LEAD Action NEWS

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Lead Safety in the United Kingdom
Blood Lead Levels in the UK

Lead, the most dangerous thing in Led Zeppelin's name…

The British satirist Jon Oliver started an HBO piece on lead poisoning with "Lead, the most dangerous thing in Led Zeppelin's name and, may I remind you, the other thing is zeppelin". Led Zeppelin had an early hit with 'Whole Lotta Love'. Perhaps it should have been 'Whole Lotta Lead'. In the UK there is lots of it, everywhere. What we do not seem to clear about is what impact this is having on blood lead levels.

There appears to be no recent, population wide data on blood lead levels in the UK. This section describes what seems to be all we know.

Screening

In 2013 Public Health England decided that there was no need to screen children for elevated blood lead levels. The reasons given were:

1. The number of people affected by lead poisoning has been declining for many years. Very few children are now affected by it in the UK.
2. The current test is not reliable enough.
3. There is a lack of proven treatments for lead poisoning, especially for children only slightly affected and these may even be harmful in these children.

[Ref: *The UK NSC recommendation on Lead poisoning screening in children*, December 2013, https://legacyscreening.phe.org.uk/leadpoisoning]



2017 Volcano Art Prize (VAP) Entry.

Title of Image: Making the World Lead-Safe is like doing Jigsaw Puzzles

Lead-Safety Message: Lead ages the brain so doing Impossibles, Mindbogglers, etc Puzzles or other brain activities helps overcome the negative impacts of lead stores coming out of your bones - piece by piece.

Artist: **Elizabeth O'Brien, Malveek Dhaliwal.**

http://volcanoartprize.com/portfolio-item/making-the-world-lead-safe-is-like-doing-jigsaw-puzzles/

This decision is up for review this year and we hope to be included in the consultation. Our counter arguments to the points above are strong and simple:

1. There does not seem to be any data to support the 'very few' affected conclusion. The data we do have suggests otherwise, but is rather limited and old – see below.
2. The tests used in the USA seem reliable enough.
3. Removing the source of lead exposure is not going to be harmful and should help.

Epidemiology

There seems to be little data about population wide blood lead levels in the UK. There are a few analyses since published the millennium which suggests how bad the problem really could have been.

30 Month Olds

The Avon Longitudinal Study of Parents and Children, University of Bristol, studies environmental and genetic factors that affect a person's health and development. This included measurement of blood lead levels. One paper from this programme is 'Effects of early childhood lead exposure on academic performance and behaviour of school age children' [Ref 1] where the authors state "These data suggest that the threshold for clinical concern should be reduced to 5 µg/dl."

The full paper has not been accessed, but the BBC reported in 2009 [Ref 2] that 'The Bristol researchers took blood samples from 582 children at the age of 30 months. They found 27% of the children had lead levels above five microgrammes per decilitre.' The USA Centre for Disease Control defines elevated blood lead level as over 5µg/dl [Ref 3].

Exactly when these measurements were taken is not clear, however, the whole programme is called 'Children of the 90s' or 'Avon Longitudinal Study of Parents and Children (ALSPAC)' so is probably analysing data collected around 1993/4, i.e. 30 months after the initial cohort of pregnant mothers was recruited in 1991/2.

[Ref 1: *Effects of early childhood lead exposure on academic performance and behaviour of school age children*; K Chandramouli, C D Steer, M Ellis, A M Emond; Archives of Disease in Childhood 2009;94:844-848; http://adc.bmj.com/content/94/11/844]

[Ref 2: '*Safe' lead levels harm children*; BBC News Channel; 16 September 2009; http://news.bbc.co.uk/1/hi/health/8259639.stm]

[Ref 3: Standard Surveillance Definitions and Classifications; Centers for Disease Control and Prevention; Updated November 18, 2016; https://www.cdc.gov/nceh/lead/data/definitions.htm].

Pregnant Women

The issue of DIY renovations and risks in pregnancy was described in a 2013 article in the Daily Telegraph [Ref 1] – a major UK newspaper. This referenced the 'Children of the 90s' programme. Part of this programme measured blood lead levels in pregnant women and found that 14% had levels greater than 5µg/dl [Ref 2]. However, it seems that this was in 1991-92 when some leaded petrol was still in use, although declining, as shown in the National Atmospheric Emissions Inventory [Ref 3].

The authors do attribute some relationship to renovation work, but do not assess the relative exposure to lead from all sources - "We identified higher educational attainment as an unexpected independent predictor of BLL in our cohort of pregnant women. This may be reflected from exposure to lead during renovation work in older properties."

[Ref 1: *Doing DIY in period homes can put pregnant women at risk*; The Telegraph; Claire Carter; 06 Sep 2013; http://www.telegraph.co.uk/news/health/news/10290465/Doing-DIY-in-period-homes-can-put-pregnant-women-at-risk.html]

[Ref 2: *Environmental Factors Predicting Blood Lead Levels in Pregnant Women in the UK: The ALSPAC Study*; Caroline M. Taylor , Jean Golding, Joseph Hibbeln, Alan M. Emond; 2013; http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0072371]

[Ref 3*: Emission summary data for Lead; National Atmospheric Emissions Inventory*, 2014; http://naei.defra.gov.uk/overview/pollutants?view=summary-data&pollutant_id=17]

Children With Global Developmental Delay And Learning Difficulties

A small study in Yorkshire of children with global developmental delay and learning difficulties found that 9 out of 104 children had BLL above 5µg/dL. However, this was a selected, small cohort and may not reflect the general population.

The authors made the following comment "We suggest inclusion of BLL as a standard investigation for global developmental delay and learning difficulty, acting as a targeted screening tool, and to start environmental investigations as per HPA protocol at a lower BLL of 0.24 µmol/l (5µg/dL)."

[Ref: *Prevalence of high lead levels in children with glbal developmental delay and moderate to severe learning difficulty in Leeds and Wakefield*; PD Ghosh, S Sivaramakrishnan, A Seal; Archives of Disease in Childhood 2014;99:A133-A134; http://adc.bmj.com/content/99/Suppl_1/A133.3.info]

Summary

That seems to be all we know about the distribution of BLLs in the UK as noted by Dabrera et al in 2015 [Ref 1] – 'The most recently published evidence for childhood lead poisoning in the UK comes from the Avon Longitudinal Study of Parents and Children (ALSPAC) study in the South West of England in 1995'

[Ref 1: Investigating lead poisoning in children—could surveillance help?; G. Dabrera B. Sampson R. Ruggles G. Leonardi; 2015; QJM (2015) 108 (11): 849-852.; https://academic.oup.com/qjmed/article/108/11/849/1903791/Investigating-lead-poisoning-in-children-could]

We would hope that the removal of lead from petrol has a beneficial effect, and BLLs have come down since, but we do not know how much influence that will have had. Furthermore, blood tests are only one measure. We also do not seem to have any data on bone lead levels.

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Editorial

By Hesaan Sheridan, The LEAD Group Inc, UK

This issue marks the debut of The UK LEAD Group and our strong partnership with the UK as part of our Global Mission.

Like all our logos, this LEAD Group UK logo was designed by graphic designer and co-founder of The LEAD Group, **Kerry O'Donnell.**

This 'special United Kingdom edition' issue was produced in conjunction with the UK, our frontpage article reveals that although valuable ongoing research is currently being funded in parts of the UK there is a surprising lack of up to date population-wide data on blood lead levels and lead sources.

Perhaps this is why the blood lead limits for UK health care professionals in regard to clinical investigation or intervention of lead poisoning are years behind countries such as the US and Canada.

Also in this issue we review the latest valuable published research, consider the impact of firearms use on lead exposure, and take a very cynical poke at 'The Legal System'.

We're very pleased to have a Greek translation of our Blood Lead Challenge.

CALL FOR VOLCANO ART PRIZE ENTRIES! It's a fun way to contribute to lead poisoning prevention, and you could win an award! The deadline is 24th July 2017, so there is still time to get creative…



2017 Volcano Art Prize (VAP) Entry.
Title of Image: It makes me happy to enter Volcano Art Prize.

Lead-Safety Message: I know I'm helping The LEAD Group to create a Lead Safe World, and I win a beautiful Pictureproducts mug with my image on it.
Artist: **Noela Whitton.**
http://volcanoartprize.com/portfolio-item/it-makes-me-happy-to-enter-volcano-art-prize/

Date for your diary: **International Lead Poisoning Prevention Week of Action (ILPPWA) 2017** is Monday 23rd October to Saturday 28th October. Please send in your ideas...

If you wish to comment or elaborate on any of the material in this issue please reply with your letter to the editor, to be published in the next issue.

Lead Use in the UK

Here are some examples of lead use in the UK that may differ when compared to other developed countries.

Flashing

Many, or even most, buildings in the UK, especially domestic, have some external lead flashing, i.e. sheet lead used to prevent water ingression around chimneys, windows, doors and roof valleys. This includes properties of all ages, even new builds.

Older

For example, this house appears to have lead flashing around the chimneys, dormer windows and over the front door.



Photo: © Copyright Graham Horn and licensed for reuse under this Creative Commons Licence.

Newer



The house below looks like a mid-20th century build or conversion. Lead appears to have been used on top of the dormer windows and beneath each light. There also appears to be a strip beneath the bottom row of tiles.

Photo: © Copyright Oast House Archive and licensed for reuse under this Creative Commons Licence.

New



This picture, from a home builder's web site, appears to show lead being used between the walls and ground floor roofs. It could be some other material of course.

Regulations

One roofing information source called 'Roofconsult' makes the following comment: 'The UK is the main user of lead sheet in Europe, as most countries consider it a poison. Lead is poisonous when ingested, so all health and safety recommendations need to be complied with when working with the material.'

That would be fine, but our Control of Lead at Work (CLAW) regulations state that 'Handling of clean solid metallic lead, e.g. ingots, pipes, sheets etc.' is 'Work not liable to result in significant exposure'. Maybe that is true, but I would like to see some evidence to support that contention in the regulation. Our 'Control of Substances Hazardous to Health (COSHH) Regulations 2002' do not help as they specifically exclude lead and refer to CLAW.

Risks

What needs to be considered is whether lead sheet when used as a building material presents any risk to health. The best way to know is to do a Blood Lead survey of roofers and other building workers.

Run Off

The Lead Sheet Association make the following statement "lead sheet forms a natural patina or surface protective film that is both strong and adherent." This does not seem to be consistent with the findings of Magyar et al, 2014, who state "Lead concentration in tank water exceeded Australian Drinking Water Guidelines for all roof types where there was lead flashing." The Lead Sheet Association say that "Any minute products of corrosion washed off during the lifetime of a roof become highly diluted in rainwater", but this does of course depend on the volume of water. It would appear that in the case of the findings in the Australian study the dilution was not sufficient.

The Netherlands National Water Board in 2008 report stated that "Corrosion and subsequent runoff of lead is a major source of lead in surface waters", but do not state whether the quantity is considered hazardous to health.

Accessible Solid Lead

Perhaps because use is less in countries other than the UK, it is hard to find any research to help understand the impact on health risks from metallic lead used in building.

A blogger called 'The Roofer' in one piece called 'Lead Flashing: Is It Dangerous' states that lead sheet "forms a tightly adherent, stable patina of virtually insoluble lead compounds".

My own tests, see below, show that, in one case, the lead is not so tightly adherent as that. In fact, it was easily rubbed off.

'The Roofer' references The European Lead Sheet Industry Association brochure. In this brochure, ELSIA acknowledge that those working with lead should wear gloves, wash hands before eating and drinking, and wear a dust mask while handling old lead sheet. Fair enough, but a child, or anyone ignorant of this advice, would not be likely to follow these practices. Not all sheet lead is beyond reach – EILSA would do well to advise that this should always be the case. It would also be good if warnings were included in standard home buyer's surveys where accessible lead is present which could include windows with lead flashing below them or with decorative lead cames as shown below.

Underside corrosion

A report by Cathedral Communications on their Building Conservation web site on "Underside Condensation and Corrosion of Lead Sheet Roofs" notes that conditions on the underside of lead sheet may not promote the development of a protective patina. This can therefore reduce the expected life of lead.

Bioavailability

In order to assess the risk from lead flashing it might be useful to consider whether the lead compounds formed by weathering are 'bioavailable'. For this article this is considered to be whether a substance enters the circulation, i.e. influences blood lead levels.

The process of lead patination is understood to include the following steps as described by Guardian Industries Goole Ltd, UK, in The Oxidation of Lead.

Lead -> Lead oxide -> Lead carbonate -> Lead sulphite -> Lead sulphate

The final patina has approximately 30% lead sulphite, 60% lead sulphate and 10% lead carbonate, but this varies depending on conditions.

It is understood that lead oxide and lead carbonate are more soluble than lead sulphite and sulphate which might suggest that the risk reduces with time, but further analysis would be needed to quantify this.

Risk Management

Patination

When lead flashing is exposed to moisture it forms lead carbonate which does not adhere to the flashing and the resultant white powder can be washed by rain onto other surfaces.

To prevent this, patination oil can be applied as described by British Lead. Whether this is just an aesthetic advantage or prevents release of lead compounds is not explained.

LeadCheck Test of 90 year old Lead Sheet



Any claim that lead sheet forms a protective insoluble coating can easily be investigated. In a simple test I rubbed a cotton bud on 90 year old lead sheet.

I then dipped another cotton bud in mixed reagent from a LeadCheck swab. The two cotton buds were rubbed together as shown below. The result was that both cotton buds turned strong pink showing that lead was present.



Conclusion

I cannot argue that lead is not a useful building material. What is hard to assess is whether the benefits outweigh the risks of personal and environmental contamination. What seems to be established is that roofs bearing lead flashing should not be used as a source for drinking water and the lead flashing should not be touched without personal protection equipment, e.g. gloves.

More warnings in home buyer's surveys, and for potential renters of buildings, and on replacement windows where lead is accessible, would seem to be low cost ways to start to manage the risks of external building lead.

Lead Cames in Leadlighting

Lead cames (the lead that hold the panes of glass 'quarries' together) are a fairly common sight not only in older buildings, but also as decoration on the outside of double-glazing in new builds or replacement windows or furniture such as kitchen cabinets

Examples



The house below looks like a typical early 20th century build, or perhaps older, with leadlighting in diamond pattern.

Photo: Free for commercial use. No attribution required.

You might recognize this next house from a Harry Potter film. I am not sure that 'defence against the dark arts' would help with all that lead.



Photo: Dave Catchpole Some rights reserved.

Risk

It has been noted that lead from cames can be a source of contamination (al-Radady, Davies and French, 1993) – "Corrosion of 'cames', i.e., the lead binding or decorative strips in leadlight windows, is a significant, but previously unreported source of lead within older homes."

Lead on Window Quarries

In a DIY-sampling lab test I found that condensation on the glass of leaded windows (leadlighting) contains detectable lead. This was shown by applying a LeadCheck swab which readily turned pink. An extended test showed that the lead contamination can be removed by cleaning with a baby wipe, but then returns after a couple of weeks. It should

be noted that these cames had been treated with patination oil which it was hoped would reduce the release of lead, but not so in this example.

Lead from Cames onto Sills

Laboratory dust wipe tests of the internal sills below some leaded windows showed the following levels of lead before cleaning.

Inside 64.2 µg Pb/ft² (micrograms of Lead per foot squared)

Inside 70.4 µg Pb/ft²

Inside 63.8 µg Pb/ft²

Inside 61 µg Pb/ft²

Outside 63 µg Pb/ft²

Sampling followed the United States Environmental Protection Agency Lead Dust Sampling Technician Field Guide followed by analysis by inductively coupled plasma mass spectrometry.

These values are within the USA Housing and Urban Development lead hazard and clearance action levels as of 1st April 2017. For window sills the level is < 100 µg Pb/ft².

Cleaning Cames and Quarries

I conducted some testing on different cleaning methods to see how much lead was deposited from the cames and quarries to the horizontal surface below. Sampling and analysis was as above. In each case a smooth clean board was placed beneath the window being cleaned. The cleaned sample board was tested before and in-between tests and the Lead result was <4 µg Pb/ft².

Method	µg Pb/ft²
1) After brushing the cames with bristle brushes and oven blacking	5690
2) After cleaning with baby wipe and polishing with kitchen paper towel	208
3) After cleaning with a purpose-made window wipe	59
4) After cleaning with a window vacuum cleaner similar to this (photo)	106



The windows had recently been installed and the lead cames were subject to condensation.

Test notes

Cleaning method to clean the board in between each test - Using baby wipes removed lead contamination to sub-detectable levels even after the highest level of contamination in these tests.

Cleaning method 1 was that performed by the installers of renovated windows. They have been told of the results, but have not acknowledged a change in practices.

Cleaning method 2 - Polishing with a paper towel results in more contamination.

Cleaning method 3 - Using purely a window wipe produced the least contamination, but did leave smears on the glass.

Cleaning method 4 – After use the blade of the window vacuum cleaner was tested with a LeadCheck swab and showed positive for lead meaning that lead could possibly be transferred to other windows as, unlike the other methods tested, the blade is not disposable.

The lesson learned here is that the window board beneath the windows should be cleaned with a baby wipe after cleaning the glass and cames. Cleaning with disposable baby wipes is not environmentally sustainable so the next logical test would be to clean with reusable washable wipes and a lead specific detergent such as sugar soap.

It should be noted that these are single DIY-sampling lab tests and the results may not be repeated in other cases.

Cleaning

A window supplier, Guardian Industries, Goole Ltd of York, suggest that "After glazing, the lead should not be cleaned with solvent based or abrasive cleaners, as this may cause the oxidation process to begin again on any re-exposed 'fresh' surface"

The Australian Government, Department of the Environment and Energy seem to have the most authoritative advice on 'Lead in Stained Glass' which should apply to any leaded glass (Leadlighting).

"Lead cames oxidise, causing a white powdery coating that rubs off very easily.

"Any cloths and other cleaning equipment used should not be used for cleaning anywhere else, otherwise you could easily contaminate other parts of the house."

In my experience this advice is not always provided in the UK. We should perhaps see if the relevant industry associations can be persuaded to provide it as standard.

Patination Oil Failure





This is an example of the use of lead cames. Some new windows had been installed with decorative lead cames. These were supposed to have been treated with patination oil by the manufacturers. However, soon after installation they were exposed to rain and this resulted in what appears to be lead salts running off the cames and onto the glass and sill below. This was confirmed with a LeadCheck test.

It would seem that application of patination oil does not work in these conditions, or the manufacturers failed to apply the oil properly, if at all.

Conclusion

From these pieces of advice, and DIY-sampling lab tests, it would seem that some lead can be released from lead cames and this can be significantly increased by the wrong kind of cleaning. However, the released lead can be cleaned up easily and effectively. This concurs with the US EPA advice "Wipe down flat surfaces, like window sills, at least weekly with a damp paper towel and throw away the paper towel." Again, a wet cloth with a lead-specific detergent is more environmentally sustainable than discarding paper towel.

What is not known is whether lead dust resulting from external corrosion can be drawn into the air and inside the home when windows are opened.

uPVC

Over the past few decades many homes in the UK have been built or renovated with uPVC windows. This picture shows a typical example of before and after:



Photo: The copyright on this image is owned by Stephen Richards and is licensed for reuse under the Creative Commons Attribution-ShareAlike 2.0 license.

This should have been very good for lead poisoning prevention because it meant that old wooden, lead-painted, window frames have been removed. However, it seems that lead compounds were used as plasticisers in uPVC.

Risks

Lead Content

The British Plastics Federation state that the amount of lead in uPVC is 0.5 to 2.5% and add that this "does not represent any significant risk of damage to health." However, the justification for this is based on pipes. They quote a report (which I cannot find) which apparently states "it is just as safe to eat meals off a lead stabilised PVC pipe as it is to eat them off a ceramic plate". I am happy to hear that, but that is pipes. Windows are subject to one significant difference – sunlight.

Lead Release

A group called "Say No To Vinyl" have collated many quotes referring to the degradation of uPVC windows in sunlight and Yousif and Hasan, 2014, stated "UV radiation causes photooxidative degradation which results in breaking of the polymer chains…. leading to useless materials, after an unpredictable time."

LeadCheck Test of uPVC windows exposed to sunlight

A simple test on examples of uPVC windows exposed to sunlight, both internal and external, with a LeadCheck swab, revealed the presence of lead. This could be because the tartaric acid in the LeadCheck reagent etches into the plastic and releases lead, but then perhaps some other acids could do the same.

Restrictions

A voluntary initiative has resulted in members of the European Stabilisers Production Association (ESPA) replacing lead stabilisers by the end of 2015. This is great, but of course leaves many windows in place which will degrade over time and potentially release lead. Also, it does not seem to be clear whether this voluntary agreement applies to manufacturers who are not members of the ESPA. Perhaps manufacture outside Europe is not constrained.

Conclusion

There seems to be nothing to stop uPVC windows degrading and releasing lead. Further research would be needed to determine whether this might cause a risk to health. At least it might be advisable that cloths, and other materials, used in cleaning uPVC should not then be used for other purposes, unless thoroughly rinsed first.

Paint

Like many countries lead was used historically in paint in the UK. Unlike many other countries we have never ratified the Geneva White Lead Convention of 1921.

Dates

Some of the key dates that apply to the UK have been source from 'Lead & Public Health: Dangers for Children', Erik Millstone, 1997.

1927 – Control of lead in paint in factories

1963 – Voluntary agreement to label paint with more than 1% lead when dry and accessible to children, but only by members of the Paint Makers Association and not to imported product

1974 – The voluntary agreement changed to 0.5%

1987 – Cessation of the use of lead in decorative paints and varnishes

1992 – European Union legislation implemented in the UK which bans addition of white lead in paint except for historic buildings

2015 – The ban on lead chromate in road paints is delayed on request of Domion Color Corporation of Canada. However, the Swedish government have taken the EU to court over the decision.

Rules

Unlike some countries, e.g. France where homes built before 1949 require testing, the UK has no rules about testing for lead paint on sale or rent; or for inclusion of lead in home buyer surveys. I believe we have no rules for disclosure; no formal lead safe contractor training or certification; no renovation, repair and painting rules; and little public information.

Warnings about Lead in Paint

Packaging on paint and abrasives sometimes includes warnings about taking precautions, but rarely describe what those precautions should be or where to find more information.

Information about Lead Paint Management

The Department for Environment and Rural Affairs has a web page which is useful, but limited and the link to 'further information' leads nowhere. I have told them about this months ago.

The British Coatings Federation (BCF) have a useful guide on lead paint which is broadly in line with the USA Lead-Based Paint Renovation, Repair, and Painting (RRP) Program rules. The BCF "Updated lead paint guidelines" also includes lists of service provides in the UK for lead testing and further information.

Resources for Home Tests for Lead

It is hard to find products in the UK to help determine whether paint contains lead. One major retailer, B&Q, recommends testing for lead on pre-1960s doors with test kits, but does not actually sell them. I have suggested to them that they should. Specialist retailers do have stocks of LeadCheck, and they can be found on Amazon, but not, in my experience, in the average DIY store. However, I have not found a retailer of D-Lead Test Kits in the UK.

What I would really like to see is B&Q, and other DIY stores, hand out paint stirrers like this from the USA, which says: Sherwin Williams WARNING! If you scrape, sand or remove old paint, you may **release** lead dust. LEAD IS TOXIC. Contact the National Lead Information Hotline at 1-800-424-LEAD or log on to www.epa.gov/lead



Lead-contaminated Feed for Livestock

The Food Standards Agency, Northern Ireland reports that "More than half of on-farm food safety incidents reported to the Food Standards Agency are caused by lead poisoning each year." This makes it the biggest problem of its kind in the UK and includes cattle, sheep, pigs and poultry. In 2008, 2,500 animals were restricted from the food chain. How many were not detected is, of course, not known.

Leaded Antiques

Antique items are popular in the UK. There seem to be no warnings provided on sale of antiques, e.g. furniture, ceramics, about how they should be used safely. This might be an unreasonable requirement for small retailers and charity shops.

Acid Dipping to Remove Lead Paint

Reclamation of old doors and other removable building components or furniture is popular in the UK. These are often 'dipped' in a bath of paint stripper and then washed in water. This service is often provided by small businesses. The issue is that not all the lead is

removed. Furthermore, because the bath of paint stripper is used for many doors, lead can be transferred from one door to another.

Research Reviews
Research Review: Wine as a Proxy for Air Quality Data

Study
Tracing changes in atmospheric sources of lead contamination using lead isotopic compositions in Australian red wine

Authors
Kristensen LJ, Taylor MP, Evans AJ

Year
2016

Journal
Chemosphere. 2016 Jul;154:40-7

URL
https://www.ncbi.nlm.nih.gov/pubmed/27037773

Quotes
Wine lead concentrations mirror available lead-in-air measurements.

This study demonstrates wine can be used to chronicle changes in environmental lead emissions and is an effective proxy for atmospherically sourced depositions of lead in the absence of air quality data.

Commentary
Having established a way to measure trends in lead emissions into periods when primary data were not collected enables improved correlation with health outcomes.

Research Review: Safe Gardening

Study
VegeSafe: A community science program measuring soil-metal contamination, evaluating risk and providing advice for safe gardening.

Authors
Marek Rouillon, Paul J. Harvey, Louise J. Kristensen, Steven G. George, Mark P. Taylor

Year
2017

Journal
Environmental Pollution, Volume 222, March 2017, Pages 557–566

URL

http://dx.doi.org/10.1016/j.envpol.2016.11.024

Quotes
The Australian soil lead guideline of 300 mg/kg for residential gardens was exceeded at 40% of Sydney homes.

Community engagement with VegeSafe participants has resulted in useful outcomes

Commentary
The outcomes included dissemination of knowledge, building raised beds and replacement of contaminated soil.

This program demonstrates that some risks from environmental lead can be successfully managed in the domestic environment. Programs such as this should be rolled-out across other affected communities world-wide.

Research Review: Using Lichens and Fungi to Measure Atmospheric Lead

Study
Australian atmospheric lead deposition reconstructed using lead concentrations and isotopic compositions of archival lichen and fungi

Authors
Liqin Wu , Mark Patrick Taylor, Heather K. Handley, Michael Wu

Year
2016

Journal
Environmental Pollution, Volume 208, Part B, January 2016, Pages 678–687

URL
https://doi.org/10.1016/j.envpol.2015.10.046

Quotes
During the period of leaded petrol use in Australian automobiles from 1932 to 2002, total median lead concentrations rose.

Following the cessation of leaded petrol use, median total lead concentrations decreased sharply in the 2000s

Commentary
The study showed that overall lead levels have fallen, but the ratio of ^{206}Pb to ^{207}Pb has increased, and therefore concludes that lead emission from petrol is still a source of contamination.

The abstract does not state that ^{206}Pb is predominant in tetra-ethyl lead, but this is assumed based on the statement 'Lead isotopic characterization appears to be applicable as a "fingerprinting" tool for tracing the sources of Pb pollution' in the paper 'Lead Isotope Characterization of Petroleum Fuels in Taipei, Taiwan' by Pei-Hsuan Yao, Guey-Shin Shyu, Ying-Fang Chang, Yu-Chen Chou, Chuan-Chou Shen, Chi-Su Chou,5 and Tsun-Kuo Chang, 2015.
(https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4454928/)

Research Review: Nrf2 Raising Agents, Detoxification and Cytoprotection

Study
Nrf2, a master regulator of detoxification and also antioxidant, anti-inflammatory and other cytoprotective mechanisms, is raised by health promoting factors.

Authors
Pall ML, Levine S

Year
2015

Journal
Acta Physiologica Sinica, February 25, 2015, 67(1): 1–18

URL

http://www.actaps.com.cn/qikan/manage/wenzhang/2015-1-01.pdf

Quotes
Nrf2 is not a magic bullet but is likely to be of great importance in health promotion, particularly in those regularly exposed to toxic chemicals.

Commentary
This paper is long and complex with references to 141 other studies so extracting and understanding the essential facts is not easy. What follows is an attempt to summarise some key points and to express them in less scientific terms.

How Nrf2 Works

Nrf2 (nuclear factor erythroid-2-related factor 2) is a transcription factor. These are proteins that control the transcription of genetic information from DNA. Essentially, it seems that they turn genes on or off and control production of other proteins. [Ref: *Khan Academy,* https://www.khanacademy.org/science/biology/gene-regulation/gene-regulation-in-eukaryotes/a/eukaryotic-transcription-factors].

In the case of Nrf2, most related genes have a cytoprotective function, including toxic metals. The Medical Dictionary defines cytoprotective as "protecting cells from noxious chemicals or other stimuli." [Ref: *http://medical-dictionary.thefreedictionary.com/cytoprotective*]

Diet for Raising Nrf2 Levels

It has been found that some nutrients can raise Nrf2. The following nutrients are listed in the report followed by some example foods. (This should not be considered dietary advice).

- Many phenolic antioxidants;

  Examples - fruit, vegetable, grains, legumes, parsley, coffee, tea, juices, cider, red wine

  [Ref: *Livestrong http://www.livestrong.com/article/165497-list-of-high-phenol-foods/*]

- Gamma- and delta-tocopherols and tocotrienols;

  Examples - edible oils, seeds

  [Ref: *Tocopherols and Tocotrienols in Common and Emerging Dietary Sources: Occurrence, Applications, and Health Benefits*; Fereidoon Shahidi and Adriano Costa de Camargo; International Journal of Molecular Science; 20 October 2016; www.mdpi.com/1422-0067/17/10/1745/pdf]

- Long chain omega-3 fatty acids DHA and EPA;

  Examples - fatty fish (herring, salmon, mackerel, and tuna) and fish oils; walnuts, flaxseed oil, soybean, and canola oil

  [Ref: *Functional Foods Fact Sheet: Omega-3 Fatty Acids,* International Food Information Council Foundation, http://www.foodinsight.org/Functional_Foods_Fact_Sheet_Omega_3_Fatty_Acids]

- Many carotenoids of which lycopene may be the most active;

  Examples - tomatoes

  [Ref: *Dietary lycopene and tomato extract supplementations inhibit nonalcoholic steatohepatitis-promoted hepatocarcinogenesis in rats*; Yan Wang, Lynne M. Ausman, Andrew S. Greenberg, Robert M. Russell and Xiang-Dong Wang; Int J Cancer. 2010 Apr 15; 126(8): 1788–1796.]

- Isothiocyanates from cruciferous vegetables;

Examples - brocolli, brussels sprouts, turnips, watercress, garlic oil

[Ref: *Natural products for cancer prevention associated with Nrf2–ARE pathway*; Kua, Kirberger, Yang and Chen; Food Science and Human Wellness Volume 2, Issue 1, March 2013, Pages 22-28]

- Sulfur compounds from allium vegetables;

  Examples - garlic, onions, scallions, shallots, chives and leeks

  [Ref: *All You Need To Know About Allium Vegetables;* Vegetable Expert*;* http://www.vegetableexpert.co.uk/all-you-need-know-about-allium-vegetables.html]

- Terpenoids

  Examples - lemons, camphor, pine, cloves, fennel, thyme, oregano, roses, menthol, cannabis, ginkgo, turmeric, mustard seed

  [Ref: *What are Terpenes*; Food Info, http://www.food-info.net/uk/qa/qa-fi69.htm]

  [Ref: *Terpenoid*, Wikipeadia, https://en.wikipedia.org/wiki/Terpenoid]

Examples of diets containing these foods mentioned are known as 'Mediterranean' and 'Okinawan' as well as the 'Paleolithic' diet.

However, a study by Kordas, 2017, included the statement "An expectation that any nutrient-rich food will prevent lead absorption or increase lead excretion in children is not based on empirical evidence." That is in children, but shows that further analysis and research may be needed. [Ref: *The "Lead Diet": Can Dietary Approaches Prevent or Treat Lead Exposure?;* Katarzyna Kordas, 2017; The Journal of Pediatrics, Volume 185, Pages 224–231.e1]

Other Nrf2 Raising Factors

Other Nrf2 raising factors mentioned in the paper include:

- Hormesis

  This is where low doses of an agent appear to have a beneficial effects where high doses have toxic effects. This seems to be a controversial area - [Ref: *If low-level exposure to pollutants is good for us, what does that mean for regulations?* Kevin Elliott; Associate Professor, University of South Carolina; http://www.environmentalhealthnews.org/ehs/editorial/hormesis-op-ed]

  The Pall and Levine paper refers to Mayer and Yamamoto, 2010. This paper discusses the evolution of Nfr2, but does conclude "The functions of Nrf2 thus suggest a hormetic factor that has evolved empirically over time." [Ref: *The rise of antioxidant signaling--the evolution and hormetic actions of Nrf2*.; Maher J, Yamamoto M. ; Toxicol Appl Pharmacol. 2010 Apr 1;244(1):4-15; https://www.ncbi.nlm.nih.gov/pubmed/20122947]

Another paper (Wang, Wang, Wang, Wang, Lu, Yu and Tien, 2010) showed a hormetic effect in plants grown in lead-contaminated soils. They concluded that "traditional threshold models ought to be combined with hormesis effect in assessment of Pb-polluted soils", but give a wide range for the 'threshold' level of lead contamination in soil from 25-125 mg kg(-1). [Ref. *Hormesis effects and implicative application in assessment of lead-contaminated soils in roots of Vicia faba seedlings*; Wang CR, Tian Y, Wang XR, Yu HX, Lu XW, Wang C, Wang H.; Chemosphere. 2010 Aug;80(9):965-71.; https://www.ncbi.nlm.nih.gov/pubmed/20591469]

This is further discussed by Gonick, 2011, where it is noted that lead-binding proteins increase in concentration after exposure to lead and that these proteins 'segregate' lead in several organs. This therefore seems to suggest that the body has some evolved protection against lead toxicity. [Ref: *Lead-Binding Proteins: A Review*; Harvey C. Gonick; Journal of Toxicology Volume 2011 (2011), Article ID 686050]

- Exercise

  It seems that Nrf2 can be regulated by exercise. A paper discussing this is referenced in Pall and Levine's work.

- Caloric restriction

  This is simply eating less calories.

It is also noted that too much Nrf2 for too long can have a negative effects.

Nrf2 and Lead

The paper does contain some lead specific discussions. Pall and Levine note that Nrf2 induces genes for metallothionein which has a role in chelation, transport and excretion of lead, and other heavy metals.

Curcumin

Pall and Levine also note that curcumin has been shown to lower hepatotoxicity of lead and that this is attributed to Nrf2 activation and direct chelation. It is a rather sad irony that turmeric, the source of curcumin, is sometimes contaminated by lead [Ref: *US Food and Drug Administration*; August 5, 2016; https://www.fda.gov/Safety/Recalls/ucm515328.htm?source=govdelivery&utm_medium=email&utm_source=govdelivery#recall-photos]

The benefits of turmeric are listed by Authority Nutrition [Ref 1], with reference to academic studies, and the related conditions are also those related to lead, e.g. brain disease, heart disease, Alzheimer's (although the link to lead is disputed), depression, but also cancer and arthritis. They note that absorption of curcumin is greatly enhanced by bioprene/piperene (found in pepper) as supported by Prasad, Tyagi and Aggarwal, 2014 [Ref 2].

[Ref 1: *Proven Health Benefits of Turmeric and Curcumin*, By Kris Gunnars, BSc | Reviewed on June 9, 2017, https://authoritynutrition.com/top-10-evidence-based-health-benefits-of-turmeric/]

[Ref 2: *Recent Developments in Delivery, Bioavailability, Absorption and Metabolism of Curcumin: the Golden Pigment from Golden Spice*; Prasad, Tyagi and Aggarwal; Cancer Res Treat. 2014 Jan; 46(1): 2–18.; https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3918523/]

It should be noted that there are some concerns about curcumin toxicity which would need further exploration.

Final Note
Pall and Levine conclude that "Nrf2 probably has a substantial role in producing resistance to toxic metal exposure" and note that there is much more information available that has not been referenced in the paper.

Another review of this study can be found at:

> Diet And Lifestyle Promote Nrf2 – Science Again Supports What We Have Been Saying For A Long Time, Posted ByDr. Paul Anderson, https://www.consultdranderson.com/diet-lifestyle-promote-nrf2-science-supports-saying-long-time/. This is entitled "Nrf2, a master regulator of detoxification and also antioxidant, anti-inflammatory and other cytoprotective mechanisms, is raised by health promoting factors."

Conclusion
From this brief analysis, it would seem that the human body has some mechanisms to respond to lead toxicity. These mechanisms can be related to the Nrf2 transcription factor which stimulates genes to produce proteins that bind to lead. Furthermore, it seems that the level of Nrf2 can be increased by the appropriate diet, exercise and eating less.

What is also interesting in the paper is the hormesis concept which a low level of toxin has a beneficial effect whereas a high level does not. Unfortunately, it seems to we have not yet quantified low and high.

It is no surprise that diet and exercise are beneficial to health. This paper explains how this might work and how it has relevance in lead poisoning prevention.

Research Review: Lead Intake from Wine

Study
A human health risk assessment of lead (Pb) ingestion among adult wine consumers

Authors
Kevin M. Towle, Lindsey C. Garnick and Andrew D. Monnot

Year
2017

Journal

International Journal of Food Contamination20174:7

URL

https://foodcontaminationjournal.springeropen.com/articles/10.1186/s40550-017-0052-z

Quotes
Overall, findings suggest that Pb content in wine does not pose a health risk to adult wine consumers.

Commentary
It should be noted that this is a literature review rather than original research.

'Truth About Lead' Facebook Group
The following comment was made on the 'The Truth About Lead' Facebook group. "Again this is another example of why we need to look at lead levels and say 0 is the only safe level. I've read so many times that many products contain small levels of lead and are safe to ingest. In light of fact that lead does not pass through the body and settles into the bone and vital organs. A little bit of lead here a little there adds up over time in the body. The next thing you know your lead poisoned."

From The Editor
"I find the article to be Amero-centric in the extreme and misleading by implying that a PbB below the CDC's current 5ug/dL carries no Pb-related health risk.

I defy anyone to find another country with a mean adult PbB baseline as low as the US level (used in this study) of 1.27ug/dL. That is, I contend that it would be easy in every country outside of the US to get from that country's mean adult PbB to the Lustberg and Silbergeld Pb-related adult health risk PbB of 1.9ug/dL - JUST by drinking wine!

I also understood from perhaps something Prof Chris Winder once wrote or said, that, biokinetic lead uptake models for alcohol (and cigarettes) need to take into account more than just the lead concentration in the drink (or cigarette) and the consumption (smoking) rate, because the alcohol (temperature of the smoke) can have other impacts on both the lead rate and metabolism of other relevant-to-lead nutrients eg Vit C. These factors were not mentioned in the description of the Pb exposure model used in the study, and further research measuring lead in blood and comparing that to Pb in wine actually being imbibed was not considered."

Press Release

Australian Paint Manufacturer's Federation

Global Alliance to Eliminate Lead Paint – press release by the Australian Paint Manufacturer's Federation (APMF) Inc.

APMF PRESS RELEASE – URL: http://www.apmf.asn.au/press-releases/

[Editor's note: The APMF is a Partner of The LEAD Group's Lead Safe World Project, and The LEAD Group is a founding member of The Global Alliance to Eliminate Lead Paint (GAELP). The LEAD Group was very proud to have worked with the APMF and Australia's government agency NICNAS (National Industrial Chemicals Notification and Assessment Scheme) in achieving the ban on lead in all paints (except artist's paints) in Australia as of 2010 – a global precedent.]

There is no known level of lead exposure that is considered safe. Yet, across the globe, lead is still used for decorative and industrial paints and applied to schools and children's toys. "There is no longer any justification to continue to add lead compounds in surface coatings and it is time that the global industry and governments show leadership on the issue and worked together to proactively cease the manufacture and supply of all surface coatings containing added lead compounds" states Richard Phillips of the Australian Paint Manufacturers' Federation.

"Here in Australia, the industry voluntarily removed added lead compounds from formulations from the 1970's and then worked with the Commonwealth Government agency National Industrial Chemicals Notification and Assessment Scheme (NICNAS) to prohibit the importation of paint containing added lead compounds in 1997."

Today, Australia joins a growing list of countries that have taken positive steps to address the lead in paint issue.

The APMF has now also been recognised as an Industry Partner by the United Nations/World Health Organisation Global Alliance to Eliminate Lead Paint.

"Our actions in Australia, removing lead from paint, provide a solid template for how this can be done globally," according to Richard Phillips of the APMF.

The UN/WHO global initiative is a voluntary collaboration among governments, industry and NGO's, to prevent exposure, especially in children, to lead in paints. By 2020, the key targets are to have all paint manufacturers eliminate the use of added lead compound in priority areas (architectural and decorative paints, children's toys) and to have 70 contributors (governments and organisations) participating in the work of the Global Alliance.

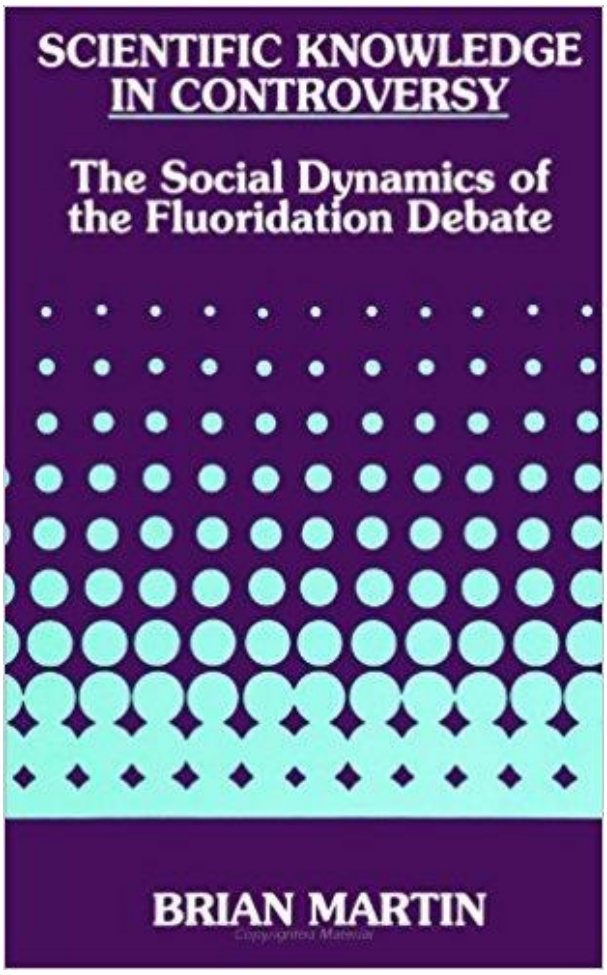
Learn more at www.unep.org/noleadinpaint

Letters to the Editor

Letter to the Editor: Fluoride in Drinking Water

Just wondering why your group are not pushing to have fluoride in drinking water removed from communities that are affected by Lead mining. Fluoride have been found to be an accelerator for lead absorbasion so if it was removed the whole community would benefit. Lead causes high blood preasure, heart disease, kidney disease, cancer and reduced fertility in adults and more. At the moment here in Broken Hill the way the advertisement is run it looks like lead only effect children 0 to 5 years. They also have a back ground level at 0 to 5 Ug/dl!!! And casually say everyone will have some lead in their blood. http://leadsmart.nsw.gov.au/effects-of-lead/#effects

Mount Isa have no fluoride in their water supply and tests show children have over all less elevated lead levels. Removing fluoride is also FREE. No cost to anyone. Only medical providers who will have less clients. Fluoride causes similar health problems to children as lead with reduced IQ etc.



[From anonymous]

Editor's note: I have decided as a first step to read, *Scientific Knowledge in Controversy: The Social Dynamics of the Fluoridation Debate* by Brian Martin (Albany: State University of New York Press, 1991) The book can be downloaded from http://www.bmartin.cc/pubs/91skic.html

Letter to the editor: Crusher dust contamination of sandpit sand in Broken Hill, Australia

Dear Elizabeth,

I would have given this information to you sooner but I have been in hospital not well.

My daughter-in-law had purchased a home for herself and my granddaughter - we were helping set up a lead free area that she could be safe and play. We had enclosed an area for her. We were given a voucher from the Lead Centre to get lead free beach sand.

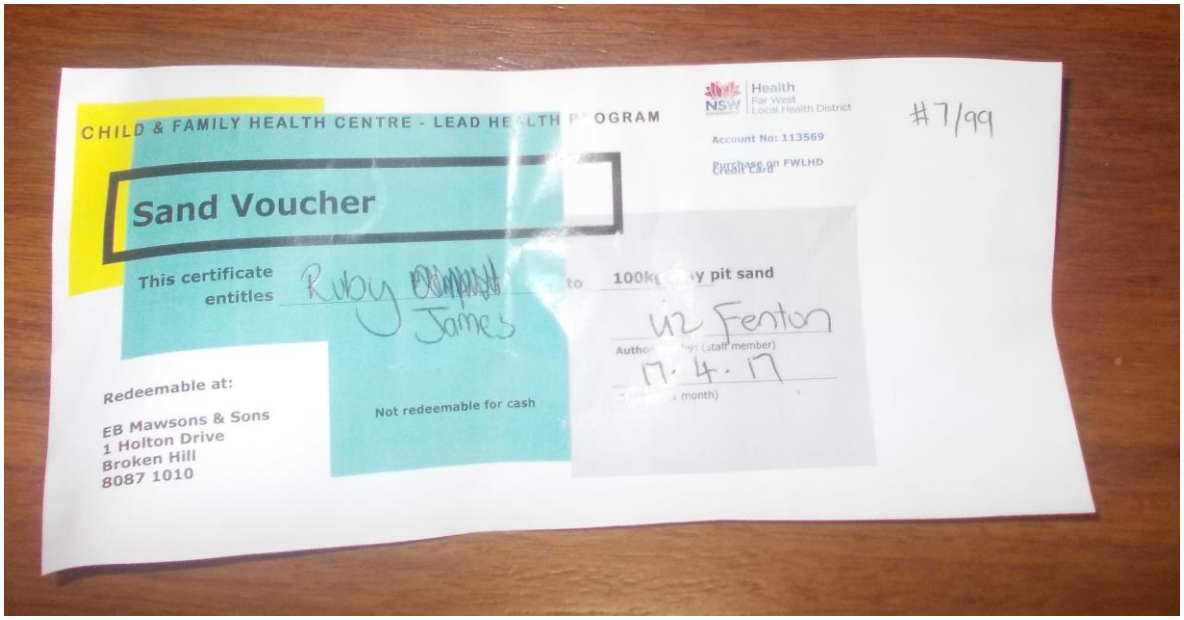


Photo (above): Sand voucher from Broken Hill Lead Centre



We attended Mawson Quarry where the voucher was to be redeemed.

Google satellite image (left) of Mawson Quarry Broken Hill, from http://www.mawsons.com.au/branches/broken-hill-quarry

The truck went and scooped the pile sand and placed it in the chute. I had noticed that the sand was exposed – there was no cover.



Photo (at right): Beach sand pile where you redeem your Broken Hill Lead Centre voucher. This is the first pile of Beach sand opposite the first crusher in pic belching toxic dust.

I had concerns and went back the next day to take some photos of the exposed sand, only to find two crushers either side of the exposed sand crushing mullock rock that contains lead and other heavy metals. I took photos and drove to the hill opposite the quarry to find a second pile of so-called beach sand with the contaminated dust belching all over it too.

So all this beach sand could be contaminated and parents have no idea when their children are playing in contaminated sand. I also have purchased bagged sand for my granddaughter after taking all the pics.



Photo (at right)**:** Washed bagged sand purchased from Globe.

How can this happen - where is the chain of command in regards to vouchers and the beach sand?

Not 50 meters away from the sand pile, you have CBH Mining mill ponds and the mill belching out contamination.





Google satellite images (above) of the mine site opposite Mawsons (CBH) Mining.
https://www.google.com.au/maps/place/Mawsons+-+Broken+Hill+Quarry/@-31.9636126,141.4739805,541m/data=!3m1!1e3!4m5!3m4!1s0x6aeeadd3661cd349:0x962699987ed00949!8m2!3d-31.9633796!4d141.4761344

Then you have the 2 crushers in Mawsons belching contamination. The whole time this beach sand is being covered in this toxic dust.

Photo (at right): Mawsons quarry (mullock containing lead) Drill blast extract material opposite the beach sand piles.





Photo (at left): Mawsons first crusher opposite the Beach sand pile.

Photo (at right): Mawsons second crusher opposite the Beach sand pile.

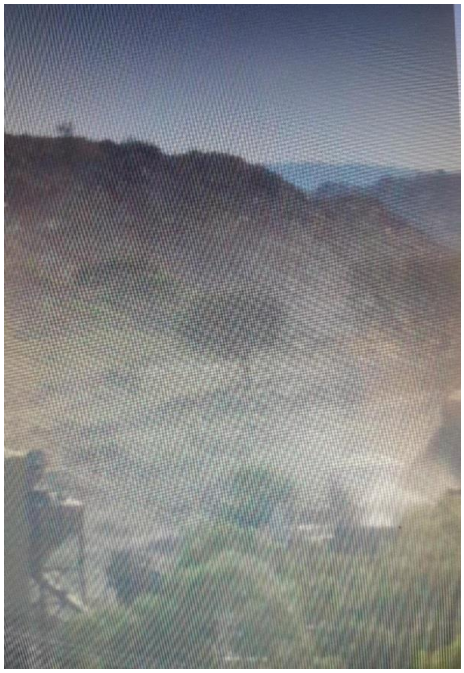




Photo (above): Toxic dust pluming over the Beach sand pile from the Mawson crusher.



Photo (at right): Dust pluming all over site at Mawson quarry. This is a reserve pile of beach sand that is used when the first and second piles are used up.

Photo (at left): Drill core (in background) at Mawsons, extracting mullock.





Photo (at left): Dust leaving the crusher.

Photo (below): Second pile of beach sand



This is why Broken Hill children are poisoned by exposure to contaminated toxic dust.

Dust monitors don't work. Surface mining by CBH mining company happens at night (when most people are asleep) so the community doesn't see the dust. When I drive out the South area of Broken Hill at night, I have to turn my high beam on because of all the dust.



The sulfur smell of the dust containing mill reagents is disgusting.

Photo (at left): Beach sand pit contamination.

All the kid's play equipment like swing sets and trampolines get covered in dust every night, so unless the parents go out and hose down the play equipment every morning – and ignore the water restrictions - how do you keep your kids safe?

Photo (at bottom)**:** Sand pit contamination - back of Mawsons Quarry.



The NSW EPA (Environmental Protection Authority) and Department of Planning are aware and for some reason turn a blind eye even when they're presented with pics, dates and times. It just falls on deaf ears. So will the contaminated beach sand.

CBH Mining company say they are not surface mining, they sub-contract surface mining, and still hold the licence that was supposed to be handed back to the NSW Department of Planning 8 years ago. Therefore they still can continue surface mining without any environmental licence being adhered to.



Photo (above): Surface mining CBH Mining Lease 7 extraction of mine skimps (tailings) opposite Mawsons Quarry.

How can the parents of Broken Hill keep their children safe from lead?

Jenny Rowbotham
Broken Hill, NSW
15 June 2017

Letter to the Editor: Broken Hill community - data and advice needs

Dear Elizabeth

I have just read an article about parks in Broken Hill - how contaminated they are. They are stating that underground mining is the cause of lead contamination of local parks. This is not the case. Surface mining started at CBH mining Lease 7 after Development consents were given in 2002. Surface mining has continued from 2002 until today (2017). This is why the lead levels are spiking again.

In 2008 Bill Balding of NSW Health was quoted in the Barrier Daily Truth (newspaper) as stating that it was parents being complacent that was causing the spike in children's blood lead levels.

At the time of the surface mining there were no working Air monitors recording air lead levels. I have photos of the lease during these dates and millions of tonnes of skimps / tailings / mineralised ore have been extracted and put in rail trucks and shipped off overseas for re-processing.



All this material has been mounded and stockpiled on site for the past 100 years.

Photo: Broken Hill Line Of Lode, from Visit NSW website.

http://www.visitnsw.com/destinations/outback-nsw/broken-hill-area/broken-hill/attractions/line-of-lode

At that time (100 years ago) they only took the lead and silver. The stockpiled waste material contains large amounts of zinc and other metals that was left behind during mill processing. This mill waste also contains hexavalent chromium which they used in the milling process.

They used cyanide and arsenic as well so all of this toxic material is in the dust that they are belching all over the town since 2002 with no environmental licences in place.

It wasn't until CBH was audited by NSW Department of Planning this year that the TEOM1 Air monitor was in operation and the surface toxic dumps where covered with a green dust suppressant.

In their audit they stated that surface mining grants had to be handed back. This was the second time that NSW Planning had asked for the licences to be handed back.

How would one go about getting a petition for the community to have independent air and soil / dust monitoring done?

Could this be done through a government grant so they can't dispute the results?

As even now when they are getting a high result they discount it, stating that the monitor has been tampered with. This has been going on since the onset of the 1990 Lead Program.

We have been told that the $13million that was given this time was not for the children, it was to put up hazard signs in parks, etc.

I think the community should set up their own Lead and Heavy Metals Centre where parents can come and get real face-to-face info on the contamination their children are exposed to and discuss their health concerns.

As I feel the real health concerns from this toxic dust are being overlooked.

I have noticed the whole time I had my three children to doctors and paediatricians in Broken Hill, not once did they state my children had lead poisoning – they were just labelled "ADHD".

Only when I was fed up and took them to Adelaide were they diagnosed with heavy metal poisoning and given treatment. That was the first time we knew the full extent of their toxic poisoning blood results. After their treatment they had to continue with oral DMSA which at the time was over $400 for one month supply so that was x3.

The Dr seen in Adelaide asked why didn't the Dr in Broken Hill refer the children to a toxicologist?

Why isn't there a toxicologist visiting Broken Hill if there are so many sick children?

Even the NSW Education Department keeps the effects of lead in the children under wraps. I took my children to Adelaide and had a leading child psychologist complete testing to see what learning levels they were at, as I had concerns we had employed teachers for private lessons and still they were not learning. We had one teacher came from Sydney and he had concerns at how far behind these children were and the children he was teaching in Broken Hill schools.

These children in the Broken Hill School system that suffer from lead poisoning are LABELLED as disruptive. There is no support for them, no understanding of how damaged their brains are from the poisoning.

Most times the Education Department blames the parents stating low social economic status or single parents or dysfunctional parents.

When I have spoken to some parents I was told one female child had a blood lead level of 60ug/dL and had an enema and was not referred for any medical treatment. The child got sicker. It was the parent taking her to a private Dr for the enema. No treatment was given for lead poisoning.

My question is: how do parents keep their children safe from lead exposure when the very government departments set up to protect our children are not naming it as LEAD POISONING in the children of Broken Hill.

And if the children are poisoned so too are the parents with all the health concerns as well, depression, lethargy, hypertension, anxiety, dementia, aggression, the list goes on.

Don't forget the air monitors are only tested for insoluble lead not bio(soluble) content so if you imagine it as segmenting an orange - only 1 quarter of the lead in the sample is being recorded as "Total Lead".

So therefore the community is being deceived with the results.

Where the tax payers millions of dollars are going it is not into protecting or helping the community of Broken Hill.

Jenny Rowbotham,
Broken Hill, NSW Australia
18 June 2017.

People Who Shoot Risk Unhealthy Levels Of Lead Exposure

Shooters exposed to lead at work over long periods of time, like military personnel in firing ranges, risk a range of medical complaints. Author provided April 6, 2017 5.18am AEST



Reprinted from https://theconversation.com/people-who-shoot-risk-unhealthy-levels-of-lead-exposure-68220.

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A gun is a dangerous weapon for obvious reasons. But there are less obvious risks to those who use them. New research shows people who shoot, for work or leisure, risk lead poisoning.

Our just published review shows how exposure to lead from bullets, airborne particles in shooting ranges and other sources shows up in shooters' blood at levels we believe pose a health risk.

Who's at risk?

Security personnel, police officers and members of the military who fire guns at shooting ranges for work, and members of the public who shoot at firing ranges for recreation, are at risk.

Large numbers of shooters are involved, particularly in the US, where there are about 16,000-18,000 indoor firing ranges. In the US, about one million law enforcement officers train regularly at indoor firing ranges each year and 20 million people practice target shooting as a leisure activity.

The Geological Survey calculated that in 2012 about 60,100 metric tonnes of lead were used in ammunition and bullets in the US. Given that lead is the dominant metal in bullets and primers

(which initiates the combustion of gunpowder in the bullet cartridge), there are large numbers of people exposed by firing bullets.

It's difficult to estimate how many Australians shoot at ranges and are exposed to lead. While the Sporting Shooters Association of Australia says it has 180,000 members, not all use shooting ranges.

How are shooters exposed to lead?

Shooters are exposed to lead when firing lead bullets. The bullet primer is about 35% lead styphnate and lead dioxide (also known as lead peroxide). When a shooter fires a bullet, lead particles and fumes originating from the primer discharge at high pressures from the gun barrel, very close to the shooter.

Shooters are also exposed to lead from the bullet itself as some parts disintegrate into fragments due to misalignments in the gun barrel. The extreme heat during the firing of a bullet results in some vapourisation of these lead fragments.



Lead from bullets can fragment and vapourise, exposing shooters to airborne fragments and particles, which they breathe in or ingest. from www.shutterstock.com

Shooters inhale lead particles emitted during the firing of a gun, whether that's from the primer or the bullet itself. Once deposited in the lower respiratory tract, lead particles (and different chemical forms of lead) are almost completely absorbed into the bloodstream.

Lead dust from the shooting range also sticks to shooters' clothes and can potentially contaminate vehicles and homes. Shooters can also ingest lead particles by transferring them from their hands into their mouths when they smoke, eat or drink.

Shooters' blood lead levels tend to be higher the more bullets shot, the more lead in the air at shooting ranges and the increased calibre of weapon.

What our review found

We reviewed 36 studies that measured blood lead levels at shooting ranges. The studies were from 15 countries, but most were from the US. About two-thirds of the studies looked at people who used shooting ranges for work.

We found blood lead levels of at least one of the participants in 31 of 36 studies had an elevated blood lead level. This means more than the current adult blood lead reference level of 5µg/dL, or 5 micrograms of lead per decilitre of blood, as recommended by the US Centers for Disease Control and Prevention and National Institute of Occupational Safety and Health.

Importantly, we found elevated blood lead levels (greater than 5µg/dL) in shooters using both indoor and outdoor shooting ranges, consistent with the release of the fine grained primer-based lead close to the shooter's face and body.

How does lead affect the body?

The US National Toxicology Program reviewed the evidence for health effects associated with chronic lead exposure in adults and children at levels identified in our literature review.

They found such blood lead levels were associated with a range of neurological, psychiatric, fertility and heart problems.

While studies have not specifically investigated all these outcomes in shooters, it is biologically plausible these conditions are associated with raised blood levels resulting from exposure to lead at shooting ranges. But few studies have been conducted on the shooting population to be sure.

There is a particular risk to women of child-bearing age exposed to lead at firing ranges because of the uptake and storage of lead in the mother's bones where it substitutes for calcium.

This is a particular problem for pregnant women, because the foetus requires calcium from her bones. So the foetus could be exposed to the mother's lead stores during critical times in development. This could cause serious neurological disorders when born.

Female shooters can also pass on the lead exposure to their children through breast milk. Additionally, multiple studies have shown raised blood lead levels in children shooting guns at firing ranges due to direct exposure. Studies show raised blood levels in children are linked with range of health problems. These range from being inattentive, hyperactive and irritable, to delayed growth, decreased intelligence, and short-term memory loss.

How do we limit lead exposure?

The ultimate solution to protect the health of shooters is to replace all primers and bullets with lead–free substitutes, which are already available.

We recommend measures such as ensuring adequate exhaust ventilation and wet-cleaning of surfaces at firing ranges, requiring people who work at firing ranges to have their blood lead levels checked, and for similar testing for frequent shooters.

We also recommend shooters be aware of the risks of lead exposure and follow guidelines recommended by health organisations such as the Council of State and Territorial Epidemiologists or Safe Work Australia.

Lead Pro Aus - Managing the Environmental Clean-Up of Shooting Ranges in Australia

By Craig Mitchell, Director, Lead Pro Aus Pty Ltd
www.leadproaus.com.au office@leadproaus.com.au

Lead Pro Aus Pty Ltd specialises in the environmental management, assessment, design, and surface lead recovery of shooting ranges across Australia.

Craig Mitchell has been involved in the shooting range environmental sector since 2012, when the original “Green Machine” lead recovery unit (see photo of the "Green Machine") was acquired and placed into operation. That unit was decommissioned in 2014 as part of a transition to more advanced, purpose-built recovery systems.



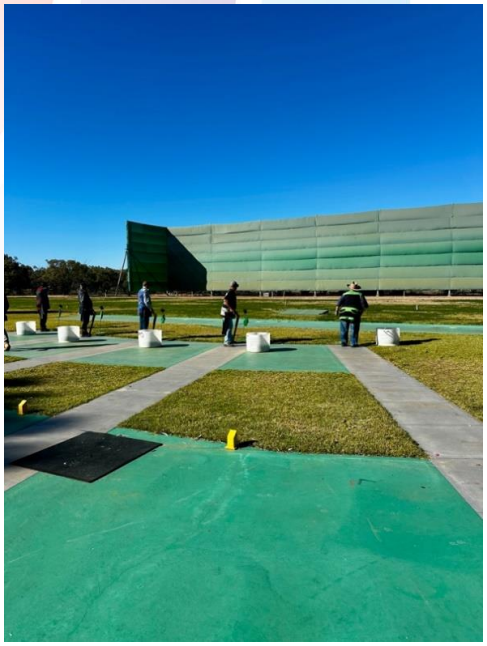


Following extensive online research, Craig found some new-generation recovery machines that had been custom manufactured in Wisconsin, USA back in 2007 & 2008. He purchased them second hand and imported them into Australia back in 2014. These machines — known as **Lead Miner #1 and Lead Miner #2** — remain operational today and are used nationwide to assist gun clubs in managing surface lead accumulation safely and efficiently.

Lead Pro works with clubs, associations, and regulatory bodies to help maintain safer, more sustainable shooting facilities. Our focus is long-term environmental management - ensuring shooting ranges can continue operating responsibly into the future.

Craig’s background combines practical shooting experience with over 20 years in environmental earthmoving and construction. This integrated knowledge allows Lead Pro to approach each site with both operational understanding and environmental responsibility.

Projects have included major Australian facilities such as:



- Sydney International Shooting Centre
- Large metropolitan and regional clay target clubs
- National competition venues

Lead Pro provides:

- Surface lead shot recovery
- Wad and clay target clean-up
- Ongoing site management support
- Environmental risk reduction strategies
- ShotStop ballistic curtain supply and installation through Green Range Pty Ltd



The Lead Miner recovery systems are purpose-built to minimise operator exposure, reduce material handling, and efficiently bag and prepare lead for licensed recycling.

In addition to lead recovery, Lead Pro supports shooting ranges in managing contamination footprints through engineered solutions including ShotStop curtain systems, which significantly reduce the spread of shot fall zones and improve ongoing recoverability.



Our mission is simple:

To help shooting facilities operate safely, sustainably, and responsibly — protecting both participants and the surrounding environment.

For further information or consultation, please contact:

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Blood Lead Challenge (Greek)

Take the blood lead discovery and reporting challenge

Written in English by Kari McKern and Elizabeth O'Brien, 22 October 2014. Translated into Greek by Peter Kozaitis, for The LEAD Group Inc (environmental health charity), Australia

This fact sheet is available in the following languages (click on the language to go to the Lead Safe World webpage):English, French, Spanish, Arabic, Greek.

Προκλήσεις Μόλυβδου στο Αίμα

Πάρετε μέρος στην ανακάλυψη και αναφορά των προκλήσεων Μόλυβδου στο Αίμα

Γραμμένο στα Αγγλικά από τους Kari McKern και Elizabeth O'Brien, 22 Οκτωβρίου 2014.
Μεταφράστηκε στα Ελληνικά από τον Peter Kozaitis, για The LEAD Group Incorporated
[Συσσωματωμένη Ομάδα ΜΟΛΥΒΔΟΣ] (περιβαλλοντική υγεία και φιλανθρωπία), Αυστραλίας.

Έρευνα αποδεικνύει την σύνδεση μεταξύ του επιπέδου μόλυβδου στο αίμα και την αύξηση κινδύνου της: άνοιας, οστεοπόρωσης, γήρανσης εγκεφάλου, πρόωρου θανάτου, και δυσκολίες μάθησης στα παιδιά.

Κάνετε τακτικά εξετάσεις αίματος; Έχετε ελέγξει το επίπεδο μόλυβδου στο αίμα σας στο παρελθόν;

Δεν κοστίζει τίποτα και το δείγμα του αίματος μπορεί να δοκιμαστεί ταυτόχρονα και για άλλα βαριά μέταλλα. Το μόνο που χρειάζεται είναι μια αίτηση από τον (GP) γιατρό σας, για ένα τοπικό παθολογικό εργαστήριο. Αν κάνετε ήδη τακτικά εξετάσεις αίματος, ζητήστε από τον γιατρό σας να προσθέσει στην συνηθισμένη αίτηση και την εξέταση για το επίπεδο ύπαρξης μόλυβδου στο αίμα σας.

Αν εντοπισθεί υψηλή στάθμη μόλυβδου στο αίμα σας, ίσος θα χρειαστεί να κάνετε μια απλή θεραπεία.

Εμείς θέλουμε, Εσείς να γνωρίζετε το επίπεδο μόλυβδου στο αίμα σας και να το πείτε και σε Εμάς.

Έτσι θα πάρετε μέρος στην έρευνα μας και θα λάβετε εξατομικευμένες συμβουλές, με βάση τα αποτελέσματα των εξετάσεων και θα έχετε ήσυχο το μυαλό σας γνωρίζοντας το επίπεδο μόλυβδου.

Βοηθήστε μας να οικοδομήσουμε μια ισχυρή συλλογή δεδομένων.



Μήνυμα: Μόλυβδου-ασφάλεια:» Αν πρέπει να παραμένετε να ζείτε όπου σκόνη μόλυβδου πέφτει από τον ουρανό όλη την ημέρα, τακτικός υγρός-καθαρισμός είναι ζωτικής σημασίας να κρατηθεί το μέρος ασφαλές από μόλυβδο για τα παιδιά. »Καλλιτέχνης: Fatima Syed. Age:9. Υλικά: Χωρίς τοξίνες μπογιές Tempera Paint σε ελεύθερο από τοξίνες χαρτί. [*http://volcanoartprize.com/portfolio-item/geometric-Trees/*](http://volcanoartprize.com/portfolio-item/geometric-Trees/)

Lead Affects The Brain; The Legal Trade Affects The Pocket

Editor's note: Lead affects the brain; the legal trade affects the pocket. Evan Whitton again shows how, in the following article reprinted from

http://tasmaniantimes.com/index.php?/weblog/article/who-runs-politics-the-dead-camel-party-the-shitters-party/

Evan Whitton's 2009 book "Our Corrupt Legal System" or "OCLS" for short, was previously mentioned in "Changes to our corrupt legal system could result in more funding for crime prevention", in *LEAD Action News* vol. 16 no. 4, June 2016 – "WANTED! Lead-safety graphics for shooters & food-growers" at http://www.lead.org.au/lanv16n4/LANv16n4-WANTED-Lead-safety-graphics-for-shooters-and-food-growers.pdf

Who runs politics? The Dead Camel Party? The Shitters' Party?

Evan Whitton* Pic: Young Napoleon from Wikipedia, 17.06.17 5:30 am



First published June 16

Taxpayers fund the legal system and pay the wages of judges, prosecutors, court officials, and long-suffering detectives. It is not surprising that the system is a racket; England has been awash with rackets for centuries.

For example, the City of London Corporation's sinister activities began in Roman times and continue to this day. Tax expert Nicholas Shaxson said in April 2016: "London is the epicentre of so much of the sleaze that happens in the world. Usually there will be links to the City of London, to UK law firms, to UK accountancy firms, and to UK banks."

However charming, lawyers who run the legal system are not universally loved. Some are even said to be shysters, from the German scheisser, a shitter.

Other opinions:

• "The first thing we do, let's kill all the lawyers." **Dick the Butcher, 1450.**

• "[Lawyering is] the art of proving … that white is black and black is white according as they are paid." **Jonathan Swift, Gulliver's Travels, 1726.**

• "The one great principle of the English law is to make business for itself." **Charles Dickens, Bleak House, 1853.**

• "If all the lawyers were hanged tomorrow, and their bones sold to a mah jongg factory, we'd be freer and safer, and our taxes would be reduced by almost half." **H. L. Mencken, Sage of Baltimore, 1924.**

• "The legal trade, in short, is nothing but a high-class racket." **Yale law professor Fred Rodell, 1939.**

• "It's only the 99% of lawyers who give the rest a bad name." **Joel Siegel, Good Morning America, 2002.**

The system is a product of chance. As Eliot put it in Four Quartets:

Footfalls echo in the memory
Down the passage we did not take
Towards the door we never opened
Into the rose garden.

William II, born c. 1056 and king of England from 1087, was a short, fat man with a red face and yellow hair who never married; he preferred sodomy. He put every public office on sale; buyers extorted bribes from people who dealt with the office. Widely despised, he was shot dead on 2 August 1100 and his body left where it lay.

William's system of trickle-down extortion continued. When the common law began in 1166, judges extorted bribes and lawyers were presumably their bagmen, as in Chicago quite recently; see Operation Greylord.

Among the consequences:

Richard Posner, a US judge/economist, says judges and lawyers have always been a cartel. Members of a cartel collude to make money.

• Judges are not trained as judges as they are in France and Germany. They are lawyers one day and judges the next.

England was represented at a church-state conference in Rome (population about a million) in 1215. European countries then changed to an inquisitorial (truth-seeking) system but a few undoubtedly corrupt judges in London (population about 11,000) chose to persist with an anti-truth accusatorial system: A accused B. B said: Prove it.

Lawyers became the "dominant influence" in England's Parliament about 1350.

Judges were initially in charge. On a fixed wage (plus bribes), they had no incentive to spin the process out; trials were quite short. Lawyers paid by the day (or in blocks of six minutes) do have an incentive.

Lawyers took control 10 years after the failure of Dick the Butcher's final solution for the lawyer problem. Their vehicle was pleadings, which don't have to be true but are supposed to narrow the issues.

Lawyers originally pled orally before a judge for a few hours until all agreed on the issue(s); the case then went to a jury. The adversary system dates from 1460, when lawyers began to exchange written pleadings, thus cutting judges out of the process, and judges did not stop them.

Lawyers can prolong written pleadings, with the meter running, for months or years in see-saw fashion: statement of claim, defence, reply, rejoinder, surrejoinder, rebutter, surrebutter etc, thus confirming Professor Rodell's claim that the system is a racket.

England imposed its corrupt legal system on its colonies, the United States, India, New Zealand, Australia, Ireland etc.

The Chancellor was a politician-judge. About 1650, a Chancellor, probably Bulstrode Whitelocke, concocted a disputed will racket; he ruled that in will cases lawyers were to be paid, not by clients, but from the deceased estates. Chancellors then held hearings but did not finalise cases for decades. Estates paid lawyers for turning up.

Charles Dickens knew all about the racket. His Jarndyce v Jarndyce in Bleak House (1853) was based on Jennens v Jennens, a will case concerning an estate worth some $1.5 billion today. Thirty-two sleazoid Chancellors kept Jennens going for 117 years, from 1798 to 1915, while lawyers "devoured" the estate.

A US judge, Harold Rothwax, said: "Without truth there can be no justice." OCLS details 24 truth-defeating mechanisms. Three examples:

• Concealing a pattern. In 1894, a Chancellor, Farrer Herschell, concocted a rule which conceals evidence of a pattern of criminal activity. The rule gives jurors the impression that repeat offenders, eg organised criminals and serial rapists, are first offenders. It is then the criminal's word against the victim's, and beyond reasonable doubt, which jurors do not understand, favours the criminal.

• Ethics. (Said to be a county in south-east England.) US law professor Monroe Freedman gave lawyers an excuse to lie. He said in 2006: "... there are circumstances in which a lawyer can ethically make a false statement of fact to a tribunal ... and can ethically engage in conduct involving dishonesty, fraud, deceit, or misrepresentation." Freedman said that even if a rapist privately admits his guilt to his lawyer, the lawyer can still ethically let him deny his crime on oath and can question the victim about her sex life to suggest she consented. Rape victims have vomited on the witness box. The American Bar Association gave Freedman its highest award for his work on ethics.

• Cross-examination. US law professor James Elkins said the adversary system has a philosophy of cruelty. Frances Andrade, an English rape victim, said during cross-examination by defence lawyer Kate Blackwell: "This feels like rape all over again." Andrade killed herself before the trial was over.

...

Lawyer-politicians may be a universal problem. They were heavily represented in the corrupt French legislature. Napoleon, 30, told his generals on Saturday, 9 November 1799: "We must get rid of these lawyers."

Next day, 500 politicians at the Orangerie Palace at St Cloud planned to have Napoleon guillotined, but his cavalry general, Joachim Murat, lined up a column of grenadiers and, to beating drums, marched them into the palace and gave a cheery order: "Throw me these blighters out of the window."

That was the end of the lawyer-politicians but it would have meant nothing for the law except for a fluke of timing at Marengo in Piedmont at about 5.20 pm on Saturday 14 June 1800.

That day, there were two battles between France and a coalition led by Austria but financed by England. Napoleon lost the first. A. G. Macdonell described the fluke in the second in Napoleon and His Marshals:

"The French counter-attack was, by chance, one of the most perfectly timed tactical operations by combined infantry, artillery, and cavalry in the whole history of warfare ... Suddenly, through the dense smoke, [artillery General Auguste] Marmont saw, not 50 yards in front, a battalion of Austrian Grenadiers advancing in perfect formation to counter the counter-attack ...

"Marmont ... fired four rounds of canister at point-blank range into the compact battalion, and at that precise moment, while the Austrians were staggering under the blow and an Austrian ammunition-wagon was exploding with a monstrous detonation, [General Louis] Desaix went forward with a shout, and young Kellermann, son of old Valmy Kellermann, came thundering down on the flank, through the mulberry trees and the tall luxuriant vines, with a handful of heavy cavalry.

"A minute earlier, or three minutes later, and the thing could not have succeeded, but the timing was perfect, and North Italy was recovered in that moment for the French Republic."

Napoleon, who did not eat before a battle, was famished. His cook, Dunand, invented a meal from materials to hand, a chicken, some tomatoes, mushrooms, eggs, prawns, and a crayfish, all cooked in brandy flames. Today's Chicken Marengo is essentially chicken, mushrooms, tomatoes, perhaps with a fried egg on top.

England did not finance another coalition for five years. Napoleon, 30, thus had time to apply his remarkable intellect to reforming and codifying the inquisitorial system. His system is now the most accurate, cost-effective and widespread; it affects twice as many as the adversary system. Details of Marengo and Napoleon's approach to reform are at pp. 62-68 of OCLS.

What might have been. England and some or all of its colonies would probably use a truth-seeking system today if Admiral Pierre Villeneuve had followed Napoleon's instructions in October 1805 and sailed north instead of south. A comparison:

The racket.

The trained lawyers who control the process can use sophistry, a technique of lying by false arguments etc, and can demand Yes or No answers to trick questions. Suspects can refuse to

answer questions. Judges conceal evidence on the ground that jurors are stupid. It gets sillier; judges sitting without a jury have to conceal evidence from themselves, which is quite a trick and implies that judges are stupid. But judges do the decent thing; they try to stay awake while lawyers are spinning the process out. Jurors do not give reasons. About half guilty criminals – 75% in rape cases – get off. A lawyer, Brett Dawson, says it is a get-the-guilty-off system.

The French system.

The trained judges who control the process use a series of filters to protect the innocent. They do not conceal evidence and do not let lawyers use sophistry. Witnesses give evidence as a narrative. The commonsense of ordinary people is valued: jurors sit with judges and can outvote them. Suspects must answer questions. Most hearings take a day or so. About 95% of guilty defendants are convicted. Reasons are given for verdicts.

To sum up: Adversary lawyers search for the money; inquisitorial judges search for the truth.

The racket persists because lawyers, although only 0.2% of the population, have infested English-speaking legislatures for 6½ centuries. Today, they are 60% of the US Senate. Hence perhaps the Tammany Hall saying: "More lawyers live on politics than flies on a dead camel." In effect, there are basically three political parties:

• A conservative party.

• A less conservative party.

• A Lawyer Party consisting of lawyers in the other two parties. The Dead Camel Party? The Shitters' Party?

Justice clearly requires change to a truth-seeking system run by trained judges but that cannot happen until enough lawyers are winkled out of legislatures. Vote 1: Anyone but a lawyer.

It may take 10-15 years but the winkle will have general support; Justice Russell Fox said the public knows that "justice marches with the truth".

*__Evan Whitton__ *read History at the University of Queensland. The texts of seven of his non-fiction books, including Our Corrupt Legal System, can be found at a site run by legal academic Dr Robert Moles, www.netk.net.au/whittonhome.asp*

Notes: *Sources omitted for brevity are in Our Corrupt Legal System (OCLS).*

- See more at: http://tasmaniantimes.com/index.php?/weblog/article/who-runs-politics-the-dead-camel-party-the-shitters-party#sthash.Qw25msqI.dpuf

Get your entries in before 24th July, 2017 for Volcano Art Prize

Volcano Art Prize (VAP) is an art competition held by The LEAD Group (charity organisation) annually for people of all ages. Two types of awards will be awarded - best entry chosen by the judge and best entry chosen by the people. Entering VAP might not just help you win attractive prizes but could also make you a Good Samaritan in spreading awareness about solutions to Lead problems in your day-to-day life. The entry could be of many forms. The image just has to be rectangular and in landscape-orientation (not portrait-orientation). It's preferable if your entry has a lead safety message with it. Children can take help from their parents for the message. Submit your entries on http://volcanoartprize.com/

- Photograph
- Video
- Short film
- Poems
- Plays
- Short stories
- Case Studies
- Posters
- Paintings
- A photo of any form of creative item

The last date to submit an entry is **Monday 24th July, 2017** and the last date for voting via facebook likes for People's choice winner is **Monday 25th September, 2017**. The Award Ceremony can be attended via Skype or in person in Sydney, Australia, and will be held during International Lead Poisoning Prevention Week of Action (ILPPWA) – **Sunday 22nd – Saturday 28th October 2017**.

Some of the previous winning entries on a prize mug are shown below.



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