

Burden of Disease from Toxic Waste Sites in India, Indonesia, and the Philippines in 2010

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BACKGROUND

- Toxic waste sites have not been systematically assessed in low- and middle-income countries
- Lead accounts for 0.6% of global Disability Adjusted Life Years (DALYs)
- Toxic chemicals collectively account for 5.7% of global DALYs
- Prior burden of disease calculations have not included exposures from toxic waste sites

OBJECTIVE

- To calculate the burden of disease in DALYs attributable to toxic waste sites in India, Indonesia, and the Philippines

METHODS

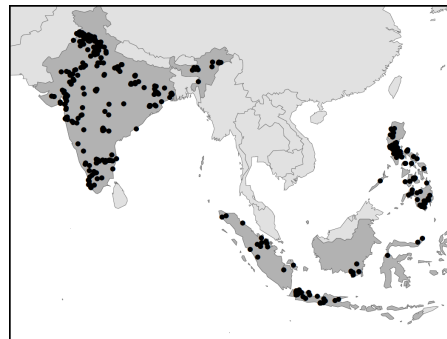
- We obtained characteristics of toxic waste sites from the Blacksmith Institute's database:
 - Dominant chemical pollutant
 - Pathway of exposure
 - Exposed population
- For each chemical we:
 - Identified the relevant health effect (cancer and/or non-cancer)
 - Selected the related disability weight
- We calculated disease incidence using US EPA reference doses, reference concentrations, and slope factors

We then calculated YLDs and YLLs for each chemical:

Years Lived with Disability (YLD)	Years of Life Lost (YLL)
Morbidity associated with a disease	Prematurity mortality associated with a disease



RESULTS



- 373 sites
- Population = 8,629,750
- 7,000 individuals/site
- ~3.5 million children
- ~2.2 million women of childbearing age

Chemical pollutants:

- Aldrin
- Asbestos
- Cadmium
- Chromium
- DDT
- Lead
- Lindane
- Inorganic mercury

Top 2 Contaminants

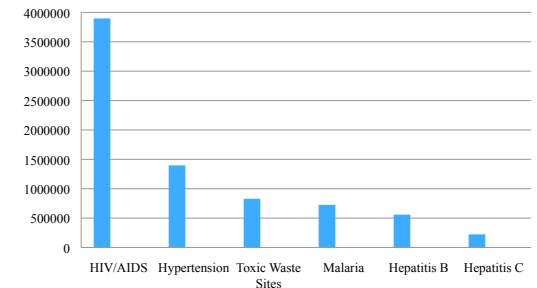
	# of sites	Population	YLD	YLD	DALYs
Chromium	128	3,231,750	63,174	235,483	298,657
Lead	79	1,829,900	523,630	0	523,630

- Lead and hexavalent chromium account for >99% of total DALYs

	Population	DALYs _(3,1)
Screened sites	8,629,750	828,722
Unscreened sites	35,00,000	3,500,000
Screened & unscreened sites	43,629,750	4,328,722

- In addition to screened sites, an additional 5,000 sites are estimated to exist in these countries

CONTEXT



- DALYs from different exposures and diseases in these 3 countries

LIMITATIONS

- Only 8 chemicals and 1 chemical per site
- Limited environmental sampling
- No biomarkers or completed pathways of exposure
- Reliance on slope factors and reference doses/concentrations

CONCLUSIONS

- In these 3 countries, toxic waste sites cause >820,000 DALYs
- Children and women of childbearing age constitute 65% of exposed population
- Lead and chromium cause vast majority of DALYs
- Remediation of these sites to international standards could save ~800,000 DALYs

NEXT STEPS

- Calculate the global burden of disease attributable to toxic waste sites

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