Health impacts of lead exposure

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Outline

• Sources and routes of exposure
• Health effects
• Social and economic impacts
Lead persists in the environment

• Lead is released as particles and fumes during recycling and deposited on ground and other surfaces

• Lead can remain in the environment indefinitely

• Lead contamination creates a legacy of potential human exposure for years into the future
Environmental contamination can kill (Thiaroye sur Mer, Senegal)

- 18 children died
- 47 required treatment for lead poisoning
- 27 had life-threatening poisoning, some with permanent neurological damage
Multiple sources and pathways of exposure to lead from ULAB recycling

Draining electrolyte

Smashing up batteries

Smelting lead components

Workers return home in contaminated clothes

Lead in water

Lead in dust & soil

Lead in air

Ingestion

Inhalation

Exposure of family members

Body burden e.g. blood lead concentration

Health outcomes
Lead is a multi-system toxicant

- Accumulates in bone
- Affects multiple body systems
- Long-term effects include reduced IQ, cardiovascular & kidney disease, anti-social behaviour
- No known level of exposure without harmful effects
Children are especially vulnerable

• Greater exposure:
  ➢ spend more time on the ground and in contact with contaminated soil and dust
  ➢ hand-to-mouth activity, mouthing
  ➢ absorb 4–5 times more lead from the gut than adults

• Early childhood is critical period for neurological and organ development

• Damage may be permanent
  ➢ reduced potential for intellectual development
  ➢ increased likelihood of behavioural disorders
Small IQ reduction has significant societal impact

Distribution of IQ Scores in US Children

Mean IQ = 100

Distribution of IQ Scores in Lead-Exposed US Children

Mean IQ = 95
Economic costs of lead exposure are high

• Estimated economic losses due to reduced IQ is ~1.2% of global GDP
  ➢ Largest economic burden is borne by low and middle income countries

• Prevention of lead exposure now saves future costs
  ➢ Avoids future costs of lead exposure e.g. cost of reduced IQ, cost of anti-social behaviour
  ➢ Avoids future costs of hazard controls for contaminated areas e.g. remediation
Conclusions

• Lead is a persistent hazard – it remains in the environment and in the human body

• ULAB recycling is an important source of lead exposure

• Lead has wide-ranging effects on health – these have personal, societal and economic impacts

• Prevention of exposure is essential