



The Hidden Risk and Impact of Lead on NZ Families

Ananda Card
Lead Aware NZ

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My story

Family of scientists

Bought a 1929 bungalow



Leadlight windows initiated a cascade of learning
We started testing the house, the kids, the soil...



Test Results



- Lead paint everywhere (except walls)
 - Up to 100,000 ppm in some door frames and ceiling
- Contaminated soil in entire backyard, some front yard
 - Backyard 300-400 ppm, some soil up to 3,500 ppm (“contaminated” soil is > 210 ppm)



- Lead in native timber varnish throughout
- Carpet dust under leadlights: 2100 ppm
- Youngest child’s blood: 4.8 $\mu\text{g}/\text{dL}$
 - Reference level in USA is currently 3.5 $\mu\text{g}/\text{dL}$, but a “safe” level doesn’t exist ¹
 - At the time (2019) NZ notifiable level was 10 $\mu\text{g}/\text{dL}$ (0.48 $\mu\text{mol}/\text{L}$)



Concerns for lead exposure

- Blood levels as low as 1 $\mu\text{g}/\text{dL}$ = increased risk of ADHD ² (0.048 $\mu\text{mol}/\text{L}$)
- Effects of exposure
 - Usually none apparent at time of poisoning ³
 - Show up years later as behavioural problems, learning difficulties, impulsivity etc ³
- Elevated blood lead is a warning of potential for much higher exposure if ignored
- Steepest decline of IQ seen at lower levels (1-10 $\mu\text{g}/\text{dL}$) than higher levels ⁴

What did we do?

- Studied lead-safe renovation practices
 - Plastic sheeting containment, extensive cleanup, clearance testing
- Renovated everything ourselves
 - Micromanaged the tradies we had no choice but to use and put up containment before they started, cleaned up afterwards ourselves.
 - Endured extreme stress and strain on family.
- Moved kids out of the house and into our motorhome during work
- Remediated soil
 - Removed some soil to contaminated waste disposal
 - Brought in new soil and capped with ready turf in back yard



Unforeseen and Ongoing Risks

- Kids digging up lead-painted bricks in the front (not contaminated) soil
- Roof damage requiring kitchen ceiling replacement
- Ceiling/attic dust very high in lead and arsenic
- Encapsulated paint begins flaking again after a few years
- Neighbour's dog digging
- Flooding
- “Safe” is a precarious status requiring ongoing vigilance



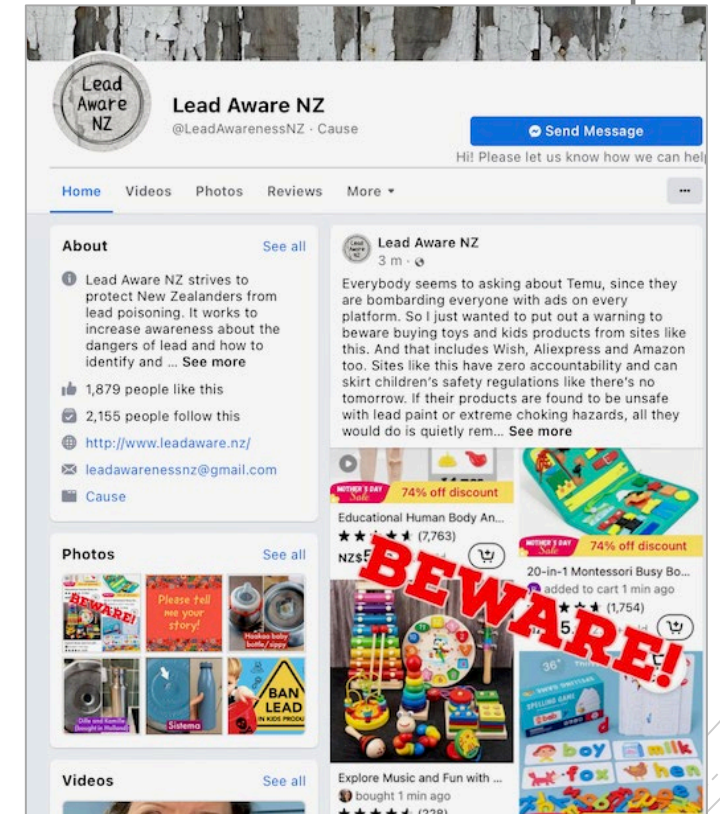
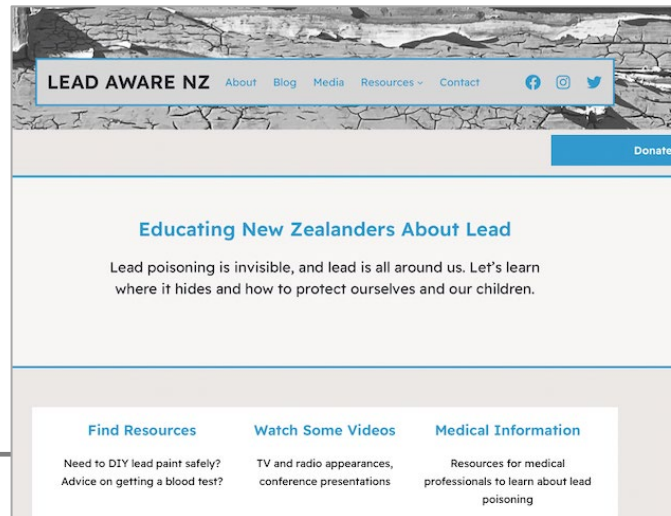
International Comparisons

	USA	NZ
Doctors	Children checked by finger prick with instant results at routine doctor visits	Difficult to get GP to order blood test, house painting is only known risk
Builders	Tradesmen must be certified in working safely with lead paint under the EPA RRP program. High fines.	Tradesmen routinely use unsafe practices. Guidelines appear voluntary,.
Assistance	Federal and local grants to help homeowners and landlords with abatement	None
Notification	Required to notify renters and buyers of lead paint	None
Observation	Ongoing population studies	Children < 5 yrs have never been analysed. Nobody is looking at them

Lead Aware NZ



- Started as Lead Awareness NZ Facebook page in 2019
- To share the knowledge I gained
- To advocate for better information/regulations/practices
- Now an organisation with nonprofit status
 - And a website!
- Currently over 2000 followers



Consumer product and other unexpected risks

While paint and soil are the biggest risks, common household products can be problematic too



- Ceramic dinnerware (+cadmium and arsenic too!)
- Painted glassware
- Pressure cookers
- Brass (doorknobs, keys, hoses, vases)
- Tapware
- Tile and bathtubs
- Pre-2010 or generic toys: plastic, painted, metal or jeweled
- Vintage products
- Bullets and fishing weights
- Light aircraft fuel (Avgas)

- Vitamins and supplements
- Painted glass baby bottles
- Galvanised steel
- Vinyl and PVC
- Jewellery
- Pewter
- Baby food



Stories from around New Zealand

Lead
Aware
NZ

- A tale of two families with *extremely* contaminated soil and exposed babies
 - Waikato family pulling out all the stops with testing and renovations
 - Another family overwhelmed and in denial, doing nothing
- Erin the naturopath who found lead in all her crockery and kids' mugs
- Single mum renting in Wellington interrupted scraping her painted deck to discover lead paint, not financially able to buy safe supplies
- Renovating families
- Renting families



Where to next...?

- Most New Zealanders don't know about lead – how can we reach them?
 - Community outreach campaigns? Signs in DIY shops? Plunket pamphlets? National screening programme for infant blood testing? Apprentice builder training?
- New Zealand has never tested children under 5, the highest risk group.
- Our regulations for toys, children's products and ceramics have fallen behind internationally.
- New standards for lead in tapware are coming (yay!). What about the current leaded taps in homes and schools?
- How can we make older homes and renovations safer?
- When an adult gets a notifiable blood result, does their whanau get tested too?
- Worldwide, the burden of lead poisoning falls hardest on poor and people of colour. Does this happen in NZ too?



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Leadlight Windows

The hazard nobody seems to know about

- Lead comes are constantly oxidising and “dusting”
- Elemental lead is more bioavailable than commonly believed (up to 100%)⁵
- Carpet under windows will trap lead, vacuuming does not remove it
- Crawling and walking sends lead dust into air
- Inhaled lead can be 100% absorbed in children⁶
- Lead risk assessors overseas are well aware of this
- Same risk for stained glass windows and Tiffany lamps

Our dust was 400-470 $\mu\text{g}/\text{ft}^2$ despite cleaning and fresh paint a couple months prior (Hazard level=100 $\mu\text{g}/\text{ft}^2$)



References



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