeting

Date	2.30 pm – 5.00 pm: Wednesday 30th May 2018
Location	Level 3, Mount Isa Hospital, Mount Isa
Members present	Dr Jeannette Young, Chief Health Officer, Department of Health – Chair Sophie Dwyer, Executive Director, Health Protection Branch, Department of Health Joyce McCulloch, Mayor, Mount Isa City Council Rob Katter MP, State Member for Traegar Paul Woodhouse, Chair, North West Hospital and Health Service (NWHHS) Katherine du Preez, Commissioner, Mine Safety and Health, Department of Natural Resources and Mines Julie Harcourt, Manager, Family and Child Research, Queensland Family and Child Commission (QFCC) Greg Ashe, Chief Operating Officer Zinc, Glencore Assets Australia Dean Ellwood, Deputy Director-General, Department of Environment and Heritage Protection (T) Lisa Davies-Jones, Chief Executive Officer, North West Hospital and Health Service Kerrie O'Connor, Nurse Unit Manager, Child Health, NWHHS Toni Glanville, Project Officer, Mount Isa Lead Alliance (MILA) – Minutes Secretary David Wainwright, Director - Air Quality Sciences, Department of Science Information Technology and Innovation (DSITI) Liz MacIntyre, Media and Communications Officer, NWHHS
Apologies	Honourable Bob Katter, Federal Member for Kennedy Phillip Brooks, Commissioner, Queensland Family and Child Commission Michelle Garner, District Director of Nursing, NWHHS Uma Rajappa, Director, Environmental Hazards Unit, Department of Health – Secretary

AGENDA ITEM	DISCUSSION AND OUTCOME
Agenda item 1	**Welcome**
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Agenda item 2	**Minutes of the previous meeting**

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Agenda item 3	Business arising – Action Log

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Agenda item 4	s.73

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Agenda item 5	Analysis of NWHHS – Capillary Testing Program

Chair notified the committee of the Therapeutic Goods Administration (TGA) investigation into blood lead testing using the LEADCare11 machines, which resulted in NWHHS suspending Mount Isa POCT in February 2018.

The TGA alerted the Chief Health Officer that the device may underestimate results. A review however revealed this warning was based on the use of the device for venous testing and not capillary testing, with the rubber stopper used in venous blood collection contained chemical thiuram, which releases sulphur containing gases that dissolve into blood samples and bind to lead particles, causing the under estimation of blood lead results in venous samples.

Testing in Mount Isa recommenced 8th May under instruction from the Chief Health Officer.

Agenda item 6	Update NWHHS – Blood Lead Testing Programs

Kerri O'Connor, Nurse Unit Manager Child Health Community & Primary Health Care provided an update of the testing programs for blood lead surveillance in Mount Isa.

Point of Care Testing

The number of children tested at Mount Isa Health Services from September 2016 to February 2018 is 757, of which 179 children had blood lead levels between 5 and 10µg/dL (micrograms per decilitre), 32 children greater than 10µg/dL and 112 children were Indigenous.

Results show that the Geometric Mean was 4.3µg/dL This mean was higher for indigenous children (4.7µg/dL) than non-indigenous children (4.3µg/dL). The highest blood lead level recorded was 19µg/dL.

The Committee noted that its strategy to introduce the POCT in Mount Isa was working and

yielding results. It also noted that the POCT program may need to be evaluated to assess barriers and opportunities to increasing the participation in the program by including a permanent testing site at Gidgee Healing.

Venous Testing

Chair updated the committee on the BLL results from children under 5 years of age utilising venous testing, noting the Geometric Mean had significantly decreased since 2010 from 5µg/dL down to 2.3µg/dL in 2017.

Hospital testing results showing a Geometric Mean of 2µg/dL, with indigenous children at 2.3µg/dL

Outcome:

The Committee noted the updates and the progress made by NWHHS in conducting the POCT in Mount Isa and commended the significant increase in the number of children tested at POCT centres.

Agenda item 7	s.73

s.73

s.73

Agenda item 8	University NSW – POCT at Ngukuthati Children & Family Centre

The Committee was informed of the University of New South Wales (University of NSW) Mount Isa Point of Care Testing (POCT) - Blood Lead Study. The research study was led by Dr Donna Green and blood lead testing was conducted on 17 March and 12 May 2017 at the Ngukuthati Children & Family Centre.

- The study reported that:

    a. of the 30 children tested (a small size);

        - 12 had a BLL ≥5 ug/dL and 3 had levels ≥ 10 ug/dL and the geometric mean was below the notifiable level.
        - 28 children had never had a blood lead level test.
        - BLLs were statistically higher for Indigenous children

    b. there are likely to be a significant number of children with blood lead levels ≥5 µg/dL and that there should be universal annual testing of children.

    c. the need for a review of Mount Isa Mines environmental emissions, recommending a reduction to that of the US EPA's requirements of 0.15 $\mu g/m^3$ (3 month rolling average)

The committee agreed that the response from the Deputy Vice Chancellor (Research) did not acknowledge the disruption to the NWHHS POCT program or the ongoing community expectations regarding the incentive payment for undertaking a POCT that followed. That there was no significant concern in the community following the release of the report on the 13 December 2017 in the '*International Journal of Environmental Research and Public Health*' 2017.

Outcome:

The Committee agreed that it will need to monitor any future studies as they arise and act accordingly.

Agenda item 9	s.73

s.73

Agenda item 10	s.73

s.73

Agenda item 11	MILHMC Other Business

s.73

Meeting closed 4.50pm

Mount Isa Lead Health Management Committee (MLHMC)

30 May 2018 Agenda item 7

Title: UNSW Mount Isa Blood Lead Study - Update

Speaker: Uma Rajappa, Director Environmental Hazards, Health Protection Branch

Action: For Noting

Purpose

To update the Committee about the University of New South Wales (UNSW) Mount Isa Point Of Care Testing (POCT) - Blood Lead Study (the UNSW study)

Background

- The UNSW study led by Dr Donna Green, Chief Investigator, UNSW was conducted on 17 March 2017 and 12 May 2017 at the Ngukuthati Children & Family Centre, Mount Isa.
- Dr Donna Green published an article on 13 December 2017 in the '*International Journal of Environmental Research and Public Health*' titled '*A Pilot Study of Children's Blood Lead Levels in Mount Isa, Queensland*'.
- The capillary blood lead testing was performed by a Sonic Healthcare general practitioner on children aged between 12 months to 6 years using an onsite portable blood lead testing analyser (LeadCare II Point-of-Care testing system). An incentive payment of $50 was offered to parents who agreed to participate in the study.
- The Chair has previously written on two occasions to UNSW seeking further details and expressing concerns regarding Dr Donna Green's research study.

Comments on the '*Pilot Study of Children's Blood Lead Levels in Mount Isa, Queensland*';

The study reported that of the 30 children tested:

- 12 (40%) had a BLL ≥5 ug/dL and 10% (n=3) had levels ≥ 10 ug/dL
- BLLs were statistically higher for Indigenous children (6.5 ug/dL; 95% CI 4.7-9.2) than for non-Indigenous children (2.4 ug/dL; 95% CI 1.8-3.1)
- The overall geometric mean was 3.8 ug/dL (95% CI 2.9, 5.0) and below the notifiable level. The highest blood measured was 17.3 ug/dL
- With respect to the acceptability of capillary testing, the method was well received by parents who appeared to be appreciate receiving immediate results
- 93% (n=28) of children reported never having been tested for lead despite long-term residence in Mount Isa

The study authors highlight the following points;

1. The method was reported as well received by parents.
    - There is little information regarding how the acceptability was assessed. The provision of a $50 gift card may bias the responses provided.

2. There are a number of limitations including small sample size (30 children only) and non-representative convenience sample.
    - Meaningful interpretation of the geometric mean is limited due to small total numbers (n=30) and low power.
3. The findings are important from a public health perspective as they indicate that there are ***likely*** to be a significant number of children with blood lead levels ≥5 µg/dL.
    - The current POCT program aims to test all children in Mount Isa including Indigenous children to identify those with a BLL ≥5 µg/dL.
4. The study recommended;
    - annual universal blood lead testing of children and publicly reported results.
    - culturally appropriate follow-up and intervention for children identified with BLL ≥ 5ug/dL,
    - stack and fugitive emissions reductions
    - other environmental strategies to reduce exposure including remediation of soil contamination in children's play and residential areas.
    - The authors also state that a stricter lead emissions should be applied to Mount Isa Mines quoting that the US EPA adopted a lead in air standard in 2008 of of 0.15 µg/m^3 (3 month rolling average). It should be noted however that applying this standard is not consistent throughout the US, as there are *areas designated nonattainment for this Pb standards and the previous standards (1.5 µg/m^3 as a calendar quarter average) also remain in effect.'(https://www.epa.gov/criteria-air-pollutants/naaqs-table)*

RECOMMENDATIONS

The Committee note:

- That the University of New South Wales Mount Isa Point of Care Testing - Blood Lead study was published in the *International Journal of Environmental Research and Public Health.*
- The blood lead results from the UNSW study should be reviewed in conjunction with results from NWHHS POCT program from X September 2016 to X February 2018 to identify improvements in the management of lead health risks in the community.
- Further and additional engagement with Indigenous community, in particular health care services to increase the number of Indigenous children aged less than five years undertaking POCT in Mount Isa.

Branch:	Mount Isa Lead Health Management Committee Secretariat (Health Protection Branch)
Contact officer:	Uma Rajappa – Director Environmental Hazards Unit
E-mail:	Uma.Rajappa@health.qld.gov.au
Phone No:	3328 9338
Date	30 May 2018
Cleared by:	Sophie Dwyer – Executive Director, Health Protection Branch

Mount Isa Lead Health Management Committee (MLHMC)

30 May 2018 Agenda item 8

Title: UNSW Mount Isa Blood Lead Study - Update

Speaker: Chair, Chief Health Officer, Prevention Division

Action: For Noting

Purpose

To update the Committee about the University of New South Wales (UNSW) Mount Isa Point of Care Testing (POCT) - Blood Lead Study (the UNSW study)

Background

- The UNSW study led by Dr Donna Green, Chief Investigator, UNSW was conducted on 17 March 2017 and 12 May 2017 at the Ngukuthati Children & Family Centre, Mount Isa.
- The capillary blood lead testing was performed by a Sonic Healthcare general practitioner on children aged between 12 months to 6 years using an onsite portable blood lead testing analyser (LeadCare II Point-of-Care testing system). An incentive payment of $50 was offered to parents who agreed to participate in the study.

s.73 [redacted]

- Dr Donna Green published an article on 13 December 2017 in the '*International Journal of Environmental Research and Public Health'* titled '*A Pilot Study of Children's Blood Lead Levels in Mount Isa, Queensland'*
- The study reported that:

    a. of the 30 children tested (a small size);

        - 12 had a BLL ≥5 ug/dL and 3 had levels ≥ 10 ug/dL and the geometric mean was below the notifiable level.
        - 28 children had never had a blood lead level test.
        - BLLs were statistically higher for Indigenous children

    b. there are likely to be a significant number of children with blood lead levels ≥5 µg/dL and that there should be universal annual testing of children.

    c. the need for a review of Mount Isa Mines environmental emissions, recommending a reduction to that of the US EPA's requirements of 0.15 µg/m^3 (3 month rolling average)

Discussion

s.73

- There doesn't appear to be any significant concern in the community following the release of the report on the 13 December 2017 in the '*International Journal of Environmental Research and Public Health'* 2017.

- The Committee will need to monitor any future studies as they arise.

RECOMMENDATIONS

The Committee note:

- The response from UNSW - Deputy Vice Chancellor (Research) to the Chair's correspondence.

Branch: Mount Isa Lead Health Management Committee Secretariat (Health Protection Branch)
Contact officer: Uma Rajappa – Director Environmental Hazards Unit
E-mail: Uma.Rajappa@health.qld.gov.au

Phone No: 3328 9338
Date 30 May 2018

Cleared by: Sophie Dwyer – Executive Director, Health Protection Branch

Attachment 1;

- 12 (40%) had a BLL ≥5 ug/dL and 10% (n=3) had levels ≥ 10 ug/dL
- BLLs were statistically higher for Indigenous children (6.5 ug/dL; 95% CI 4.7-9.2) than for non-Indigenous children (2.4 ug/dL; 95% CI 1.8-3.1)
- The overall geometric mean was 3.8 ug/dL (95% CI 2.9, 5.0) and below the notifiable level. The highest blood measured was 17.3 ug/dL
- 93% (n=28) of children reported never having been tested for lead despite long-term residence in Mount Isa.

We need this to be filed David.

From: HProt.corro
Sent: Friday, 25 May 2018 11:52 AM
To: Uma Rajappa <Uma.Rajappa@health.qld.gov.au>
Cc: environmentalhazards <environmentalhazards@health.qld.gov.au>
Subject: FW: Proposed draft response - DOH children's lead levels Mount Isa

Hi Uma

Below/attached is an FYI only.

Regards
Gail

From: CHO CHO
Sent: Friday, 25 May 2018 11:39 AM
To: Lisa Davies-Jones <Lisa.Davies-Jones@health.qld.gov.au>
Cc: md22NWHHS <MD22-MtIsa-HSD@health.qld.gov.au>; HProt.corro <HProt.corro@health.qld.gov.au>; news <news@health.qld.gov.au>
Subject: Proposed draft response - DOH children's lead levels Mount Isa

Good Morning,

Please see attached proposed draft response to Dr Steven Donohue and revised media statement supported by Dr Jeannette Young.

Kind regards,
Jess

Queensland Government

Prevention Division Correspondence Team
Jess Burns, Briefings Officer – 3708 5196
Madison Crofts, Correspondence Officer - 3708 5194
Janine Tennant, Correspondence Officer - 3708 5193

Office of The Chief Health Officer and Deputy Director-General, Prevention Division, Department of Health

a: 33 Charlotte Street, Brisbane QLD 4000
w: Queensland Health | **e:** CHO_CHO@health.qld.gov.au

From: Lisa Davies-Jones
Sent: Tuesday, 22 May 2018 5:54 AM
To: Jeannette Young <Jeannette.Young@health.qld.gov.au>
Cc: s.47(3)(b) .com
Subject: FW: DOH children's lead levels Mount Isa 180530

Dear Jeanette

Please see below correspondence from Steven Donohue. I would be grateful of your advice regarding how best to respond to Steven's ongoing concerns with our approach. Perhaps there is opportunity for this when you visit Mount Isa next week.

Kind Regards

Lisa

Lisa Davies Jones
Health Service Chief Executive
Office of the Chief Executive
North West Hospital and Health Service | Queensland Government

p: 07 4744 4469
a: 30 Camooweal Street, Mount Isa, QLD 4825
w: www.health.qld.gov.au
e: Lisa.Davies-Jones@health.qld.gov.au

North West Hospital and Health Service

Pathways to better health for our North West communities

Queensland Health acknowledges the Traditional Owners of the land, and pays respect to Elders past, present and future.

From: Steven Donohue
Sent: Monday, 21 May 2018 3:13 PM
To: Jim Guthrie; Lisa Davies-Jones
Cc: Elizabeth MacIntyre; Paul Woodhouse1 s.47(3)(b) com); Paul Woodhouse2 s.47(3)(b) .com)
Subject: RE: DOH children's lead levels Mount Isa 180530

Dear Lisa

As your Public Health Physician, I must advise that I was not consulted on and do not support the attached media statement.

The statement is inaccurate and misleading in several respects:

- 857 is not the number of children, it is the number of *tests* claimed in 2017 (children often have repeat testing).
- Many of those tests (finger-prick 'POCT') were not valid and should not be counted.
- Claiming this represents a percentage covered of an age cohort implies a population screening program, which was neither practical, intended nor desirable (see below)
- Combining mixed testing sources and methods is not a true reflection of 'average' blood lead levels, as our report made clear
- Comparing a current 'average' with a previous, flawed community survey, does not show a statistically robust trend in the population
- 'Intervention and information strategies' were almost certainly NOT responsible for a decline shown in the hospital data set (there is no evidence to show these methods work)
- No known cases of acute lead toxicity (ie. very high levels) are not the point – we have a population-wide, long-term, low-level exposure with known adverse effects.
- The Mt Isa Hospital testing is a routine addition – popularity is irrelevant

The data my team have provided is about **population surveillance** – of which only the hospital dataset is a reliable indicator and shows an encouraging trend.

The statement implies we are have a population – based **screening program** in Mt Isa (ie. diagnosis of 'cases' and individual treatment). This is not true - we cannot 'screen and treat' our way out of an environmental health problem.

In particular, the fingerprick testing does not meet basic WHO criteria for an effective screening program:

- The natural history means most neurodevelopmental harm occurs before testing and is irreversible
- Early intervention ('education') is not shown to change prognosis at typical levels
- The test will be unreliable in this setting; even accurate BLL is a poor reflection of body stores and overall risk
- No clinical difference between results just above or below 5 µg/dL
- Unlikely to capture the highest risk groups (poor, Indigenous)
- Unlikely to be acceptable to the target population

In addition, there has been inadequate management of the POCT project:

- Insufficient funding for staff
- Poor or non-existent training
- Unclear responsibility for ongoing quality control, maintenance and clinical supervision
- No guidance on notification, referral, re-testing and follow-up
- The 'intervention' for those above and below 5 µg/dL would be the same (so why test?)
- No plan for evaluation as a pilot project

Even if the POCT machine were operated perfectly, it does not have sufficient accuracy for a local screening program at current levels. From in-the-field practice, the results have been wildly inaccurate. Where we have fingerprick and Laboratory BLL results on the same child, there is no relation between these numbers.

Untrained staff are giving wrong advice to parents. Lead levels are pronounced 'normal' or 'dangerous', giving either false reassurance or false alarm around an arbitrary cutoff. This is frightening and often harmful. The PHU nurses have seen parents in tears over doubtful POCT results and inappropriate advice.

The Public Health Unit does not have resources to deal with many worthless referrals. POCT test results are regarded as invalid and do not generate a notification. The finger-prick results are essentially meaningless and our only response to these would be to advise a Blood Lead test.

I recommend the ill-advised POCT project be shut down.

As things stand, I do not believe that government owned houses, with highly contaminated soils and exposed Lead paint, are safe places for children in Mount Isa.
Rehabilitation of known contaminated environments is where we need to act, and this does not require testing of larger numbers of children.

Dr Steven Donohue
Director / Public Health Physician
Townsville Public Health Unit
Office (07) 44336900
Fax (07) 44336901
Mobile s.73

From: Jim Guthrie
Sent: Friday, 18 May 2018 11:56 AM
To: Lisa Davies-Jones <Lisa.Davies-Jones@health.qld.gov.au>; Steven Donohue <Steven.Donohue@health.qld.gov.au>
Cc: Elizabeth MacIntyre <Elizabeth.MacIntyre@health.qld.gov.au>; Paul Woodhouse1 (manfred8758@gmail.com) <manfred8758@gmail.com>; Paul Woodhouse2 (woodhousepd@icloud.com) <woodhousepd@icloud.com>
Subject: DOH children's lead levels Mount Isa 180530

Hi Lisa and Steven,

FYI: Attached statement has been approved by the CHO – and also cleared by the minister's office – and Jeannette will be handing this to the North West Star and ABC Mount Isa when she does her normal interview with them immediately after the next Mount Isa Lead Health Management Committee meeting on 30 May.

Regards, Jim

Queensland Government

James Guthrie
Principal Media Officer, Rural and Remote Qld
Media Unit, Integrated Communications Branch,
Corporate Services Division, **Department of Health**
Please note some of my contact details have changed:
p: 07 3708 5379
a: Level 3, 33 Charlotte St, Brisbane, QLD 4000
w: Queensland Health | **e:** Jim.Guthrie@health.qld.gov.au

Queensland's health vision | *By 2026 Queenslanders will be among the healthiest people in the world.*

Queensland Health acknowledges the Traditional Owners of the land, and pays respect to Elders past, present and future.

Department of Health

Media statement

Queensland Government

Xx May 2018

Mount Isa children's blood lead levels

Queensland Chief Health Officer Dr Jeannette Young said a total of 253 children under five had undergone venous blood lead level tests in Mount Isa during 2017.

A further 604 children under five were screened through the point of care testing (POCT) program during the same period.

"This represents an encouraging increase in participation by the estimated 1,801 or so cohort of children aged under five in the blood lead testing programs in Mount Isa," she said.

Average venous blood lead levels in tested children under five in Mount Isa continue to fall gradually.

"These results indicate that the intervention and information strategies we have put in place are having some effect and we will continue building on these.

Dr Young said Queensland Health had an extensive and free voluntary blood lead level testing program in Mount Isa that was available to everyone, both adults and children.

"This has been available since 2010, initially through QML and then also other private pathology laboratories in Mount Isa, and has been well promoted and is well understood in the general community," she said.

"We encourage all Mount Isa residents to be tested regularly and to have their children tested."

Dr Young said the free private laboratory venous blood testing program was supplemented in August 2014 with the introduction of venous blood lead level testing for children under five at Mount Isa Hospital.

"In addition, Point of Care Testing (POCT) was introduced in Mount Isa in September 2016 by the North West Hospital and Health Service at a number of locations in the city.

"POCT is offered at the same time as scheduled immunisations, i.e. at six months, 12 months, 18 months and three-and-half years, but all children can be tested up to five years of age.

"POCT involves quick and easy finger-prick testing of young children and was introduced to supplement the existing venous blood lead testing (taking blood from the vein).

"However, it is well recognised that POCT is not as accurate as venous blood lead testing and can only be regarded as indicative.

"Insufficient cleaning of the skin prior to the finger-prick and the environment in which the tests are undertaken may severely affect results.

"As such, we have a procedure in place in Mount Isa for all POCT results above 5 µg/dL (micrograms per decilitre) to be referred to the Mount Isa Public Health Unit for follow-up.

"Depending on the circumstances of the case and the actual blood lead level recorded, this follow-up process can include a recommendation that the child should have a venous blood lead test to confirm the POCT result.

"Due to limitations with the analysis method used in the finger-prick testing machine, only results at or above 8 µg/dL are considered for referral for the more accurate venous testing.

"Should the follow-up venous blood test confirm an elevated blood lead level, the public health unit will work with the family involved to see what further measures can be taken to minimise the child's exposure to lead in the domestic or surrounding environment.

"Such more focused monitoring and interventions targeting at risk households are the key to reducing exposure to lead and are far more effective than trying to achieve a population-wide lead screening target.''

In total, the POCT program screened 757 children under five between its introduction in September 2016 and the latest data available in February 2018.

Dr Young said the health impacts of environmental lead in Mount Isa were widely recognised and their management had been a priority for the State Government.

"While these impacts cannot be entirely removed, various steps can and have been taken to mitigate and minimise them,'' she said.

"This is particularly important in the case of young children under five years who are most vulnerable to lead health risks.

"So long as people are well informed and take the appropriate and recommended protective and mitigation measures to minimise their and their children's exposure to lead, I believe Mount Isa remains a safe place in which to live.

Mount Isa venous blood lead level testing program highlights

- 2017 data for ALL 253 children under five tested either at Mount Isa Hospital or through QML and other private pathology services indicates a geometric mean blood lead level (BLL) of 2.3 µg/d. The average for Indigenous children was also 2.3 µg/dL.
- In 2017, a total of 46 children out of the 253 tested had results equal to or above 5 µg/dL. This included 10 children who were above the old mandatory reporting level of 10 µg/dL.
- In 2016, the 170 children under five tested either at Mount Isa Hospital or through QML and other private pathology services, recorded an average BLL of 2.3 µg/dL, with Indigenous children averaging 2.8 µg/dL.
- In 2016, a total of 30 children out of the 170 tested had results equal to or above 5 µg/dL. This included five children who were above the old mandatory reporting level of 10 µg/dL.

Department of Health

Media statement

Queensland Government

- In 2006–2007, Mount Isa children under five who were tested had a geometric mean BLL of 5 µg/dL, with Indigenous children tested recording an average of 7 µg/dL.
- In 2006–2007, there is no data for the number of children with blood lead levels equal to or above 5 µg/dL as this was not a reporting level at the time. However, a total of 45 children had blood lead levels above the old mandatory reporting level of 10 µg/dL.
- The minimum detectable lead level of laboratory analysed venous blood samples is 1.04 µg/dL

Mount Isa finger-prick (POCT) blood lead level testing highlights

- The average blood lead level for ALL Mount Isa children aged under five – Indigenous and non-Indigenous – tested under the POCT program between September 2016 and February 2018 was 4.3 µg/dL. The average specifically for Indigenous children was a little higher at 4.7 µg/dL.
- Of the 757 children tested under the POCT program throughout that period, 179 recorded a blood lead level of between 5 and 9.9 µg/dL and a further 32 recorded a blood lead level equal to or above 10 µg/dL.
- The highest blood lead level recorded amongst POCT-tested children was 19 µg/dL.
- The minimum detectable lead level of capillary samples analysed using the lead care II machine is 3.3 µg/dL.

ENDS

Media contact: 3708 5376

FOR INTERNAL USE ONLY

Written by: [Jim Guthrie, Principal Media Officer] **Date: 2/05/2018**

Authorised by: [Uma Rajappa, Director Environmental Hazards] **Date: 17/05/2018**

Authorised by: [Sophie Dwyer, Executive Director, Health Protection] **Date: 17/05/2018**

Authorised by: [Dr Jeannette Young, CHO and DDG Prevention] **Date: 17/05/2018**

Response to comments from Townsville Public Health Unit

- 857 is not the number of children, it is the number of *tests* claimed in 2017 (children often have repeat testing).

  857 is not the number of tests, it is the number of children tested separately in the venous and the POCT programs in Mount Isa during 2017. As stated in the media statement, this is made up of 604 children tested in POCT (with follow up venous testing if required) and 253 children tested in the venous testing program only. The media statement has been amended to reflect this.

- Many of those tests (finger-prick 'POCT') were not valid and should not be counted.

  This comment is unclear. The NWHHS clinical staff undertake testing diligently and adhere to rigorous hygiene measures to ensure a valid result.

  The main issue with the Lead Care II device is the possible overestimation of blood lead results. Therefore, results above 8 µg/dL are followed by venous testing according to POCT protocol.

- Claiming this represents a percentage covered of an age cohort implies a population screening program, which was neither practical, intended nor desirable (see below)

  The comparison with the total number of children is purely to demonstrate the reach of the program and acceptance by the Mount Isa community.

- Combining mixed testing sources and methods is not a true reflection of 'average' blood lead levels, as our report made clear

  The media statement does not combine results from venous and POCT. The average blood lead levels for both programs have been identified separately.

- Comparing a current 'average' with a previous, flawed community survey, does not show a statistically robust trend in the population

  Agree that the 2006/7 and 2010 community surveys were not random surveys and we should be cautious in comparing the data. These surveys were designed by Townsville Public Health Unit to identify lead risks in young children in Mount Isa. The media statement has been revised to remove reference to community surveys.

  In any case, there is a down trend in the venous blood lead testing results as seen from 2011 to 2017 venous results.

- 'Intervention and information strategies' were almost certainly NOT responsible for a decline shown in the hospital data set (there is no evidence to show these methods work)

  Agreed. However, the intervention and information strategies are contributing to raise awareness of the lead risks to the community and behavioural changes appear to be occurring. This is seen in the increased participation in the POCT program.

- No known cases of acute lead toxicity (i.e. very high levels) are not the point – we have a population-wide, long-term, low-level exposure with known adverse effects.

  This statement is to assure the community that lead health risks are not acute in Mount Isa.

- The Mt Isa Hospital testing is a routine addition – popularity is irrelevant
  Agree. The media statement will be amended to reflect this.

Dear Steven,

Thank you for raising your concerns regarding the draft media statement and Point of Care Testing (POCT) program in Mount Isa.

I have reviewed the information you have provided and sought clarification from Dr Jeannette Young, about her media statement. A number of your comments were helpful and the media statement will be adjusted.

Firstly, I want to reiterate to you that NWHHS strongly supports the point of care testing program introduced in September 2016 in Mount Isa and has no intention of discontinuing this critical service to the community. NWHHS has introduced the POCT program to address the poor uptake of blood lead testing in Mount Isa. The venous blood testing program had low acceptance by the community due to its invasive nature and cost to the parents from needing to seek a medical appointment to obtain results.

I am very pleased to note that POCT has addressed these issues. It has been well accepted by the community as can be seen by the high participation of parents with young children. Since commencement till 13 February 2018, 1,028 blood lead tests have been conducted. Participation of Indigenous children has also increased.

Environmental management of lead is the goal, it is however a slow and ongoing process. In the meantime, identifying children with elevated blood lead levels is a sound measure in the protection of public health of the community.

I believe that the Mount Isa blood lead testing programs meets the World Health Organisation criteria for a screening program, in that it is part of an organised program that involves follow-up of at risk children. The main objective of the program is to improve and provide equitable and easy access to all parents of young children in Mount Isa.

The decision to introduce the Lead Care II device was based on its widespread use in clinical settings both in Australia and overseas. This device has been shown to be appropriate for the identification and monitoring of children exposed to lead, as is our objective in Mount Isa. The staff have implemented rigorous hygiene measures to prevent contamination of blood samples including quality assurance measures recommended by the manufacturer. I am also comforted that Townsville Public Health Unit is taking adequate steps to ensure that all children identified with elevated blood lead levels under the venous testing are followed up to assist in reducing their lead exposure.

I am satisfied that the NWHHS POCT program is being appropriately resourced and implemented. It is a very useful addition to the suite of measures implemented by the Health Services to reduce lead risks in Mount Isa. I am therefore confident that the continuation of the POCT testing is beneficial to the Mount Isa community.

Thank you again for raising your concerns with me. I have attached Dr Young's response to your comments on her media statement.
Regards
Lisa Davies-Jones

From: HProt.corro
To: Uma Rajappa; Suzanne Huxley
Cc: environmentalhazards
Subject: FW: Proposed draft response - DOH children"s lead levels Mount Isa
Date: Friday, 25 May 2018 1:09:00 PM
Attachments: image011.png
image017.png
image018.png
image019.png
image020.png
image021.png

Hi Uma

FYI.

Regards
Gail

From: Lisa Davies-Jones
Sent: Friday, 25 May 2018 1:07 PM
To: CHO CHO <CHO_CHO@health.qld.gov.au>
Cc: md22NWHHS <MD22-MtIsa-HSD@health.qld.gov.au>; HProt.corro <HProt.corro@health.qld.gov.au>; news <news@health.qld.gov.au>; Elizabeth MacIntyre <Elizabeth.MacIntyre@health.qld.gov.au>; NWHHS.CE <NWHHS.CE@health.qld.gov.au>
Subject: RE: Proposed draft response - DOH children's lead levels Mount Isa

Good afternoon

Thank you very much for the draft response to Dr Donohue and the updated Media Statement. I am happy with these and have made no changes.

Kind Regards

Lisa

Lisa Davies Jones
Health Service Chief Executive
Office of the Chief Executive
North West Hospital and Health Service | Queensland Government

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w: www.health.qld.gov.au
e: Lisa.Davies-Jones@health.qld.gov.au

North West Hospital and Health Service

Pathways to better health for our North West communities

Queensland Health acknowledges the Traditional Owners of the land, and pays respect to Elders past, present and future.

From: CHO CHO
Sent: Friday, 25 May 2018 11:39 AM
To: Lisa Davies-Jones
Cc: md22NWHHS; HProt.corro; news
Subject: Proposed draft response - DOH children's lead levels Mount Isa

Good Morning,

Please see attached proposed draft response to Dr Steven Donohue and revised media statement supported by Dr Jeannette Young.

Kind regards,
Jess

Queensland Government

Prevention Division Correspondence Team
Jess Burns, Briefings Officer – 3708 5196
Madison Crofts, Correspondence Officer - 3708 5194
Janine Tennant, Correspondence Officer - 3708 5193

Office of The Chief Health Officer and Deputy Director-General, Prevention Division, Department of Health

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Queensland's health vision | *By 2026 Queenslanders will be among the healthiest people in the world.*

Queensland Health acknowledges the Traditional Owners of the land, and pays respect to Elders past, present and future.

From: Lisa Davies-Jones
Sent: Tuesday, 22 May 2018 5:54 AM
To: Jeannette Young <Jeannette.Young@health.qld.gov.au>
Cc: s.47(3)(b) .com
Subject: FW: DOH children's lead levels Mount Isa 180530

Dear Jeanette

Please see below correspondence from Steven Donohue. I would be grateful of your advice regarding how best to respond to Steven's ongoing concerns with our approach. Perhaps there is opportunity for this when you visit Mount Isa next week.

Kind Regards

Lisa

Lisa Davies Jones
Health Service Chief Executive
Office of the Chief Executive
North West Hospital and Health Service | Queensland Government

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North West Hospital and Health Service

Pathways to better health for our North West communities

Queensland Health acknowledges the Traditional Owners of the land, and pays respect to Elders past, present and future.

From: Steven Donohue
Sent: Monday, 21 May 2018 3:13 PM
To: Jim Guthrie; Lisa Davies-Jones
Cc: Elizabeth MacIntyre; Paul Woodhouse1 s.47(3)(b) .com); Paul Woodhouse2 s.47(3)(b) .com)
Subject: RE: DOH children's lead levels Mount Isa 180530

Dear Lisa

As your Public Health Physician, I must advise that I was not consulted on and do not support the attached media statement.

The statement is inaccurate and misleading in several respects:

- 857 is not the number of children, it is the number of *tests* claimed in 2017 (children often have repeat testing).
- Many of those tests (finger-prick 'POCT') were not valid and should not be counted.
- Claiming this represents a percentage covered of an age cohort implies a population screening program, which was neither practical, intended nor desirable (see below)
- Combining mixed testing sources and methods is not a true reflection of 'average' blood lead levels, as our report made clear
- Comparing a current 'average' with a previous, flawed community survey, does not show a statistically robust trend in the population
- 'Intervention and information strategies' were almost certainly NOT responsible for a decline shown in the hospital data set (there is no evidence to show these methods work)
- No known cases of acute lead toxicity (ie. very high levels) are not the point – we have a population-wide, long-term, low-level exposure with known adverse effects.
- The Mt Isa Hospital testing is a routine addition – popularity is irrelevant

The data my team have provided is about **population surveillance** – of which only the hospital dataset is a reliable indicator and shows an encouraging trend.

The statement implies we are have a population – based **screening program** in Mt Isa (ie. diagnosis of 'cases' and individual treatment). This is not true - we cannot 'screen and treat' our way out of an environmental health problem.

In particular, the fingerprick testing does not meet basic WHO criteria for an effective screening program:

- The natural history means most neurodevelopmental harm occurs before testing and is irreversible
- Early intervention ('education') is not shown to change prognosis at typical levels
- The test will be unreliable in this setting; even accurate BLL is a poor reflection of body stores and overall risk
- No clinical difference between results just above or below 5 µg/dL
- Unlikely to capture the highest risk groups (poor, Indigenous)
- Unlikely to be acceptable to the target population

In addition, there has been inadequate management of the POCT project:

- Insufficient funding for staff
- Poor or non-existent training
- Unclear responsibility for ongoing quality control, maintenance and clinical supervision
- No guidance on notification, referral, re-testing and follow-up
- The 'intervention' for those above and below 5 µg/dL would be the same (so why test?)
- No plan for evaluation as a pilot project

Even if the POCT machine were operated perfectly, it does not have sufficient accuracy for a local screening program at current levels. From in-the-field practice, the results have been wildly inaccurate. Where we have fingerprick and Laboratory BLL results on the same child, there is no relation between these numbers.

Untrained staff are giving wrong advice to parents. Lead levels are pronounced 'normal' or 'dangerous', giving either false reassurance or false alarm around an arbitrary cutoff. This is frightening and often harmful. The PHU nurses have seen parents in tears over doubtful POCT results and inappropriate advice.

The Public Health Unit does not have resources to deal with many worthless referrals. POCT test results are regarded as invalid and do not generate a notification. The finger-prick results are essentially meaningless and our only response to these would be to advise a Blood Lead test.

I recommend the ill-advised POCT project be shut down.

As things stand, I do not believe that government owned houses, with highly contaminated soils and exposed Lead paint, are safe places for children in Mount Isa.
Rehabilitation of known contaminated environments is where we need to act, and this does not require testing of larger numbers of children.

Dr Steven Donohue
Director / Public Health Physician
Townsville Public Health Unit
Office (07) 44336900
Fax (07) 44336901
Mobile s.73

From: Jim Guthrie
Sent: Friday, 18 May 2018 11:56 AM
To: Lisa Davies-Jones <Lisa.Davies-Jones@health.qld.gov.au>; Steven Donohue <Steven.Donohue@health.qld.gov.au>
Cc: Elizabeth MacIntyre <Elizabeth.MacIntyre@health.qld.gov.au>; Paul Woodhouse1 s.47(3)(b) .com) <s.47(3)(b) .com>; Paul Woodhouse2 s.47(3)(b) .com) s.47(3)(b) .com>
Subject: DOH children's lead levels Mount Isa 180530

Hi Lisa and Steven,

FYI: Attached statement has been approved by the CHO – and also cleared by the minister's office – and Jeannette will be handing this to the North West Star and ABC Mount Isa when she does her normal interview with them immediately after the next Mount Isa Lead Health Management Committee meeting on 30 May.

Regards, Jim

James Guthrie
Principal Media Officer, Rural and Remote Qld
Media Unit, Integrated Communications Branch,
Corporate Services Division, **Department of Health**
Please note some of my contact details have changed:

Queensland Government

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a: Level 3, 33 Charlotte St, Brisbane, QLD 4000
w: Queensland Health | e: Jim.Guthrie@health.qld.gov.au

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News From the Food and Drug Administration

New Option for Patients With Advanced Hodgkin Lymphoma

Expanded FDA approval will allow adults with untreated stage III or IV classic Hodgkin lymphoma (cHL) to receive brentuximab vedotin in combination with chemotherapy. The drug already was approved to treat cHL after relapse and in certain circumstances after stem cell transplants.

Marketed as Adcetris, brentuximab vedotin is an antibody-drug conjugate. It binds to the CD30 antigen on the surface of lymphoma cells and delivers the anticancer drug monomethyl auristatin E into the cells. About 95% of all Hodgkins lymphomas in industrialized countries are the classical type, which is characterized by the presence of large, abnormal lymphocytes called Reed-Sternberg cells. The 5-year survival rate for stage III Hodgkin lymphoma is 80% and 65% for stage IV.

Approval of brentuximab vedotin "represents an improvement in the initial treatment regimens of advanced Hodgkin lymphoma that were introduced into clinical practice more than 40 years ago," Richard Pazdur, MD, director of the FDA's Oncology Center of Excellence, said in a statement.

In a trial involving 1334 adults with untreated stage III or IV cHL, one group received brentuximab vedotin along with chemotherapy and another was treated with chemotherapy alone. After an average of six 28-day treatment cycles, patients in the brentuximab vedotin group were 23% less likely to have disease progression, start new therapy, or die than those who received chemotherapy alone. Overall, 18% in the brentuximab vedotin group had disease progression, started new therapy, or died compared with 22% of patients in the chemotherapy group.

Among patients in the brentuximab vedotin group, 67% developed peripheral neuropathy and 91% developed neutropenia. Granulocyte colony-stimulating factor is recommended to help prevent neutropenia by prompting the bone marrow to produce white blood cells. In addition, brentuximab vedotin has a boxed warning about the risk of John Cunningham virus infection resulting in progressive multifocal leukoencephalopathy, a rare but potentially fatal brain infection.

Other serious adverse events include anaphylaxis; hematologic, pulmonary, and hepatic toxic effects; opportunistic infections; and tumor lysis syndrome.

Blood Glucose Readings Made Possible Via Smartphone

The FDA has approved a continuous glucose monitor (CGM) that can work in tandem with mobile medical apps and automated insulin pumps to help people with diabetes manage their condition more easily. The Dexcom G6 is the first CGM approved as both a stand-alone device and one that can be integrated into automated insulin dosing systems.

Dexcom, Inc.

According to the manufacturer, Dexcom Inc of San Diego, California, its newly approved CGM has an easy-to-use autoapplicator that inserts a small sensor just beneath the skin. The sensor measures glucose levels and a transmitter inside of it sends readings wirelessly every 5 minutes to a receiver or a compatible smartphone or smartwatch. With a mobile app, users can share readings with up to 5 people. No fingersticks are needed for calibration or diabetes treatment decisions. In addition, its updated sensor probe minimizes interference with acetaminophen.

In 2 trials, 324 adults and children aged 2 years or older with diabetes used the Dexcom G6 for 10 days. During multiple clinic visits, their readings were compared with laboratory test results that measured their blood glucose levels. An FDA statement indicated that no adverse events were reported during the studies.

The FDA approved the device through its regulatory pathway for new, low- to moderate-risk devices that aren't substantially equivalent to any other approved product on the market. This type of approval establishes criteria called special controls that similar devices submitted for approval will have to meet. Using this pathway streamlines the approval process for other companies that develop integrated CGMs.

Progress in Lead Test Investigation

Rubber stoppers in certain blood collection tubes have been implicated in an FDA investigation of inaccurate results from blood lead tests manufactured by Magellan Diagnostics of Billerica, Massachusetts. Becton, Dickinson and Company (BD) of Franklin Lakes, New Jersey, produces the collection tubes.

The FDA issued an initial warning last year that Magellan lead tests used with venous blood may provide results that are lower than the actual lead level in the blood. The warning included all 4 of Magellan's lead tests. However, the FDA noted that the tests were acceptable for use with blood from finger or heel sticks.

At the FDA's request, BD studied the accuracy of Magellan lead tests used with venous blood collected into its tubes. The company determined that some of its tubes' rubber stoppers contain a chemical called thiuram that can release sulfur-containing gases that dissolve into blood samples and bind tightly to lead particles. The chemical reaction makes it difficult for Magellan's lead tests to detect the correct amount of lead in a sample.

While its investigation continues, the FDA recommends that patients and health professionals follow its lead testing recommendations and those from the US Centers for Disease Control and Prevention. – **Rebecca Voelker, MSJ**

Talking points Lead Health Management Committee

General

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Reduction in mandatory blood lead notification level

- From 1 January 2016, Queensland's mandatory blood lead notification level has been reduced from 10 µg/dL to 5 µg/dL.
- This reduction was recommended last year by the National Health and Medical Research Council and accepted by the Queensland Government.

Blood lead level testing results for Mount Isa

- A free voluntary blood lead level testing program has been in place in Mount Isa through QML laboratories sincemid-1990s.

- A blood lead level testing program for children under five also operates at Mount Isa Hospital.

- The results of the various testing programs in 2015 indicate a reduction in average blood lead levels recorded in tested children under five since extensive community surveys undertaken in 2006–2007 and again in 2010.

- In 2015, all children under five tested at Mount Isa Hospital averaged a BLL of 3.2 µg/dL, with Indigenous children averaging 3.7 µg/dL.

- Children tested in 2015 under the free QML program and through other private laboratories in Mount Isa, recorded an average BLL of 3 µg/dL, with Indigenous children averaging 3.9 µg/dL

- The Living with Lead Alliance project officer is working, and will continue to work, very closely with the indigenous community (Indigenous Children and Parenting Program (ICaPP)). This includes supporting and raising awareness, and educating the indigenous community on how to minimise lead health risks. LWLA will continue to encourage young indigenous children to undertake routine blood lead tests.

- The 2015 results from the various testing programs are all reductions on the average blood lead levels recorded in tested children during extensive community surveys undertaken in 2006–2007 and again in 2010.

- In 2006–2007, Mount Isa children under five who were tested had an average BLL of 5 µg/dL, with Indigenous children tested recording an average of 7 µg/dL.

- In 2010, the survey recorded an average BLL of 4.3 µg/dL for all children under five who were tested, with an average of 5.4 µg/dL for Indigenous children.

- These results indicate that the intervention and information strategies we have put in place are having some effect and we will continue building on these. Furthermore, there have been no recorded cases of acute lead toxicity in children for more than 20 years.

- In 2015 a total of five children aged under five recorded a BLL higher than the previous mandatory reporting level of 10 µg/dL, and all have been followed up.

- In 2015 there were an additional 18 recorded blood lead levels between the new mandatory reporting level of 5 µg/dL and the old level of 10.

- Strategies to strengthen lead health management programs will continue to review evidence-based interventions undertaken at other lead impacted towns such as Port Pirie and Broken Hill, as well as international lead townships such as Trail in Canada.

- The outcome of the review will be used to inform the development of strategic initiatives by the Mount Isa Lead Health Management Committee.

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Talking points *Lead Pathway Study – Air*

General

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Blood lead level testing results for Mount Isa

- A free voluntary blood lead level testing program has been in place for all Mount Isa residents through QML laboratories since 2010.
- A free blood lead level testing program for children under five also has been in operation at Mount Isa Hospital since August 2014.
- In September 2016, finger-prick testing for blood lead levels also was introduced in Mount Isa, to supplement the existing venous blood lead tests available through Mount Isa Hospital, QML and other private laboratories.
- This form of testing is quicker and much less invasive than a venous blood test and allows primary health care providers in Mount Isa, such as Gidgee Healing, to offer tests to children.
- The results of the various VENOUS blood testing programs in 2015 and 2016 indicate a STEADY REDUCTION in average blood lead levels recorded in tested children under five since extensive community surveys undertaken in 2006–2007 and again in 2010.
- Data for all children under five tested at Mount Isa Hospital in 2016 indicates an average BLL of 2.2 µg/dL, with Indigenous children averaging 2.7 µg/dL.
- Children tested in 2016 under the free QML program and through other private laboratories in Mount Isa recorded an average BLL of 3.0 µg/dL, with Indigenous children averaging 3.8 µg/dL.

- In 2015, all children under five tested at Mount Isa Hospital averaged a BLL of 3.2 µg/dL, with Indigenous children averaging 3.7 µg/dL.

- Children tested in 2015 under the free QML program and through other private laboratories in Mount Isa, recorded an average BLL of 3 µg/dL, with Indigenous children averaging 3.9 µg/dL

- The 2015 and 2016 results from the various venous blood testing programs are all reductions on the average blood lead levels recorded in tested children during extensive community surveys undertaken in 2006–2007 and again in 2010.

- In 2006–2007, Mount Isa children under five who were tested had an average BLL of 5 µg/dL, with Indigenous children tested recording an average of 7 µg/dL.

- In 2010, the survey recorded an average BLL of 4.3 µg/dL for all children under five who were tested, with an average of 5.4 µg/dL for Indigenous children.

- These results indicate that the intervention and information strategies we have put in place are having some effect and we will continue building on these.

- Furthermore, there have been no recorded cases of acute lead toxicity in children for more than 20 years.

- In 2015 a total of five children aged under five tested under the venous blood testing laboratory and hospital programs recorded a BLL equal to or higher than the previous mandatory reporting level of 10 µg/dL, and all were followed up.

- A further 18 recorded blood lead levels between the new mandatory reporting level of 5 µg/dL and the old level of 10.

- In 2016, figures for the laboratory and hospital venous blood testing programs indicate a total of 30 children aged under five recorded blood lead levels equal to or above the new mandatory reporting level of 5 µg/dL, with five of them also above the previous mandatory level of 10 µg/dL.

- We now also have preliminary results for the finger-prick testing program between September 2016 and January this year.

- These indicate a total of 35 children out of 148 tested during that period had blood lead levels equal to or above 5 µg/dL.

- Where levels above 5 are recorded through a finger-prick test, a venous blood test is ordered to confirm the result. If the result remains above 5, it is referred to public health clinicians for follow-up as already happens with venous blood test results above the mandatory reporting level.

	Port Pirie -SA (capillary)	Broken Hill -NSW (capillary and venous)	Mt Isa -QLD (venous)	Trail (Canada) (venous)
Year	2016	2015	2016	2016
Number children tested	641 (Population 824)	679 (Population 1070)	170 (Population 1925)	106
Population geometric mean	4.3 µg/dL	5.8 µg/dL	2.3 µg/dL	4.3 µg/dL
% below 5	56.3	53	82	45.3
% above 10	19.3	24	3	7.5
Number of children with very high levels	10 children above or equal to 20µg/dL	17 children above 20 µg/dL (2 above 29)		No children above 15µg/dL

Mount Isa Venous Blood Lead Results

Year	Total No. of Children under 5 tested	% <5 µg/dL	% 5-10µg/dL	%>10µg/dL
2016	170	82%	15%	3%
2017	253	82%	14%	4%

Mount Isa Capillary Blood Lead Results (Point-of-Care)

Year	Total No. of Children under 5 tested	% <5 µg/dL	% 5-9.9µg/dL	%>10µg/dL
2017	591	71%	24%	4%

Estimated number of children less than 5 years old = 1801 (ABS estimate at 30 June 2016)

The reported 1010 children tested includes the 253 children who had a venous test in 2017 and the 757 children who have had a capillary (finger-prick) blood lead test between September 2016 and February 2018.

Attachment 7

1. Blood Lead Level testing numbers and results equal to or greater than 5µg/dL

1a. Summary – Venous blood lead results for the last 18 months

Number of venous Blood lead tests conducted on Mount Isa resident children through Queensland Government laboratories and testing by Private Laboratories reported to the Notifiable Conditions System (NOCS) Database and the Number of Blood Lead results equal to or greater than 5µg/dL

	2015			2016		
	Equal to or greater than 5µg/dL*			Equal to or greater than 5µg/dL*		
	Yes	No	Total Tests[P]	Yes	No	Total Tests[P]
Jan				4	5	9
Feb				5	2	7
Mar				1	5	6
Apr				4	13	17
May				1	16	17
Jun				4	5	9
Jul	4	7	11	1	15	16
Aug	4	9	13	3	10	13
Sep	2	9	11	1	12	13
Oct	7	21	28	0	8	8
Nov	5	3	8	6	15	21
Dec	9	3	12	0	4	4
Totals	**31**	**52**	**83**	**30**	**110**	**140**

[P] Preliminary data from AUSLAB and data provided to NOCS, doesnot contain Private laboratory data not reported to NOCS

* Some results may still be pending

Limitations of these data are:

- Refusals are not recorded nor available;
- These results omit private lab Lead tests not at/over 5µg/dL because they are not notifiable;
- Retests and duplicates have been removed;
- These tests include various different sites, methods and indications; and
- They cannot be used directly to compute average levels, or % above/below 5µg/dL in any way representative of the population.

Prepared by:
Morton Bell
Senior Epidemiologist
Townsville Public Health Unit
Townsville Hospital & Health Service

1b. Summary – Number of children participated in finger prick testing since September 2016.

Month	Children presented	Children tested *	Children greater than 5µ/dL BLL
September 2016	26	17	5
October 2016	52	33	11
November 2016	34	34	4
December 2016	20	20	4
January 2016	45	44	11
Total	**177**	**148**	**35**

* *Reasons for the difference in the number presented and number tested are due to child distress/uncooperative and parent refusal.*

Data provided by North West HHS

2. Information about blood tests not tested for lead levels

2a Information provided by Queensland Pathology states that since venous blood testing commenced at Mount Isa Hospital on 1 Oct 2015, up until 7 Feb 2017, there were 802 samples from children under five years that were not tested for lead levels for the following reasons:

- they did not have a suitable sample; or
- lead was not added to the request ; or
- they had a previous lead test during the hospital visit; or
- their parents or guardians opted not to allow lead testing.

2b. Parents of 11 children have declined the finger prick test since its introduction in Sept 2016.

Table 3 : Summary – Number of children participated in finger prick testing since September 2016.

Month	Children presented	Children tested *	Children greater than 5µ/dL BLL
September 2016	26	17	5
October 2016	52	33	11
November 2016	34	34	4
December 2016	20	20	4
January 2017	45	44	11
Total	**177**	**148**	**35**

* *Reasons for the difference in the number presented and number tested are due to child distress/uncooperative and parent declining.*

Data provided by North West HHS