

Global citizen-led insights into the composition and risks of household dust

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Australian Government

OLYMPUS

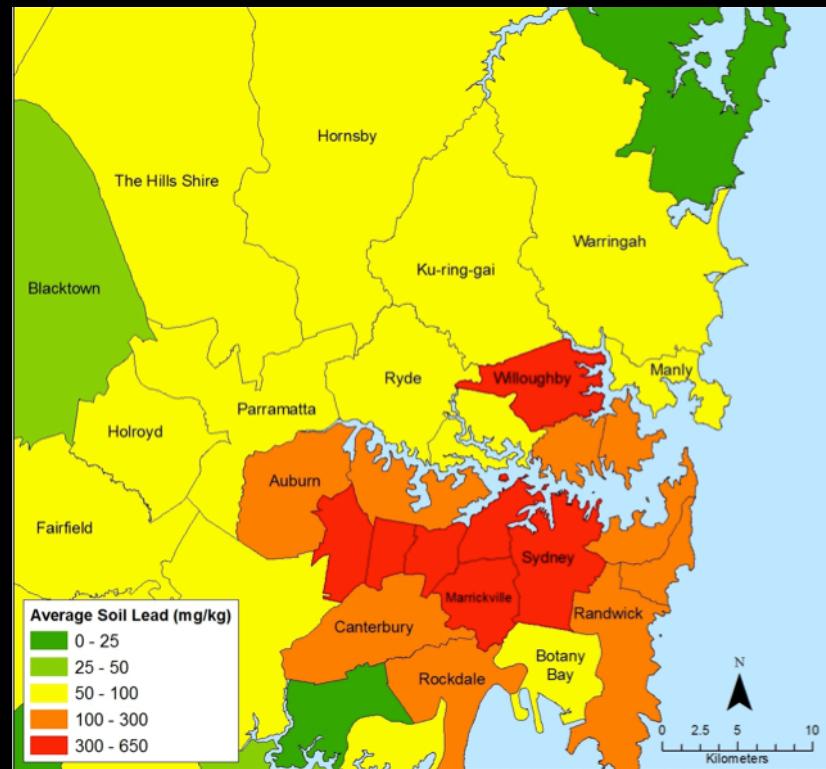
DustSafe 2017-2021

- Engage citizens in understanding science related to dust and contaminants.
- Characterise chemicals, metals, allergens, microbial components in house dust.
- Guidance on what to do next where elevated contaminants are identified.



VegeSafe Program 2014-present

Soil lead in domestic gardens



- Analysed garden soils using XRF.
- >1800 individual premises across Australia tested.
- Results report sent back homeowners.

VegeSafe Program results



ELSEVIER

Contents lists available at [ScienceDirect](#)

Environmental Pollution

journal homepage: www.elsevier.com/locate/envpol

Invited paper

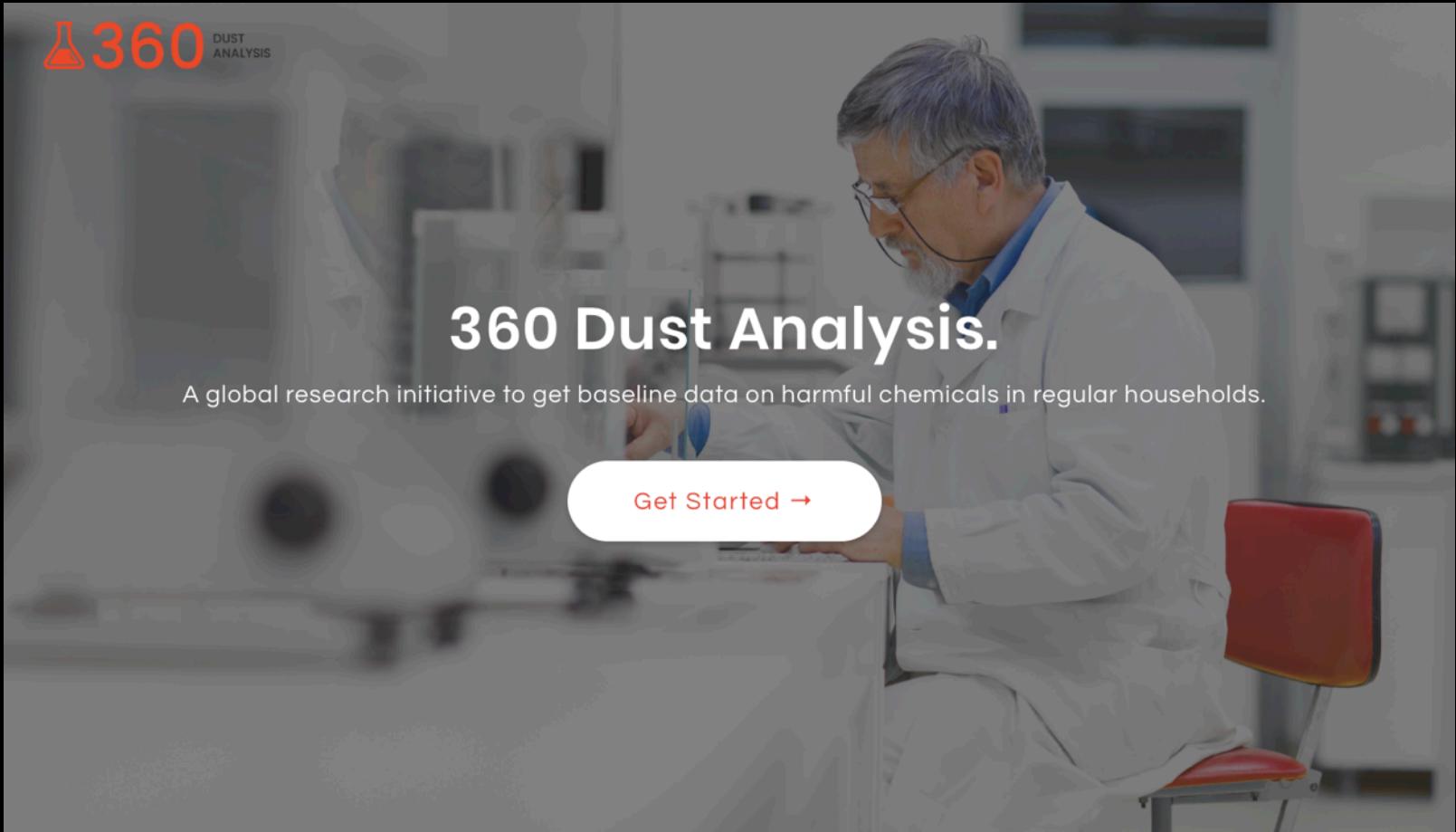
VegeSafe: A community science program measuring soil-metal contamination, evaluating risk and providing advice for safe gardening[☆]

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Citizen Science approach

- Advertise the program via media and existing email databases / Facebook.
- Citizens register online and complete household questionnaire.
- Vacuum dust mailed to Macquarie University for XRF and XRD analysis.
- Summary report returned by email.
- Maps and graphs of suburb level data generated on program web site.

Summary approach



<http://www.360dustanalysis.com>

Sources of dust contaminants

Traffic pollution



Chromium (Cr), Copper (Cu), Lead (Pb), Manganese (Mn), Zinc (Zn)

Lead based paints



Chromium (Cr), Lead (Pb), Titanium (Ti), Zinc (Zn)

Polluted Landfill/soil



Arsenic (As), Bromine (Br), Cadmium (Cd), Chromium (Cr), Cobalt (Co), Lead (Pb), Zinc (Zn)

Petrol stations



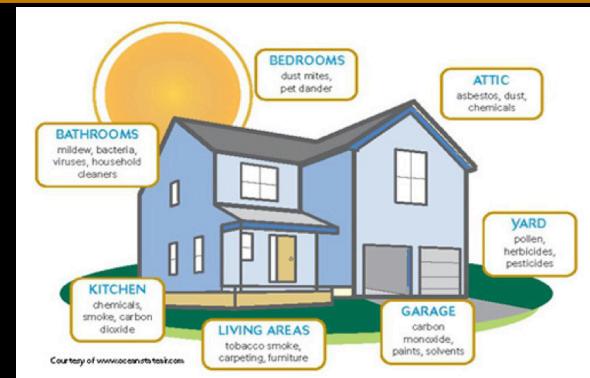
Lead (Pb), Manganese (Mn)

Industrial areas



Arsenic (As), Cadmium (Cd), Copper (Cu), Iron (Fe), Mercury (Hg), Lead (Pb), Zinc (Zn)

Household pollutants



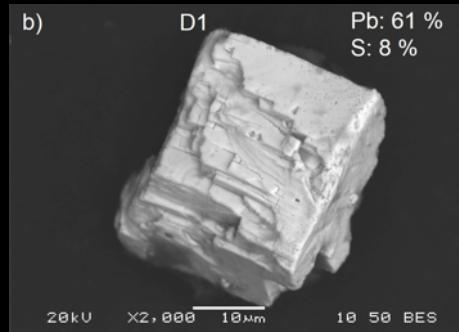
EG. Smoke, furnishings, moulds, solvents, pesticides, cleaning products etc

Constituents of household dust

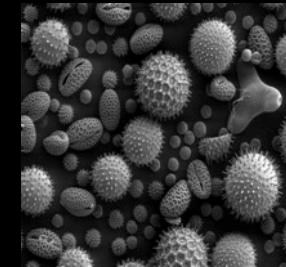
Flame retardants



Metals/metalloids



Allergens



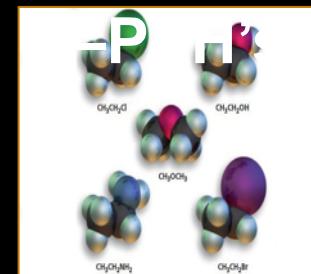
Microbes



Pesticides



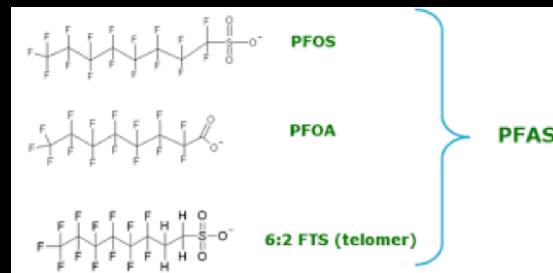
Organics



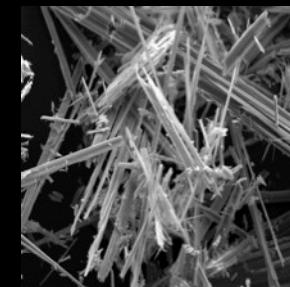
Dust mites



PFAS



Asbestos



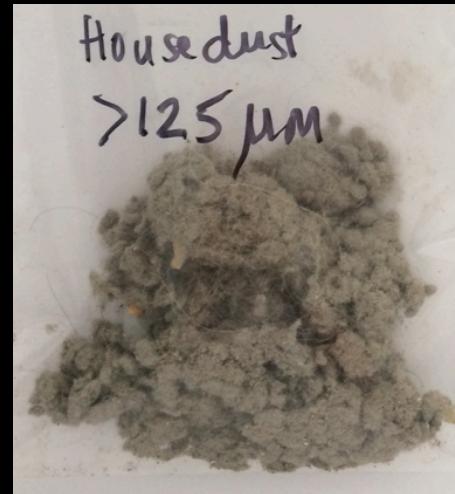
Why are contaminants a potential problem?



- Contaminants easily absorbed.
- Exposures typically via:
 - Veggies grown in contaminated soil
 - Ingestion of soil, dust, paint
 - Inhalation of soil and dust.
- Young children most at risk
 - higher absorption
 - more hand - mouth activity.
- Adverse neurocognitive and behavioural outcomes.

The 360° approach

- 600 dust samples stratified according to house age (20 yr bands) for detailed analysis of organic and inorganic contaminants.
- Program members undertake parallel analysis (comparable data).
- Data stored in a single portal.
- Any researcher can join the program and expand the network.
- Samples stored and available for new users.



The 360° approach

United
Kingdom

USA /
N. America

Asia

Australia



Outcomes

- Contribute to international resources and databank.
- Assist in characterising human exposure and risks in the home environment.
- Have potential for a wide range of applications outside households.
- Metadata explored using GIS for investigation of spatial trends.
- Links Australian public health via the Social Health Atlas of Australia.