MACQUARIE University

November 2019

DustSafe - Macquarie Uni public science initiative

A COMMUNITY SCIENCE PROGRAM EXAMINING HOUSEHOLD DUST

DustSafe is a citizen-science initiative based in the Department of Environmental Sciences at Macquarie University. DustSafe is a local chapter of the global program: 360 Dust Analysis, which encompasses research groups in Australia, Asia, the United Kingdom and the United States of America (Fig. 1).

DUSTSAFE RESULTS ARE LIVE

Thanks to your participation, DustSafe has already received almost 800 Australian household dust samples (Fig. 1). Our global total is approaching 2000, with samples from the USA, the UK, Pacific Islands, Ghana, Mexico, China and Europe.

You can now view dust data for your area on MapMyEnvironment. In fact, you can see data from all over the world on this map, as well as soil data from our VegeSafe program.

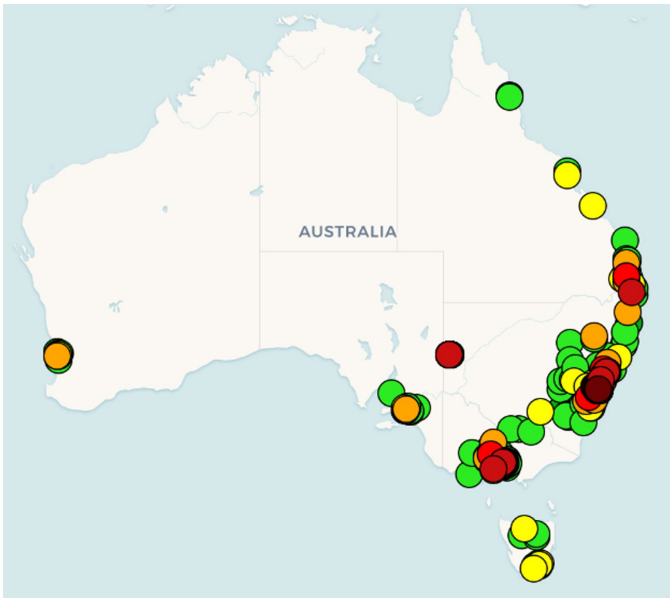

Figure 1. Analysed Australian sample locations (Source: https://www.mapmyenvironment.com/).

SYDNEY DUST STUDY

We are pleased to announce publication of Sydney trace element data in Environment International. These show that 19% of households have dust lead levels that may place children at risk of elevated blood lead concentrations. These were mainly older homes in the inner city. Likely sources (Fig. 2) identified were past use of leaded paint and petrol.

DustSafe research was covered in Oct 2019 Channel 9 news and in the Sydney Morning Herald.

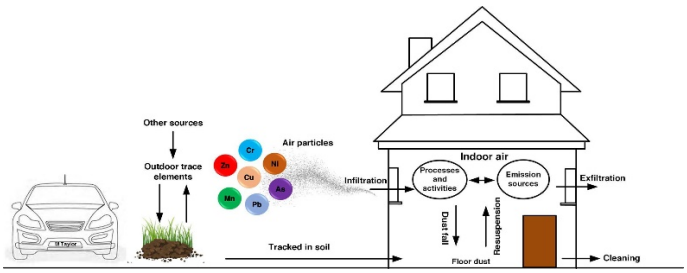

Figure 2. Dust comes from both indoor and outdoor sources.

VENTURE CAFE AT MACQUARIE

On Wednesday 7th November at 5.00 – 7.00 PM we are hosting an open night at Venture Cafe. Come along from 4.00 PM for stalls showcasing our community science projects (all welcome, free drinks and nibbles). Click here for more details.

AWARD WINNING RESEARCH

Our sister program, VegeSafe, won the Olympus Research Partnership Award in April. The award recognised that VegeSafe had assisted more than 3000 homes in Australia by analysing their soils for trace metal contaminants and providing advice on safe gardening practices. Watch the video.

Department of Earth and Environmental Sciences
Macquarie University NSW 2109 Australia
T: +61 (2) 9850 4221
M:+614 22 940 916
mark.taylor@mq.edu.au
CRICOS Provider 00002J

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WHAT'S IN DUST FROM AUSTRALIAN HOMES?

Based on the metals analyses so far (Table 1) Zn is the most abundant element. However, lead and chromium are the only metals that are present in some homes at concentrations likely to be of significance to health risk.

Table 1. Median dust metal concentrations (mg/kg).
Minimum and maximum values shown in brackets. LOD = limit of detection (4 mg/kg)

Element	Australia (n=773)	Sydney (n=335)	Melbourne (n=86)	Brisbane (n=34)
As (arsenic)	21 (<LOD – 2625)	19 (<LOD – 2625)	20 (3 – 160)	22 (5 – 220)
Cd (cadmium)	7 (<LOD – 93)	8 (<LOD – 52)	6 (<LOD – 93)	8 (<LOD – 10)
Cr (chromium)	89 (<LOD – 994)	93 (9 – 743)	89 (40 – 203)	91 (40 – 541)
Cu (copper)	180 (16 – 4906)	222 (40 – 4906)	174 (23 – 1010)	173 (38 – 807)
Mn (manganese)	260 (42 – 7542)	234 (42 – 817)	226 (89 – 532)	230 (93 – 1113)
Ni (nickel)	39 (<LOD – 500)	43(<LOD – 500)	41 (7 – 219)	36 (14 – 190)
Pb (lead)	139 (34 – 32671)	135 (43 – 32671)	112 (42 – 1506)	78 (51 – 630)
Zn (zinc)	1347 (83 – 85878)	1370 (83 – 75549)	1161 (158 – 8726)	1161 (446 – 7715)

MAD ABOUT DIRT

The DustSafe team joined the Mad About Dirt workshop at Narara Ecovillage in May (Fig. 3) to promote the DustSafe program. Being a hands-on event, we collected dust samples and offered on-the-spot analysis of garden soil samples.

Figure 3. DustSafe's Dr Cynthia Isley on Mad About Dirt's 'ask an expert' panel, alongside ABC Gardening Australia host Angus Stewart.

DO YOU HAVE CHOOKS?

We also offer lead testing of chickens. This could be of particular interest if you live in an older inner-city or industrial area. Contact Sara Yazdanparast for details.

BEYOND OUR SHORES

This year we have also collected household dust from New Caledonia. A Nickel smelter has operated in the heart of Noumea city for seven generations. Impacts on the surrounding environment include chromium (Cr) in slag wastes and nickel (Ni) particles emitted to air. The levels of both Cr and Ni were significantly higher in house dusts (and in residential soils) around the city of Noumea than they were in the local natural soil and rock (Fig.4).

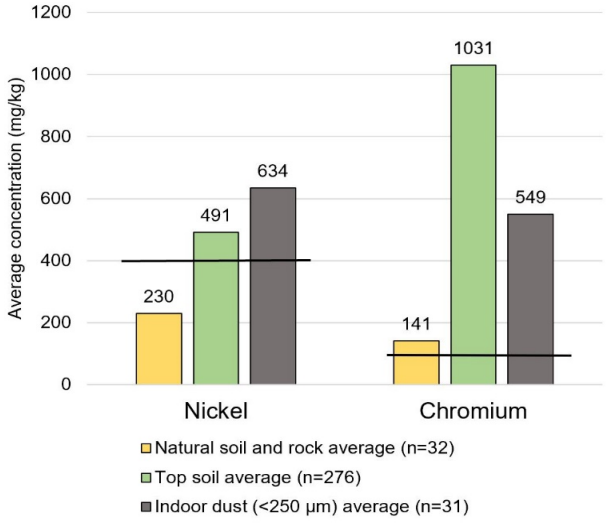

Figure 4. Average concentrations of Ni and Cr across house dust, residential soil and natural soil in Noumea. The Australian guideline for soil (NEPC Residential A, no dust guideline exists) is shown for Ni (400 mg/kg) and Cr (100 mg/kg).

Department of Department of Earth and Environmental Sciences
Macquarie University NSW 2109 Australia
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