DUST 2018

3rd International Conference on Atmospheric Dust

Villa Romanazzi Carducci - Bari, Italy | 29-31 May, 2018

DustSafe:

global insights into the composition and hazard of household dusts through citizen-led science

N. America

Asia

Australia

EU - UK

Why are indoor dusts a potential problem and why Citizen-Science approach?

- Fine particles - contaminants readily absorbed.
- Young children most at risk
  - higher absorption rates (e.g. Pb)
  - more hand - mouth activity.
- Growing need for more effective and inclusive public engagement processes to support environmental health knowledge

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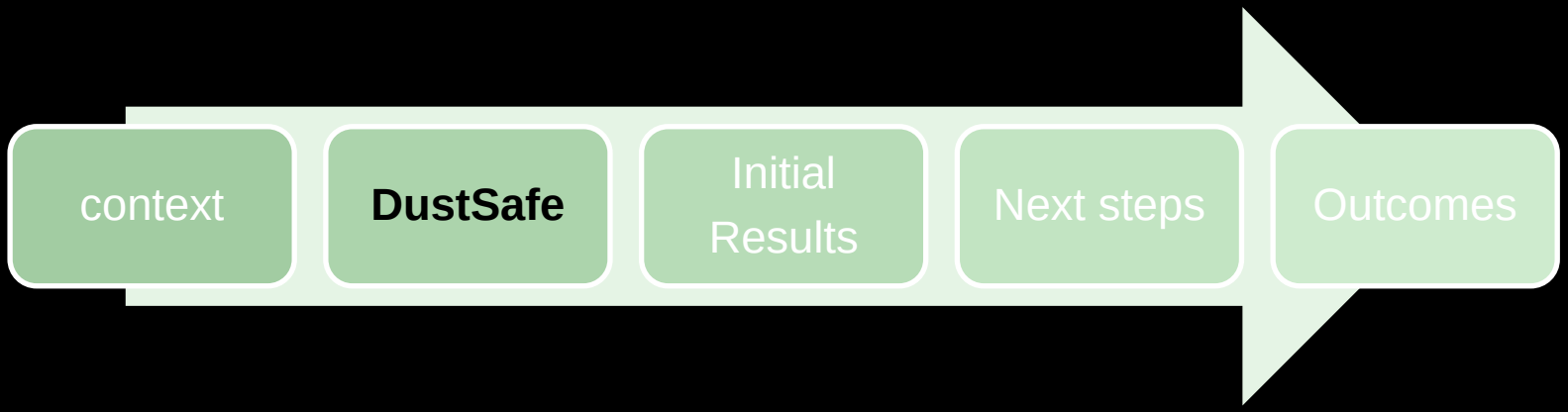
THE PROJECT



DustSafe 2017-2021

Phase 1:

- Engage citizens to collect and submit vacuum dust.

- characterise metals/metalloids by XRF

- Information on the science related to dust and contaminants, and on what to do next where elevated contaminants are identified.

Phase 2:

- Dust 360°

  Further characterisation - microbial components, mineralogy, magnetic signature, allergens, flame retardants, pesticides, fibres/micro-plastics …

Australian Government

OLYMPUS®

DustSafe ‘phase 1’ approach

- Advertise the program via media and existing email databases / Facebook.
- Citizens register online and complete household questionnaire
  [house age, home/household characteristcs]
- Vacuum dust mailed/collected for XRF analysis [and XRD in Australia].
- Summary report returned by email.
- Maps and graphs of suburb level data to be generated on program web site.

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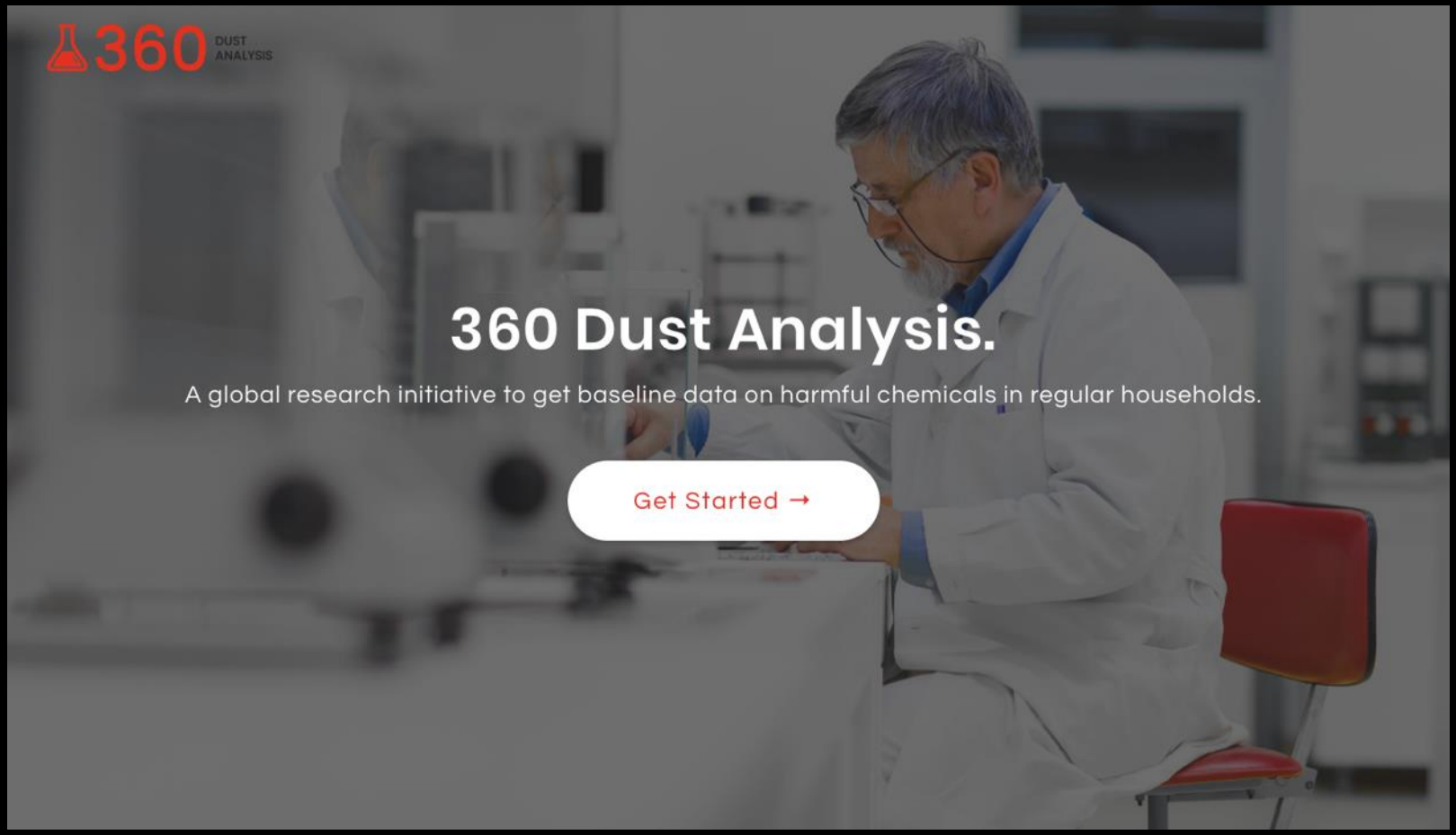

http://www.360dustanalysis.com

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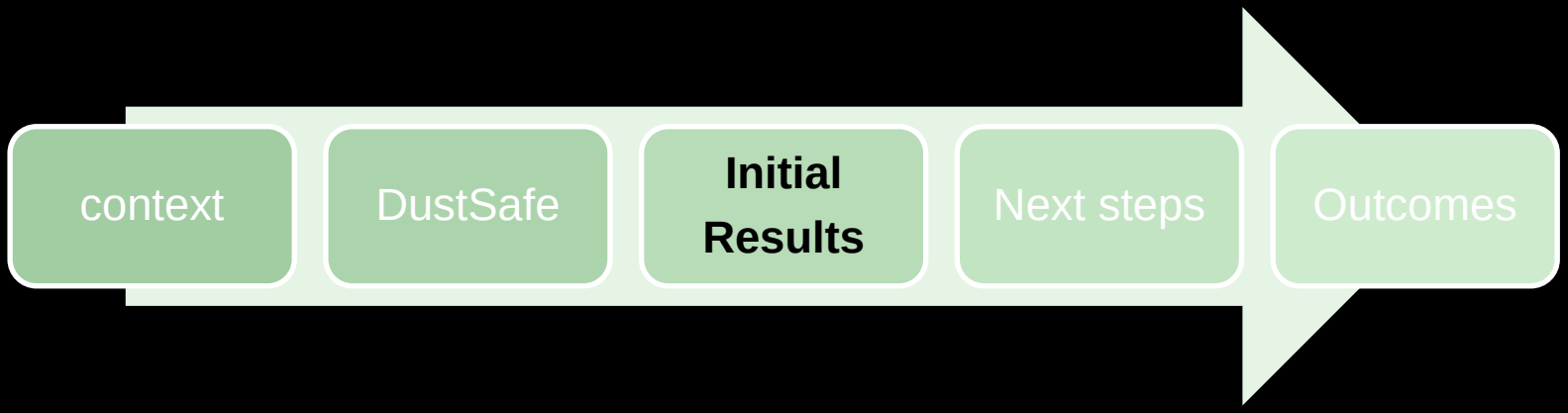
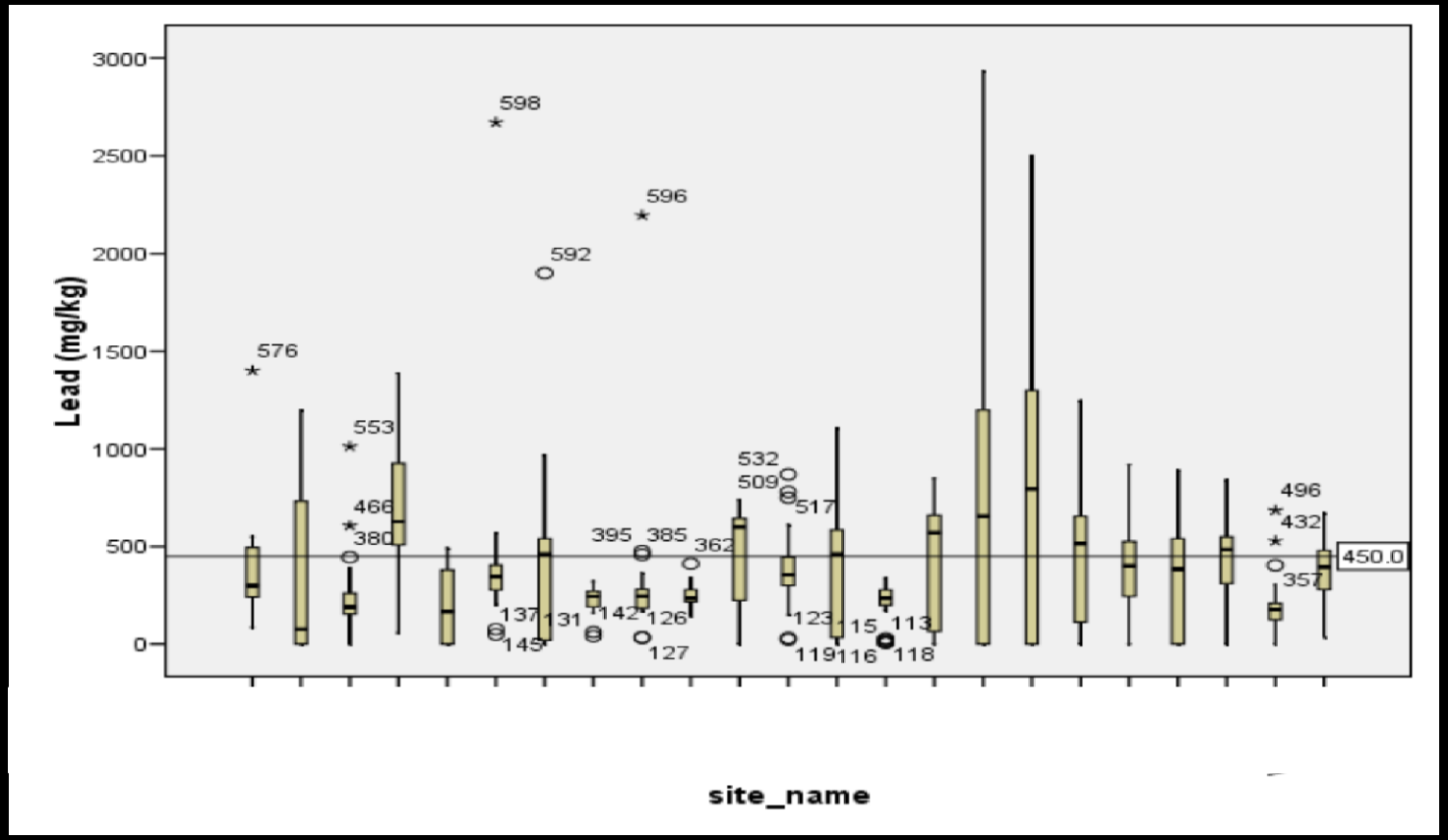
RESULTS



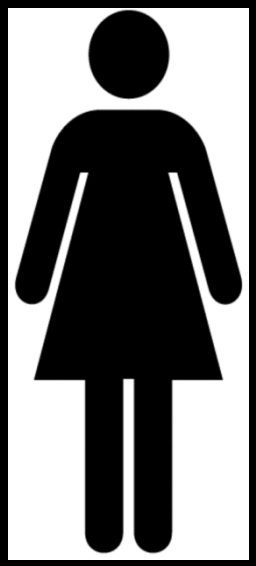
DustSafe UK pilot
[Newcastle Biomonitoring Study]



Raised Pb levels in our urban soils – backtracking particles into homes; deposition on crops

Raising environmental health knowledge

DustSafe UK pilot [Newcastle Biomonitoring Study]



Factors?

Gender?

Age?

Behaviours?

Age?
Osteoporosis?

Pathways

Pb sources

Samples Collected

Ingestion

Inhalation

Diet

Soil

Dust

Allotment

Home

Work & Hobbies

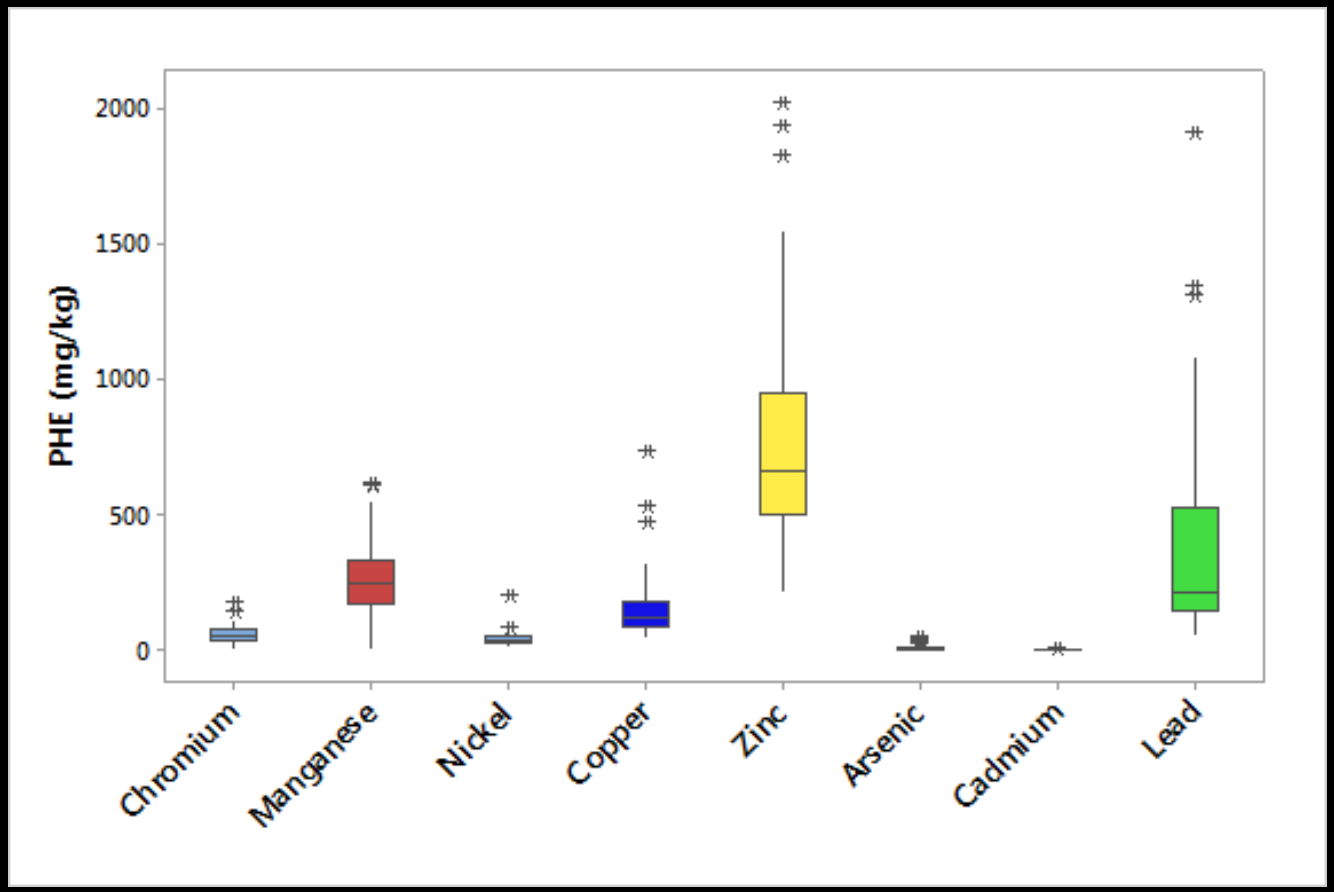
- Garden Soil
- Garden vegetables
- Tap water
- **House dust**
- Atmospheric deposition

- Exposure questionnaire
- Food frequency questionnaire

Internal exposure/ body burden

- Blood
- Saliva

DustSafe UK
[Newcastle Biomonitoring Study]



Q: What is the typical conc. of potentially harmful elements (PHE) in indoor vacuum dust?

‘Global’ indoor vacuum dust

	Median (mg/kg) by XRF		
Element	**Australia (n=95)**	**Newcastle (UK) (n = 51)**	**Canada** (Rasmussen et al. 2013) *(n = >1000)*
Arsenic	13	5.66	*7.7*
Cadmium	<LOD	<LOD	*3.8*
Chromium	66	54.2	*1.01*
Copper	173	119	*217*
Manganese	189	243	*no data*
Nickel	31	34.8	*73.3*
Lead	405	212	*119*
Zinc	931	664	*749*

<LOD – below the limit of detection

Q: What is the typical conc. of PHE in indoor vacuum dust?

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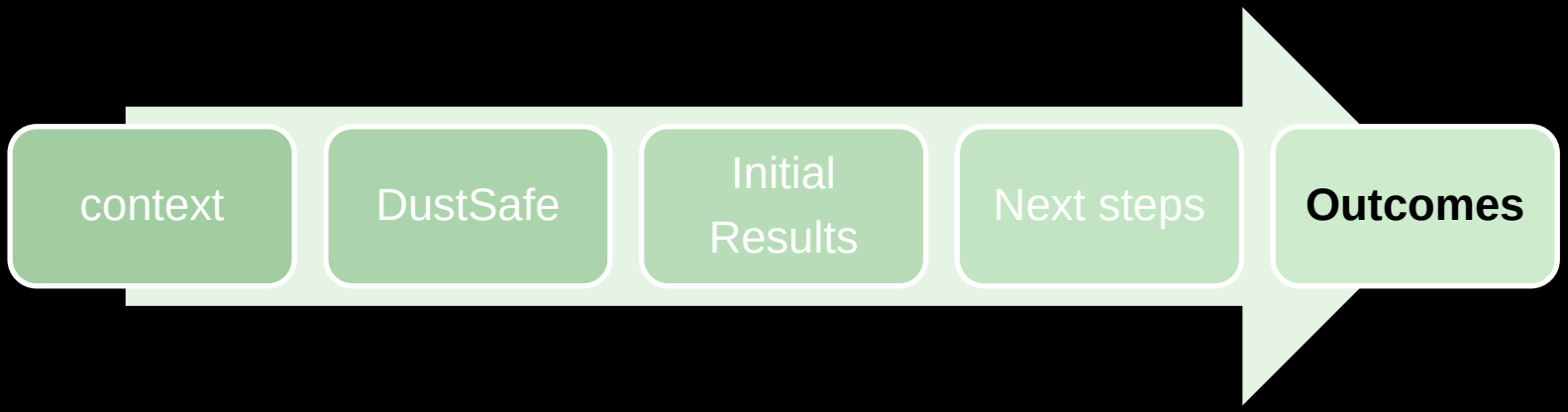
OUTCOMES?



Outcomes

- Contribute to international resource and databank.
- Assist in characterising hazards from dust and risks in the home environment.
- Metadata explored using GIS for investigation of spatial trends.
- Develop Environmental Health knowledge

THANK YOU

Jane A. Entwistle (Northumbria University, UK)

Gabriel Filippelli (Indiana University-Purdue University, USA)
Mark P. Taylor & Paul Harvey (Macquarie University, Australia)
Ming-Hung Wong (The Education University of Hong Kong, Hong Kong)

And the wider team

N. America

Asia

Australia

EU - UK