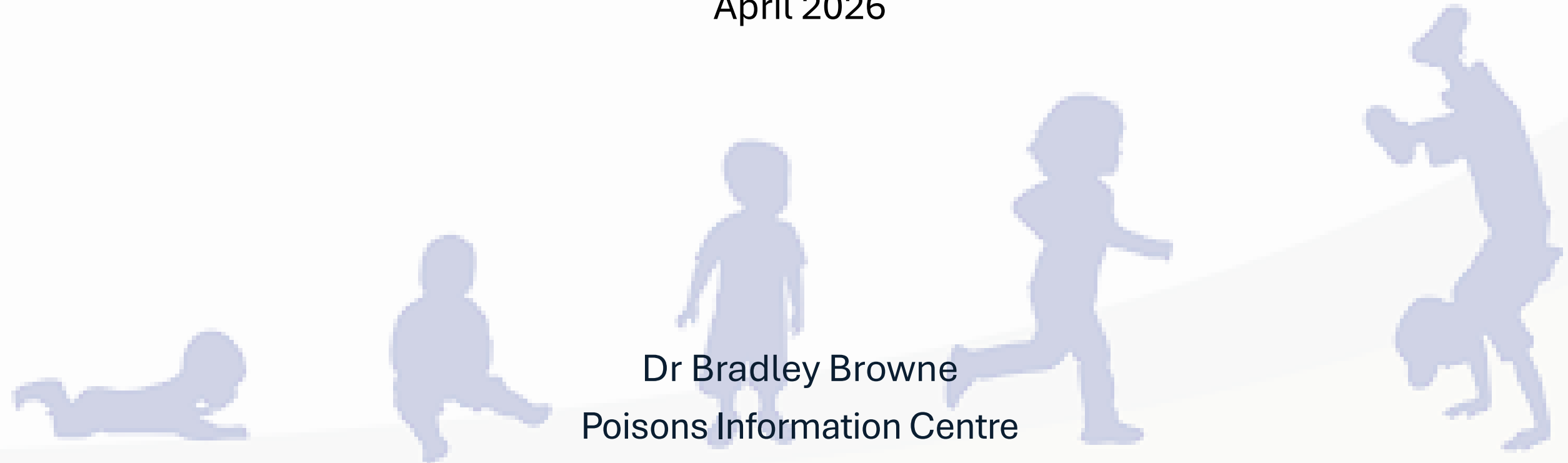




# Lead Poisoning

## Diagnosis and Management

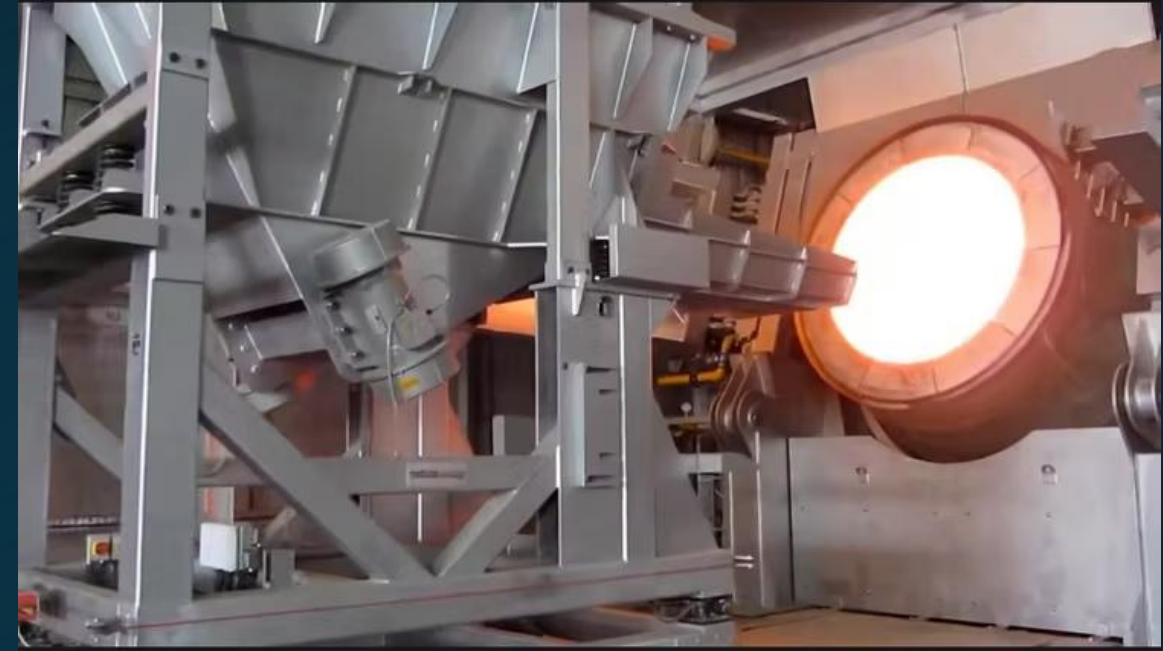
April 2026



Dr Bradley Browne  
Poisons Information Centre

Red Cross War Memorial Children's Hospital

# Case



Why were lead levels persistently elevated?

Were his symptoms due to lead poisoning?

What is the appropriate management for this patient?

Repeated Blood lead levels: 60-65ug/dL

# Presentation Overview

Vulnerable groups  
absorption & effects on the body  
management

# Risk in Childhood

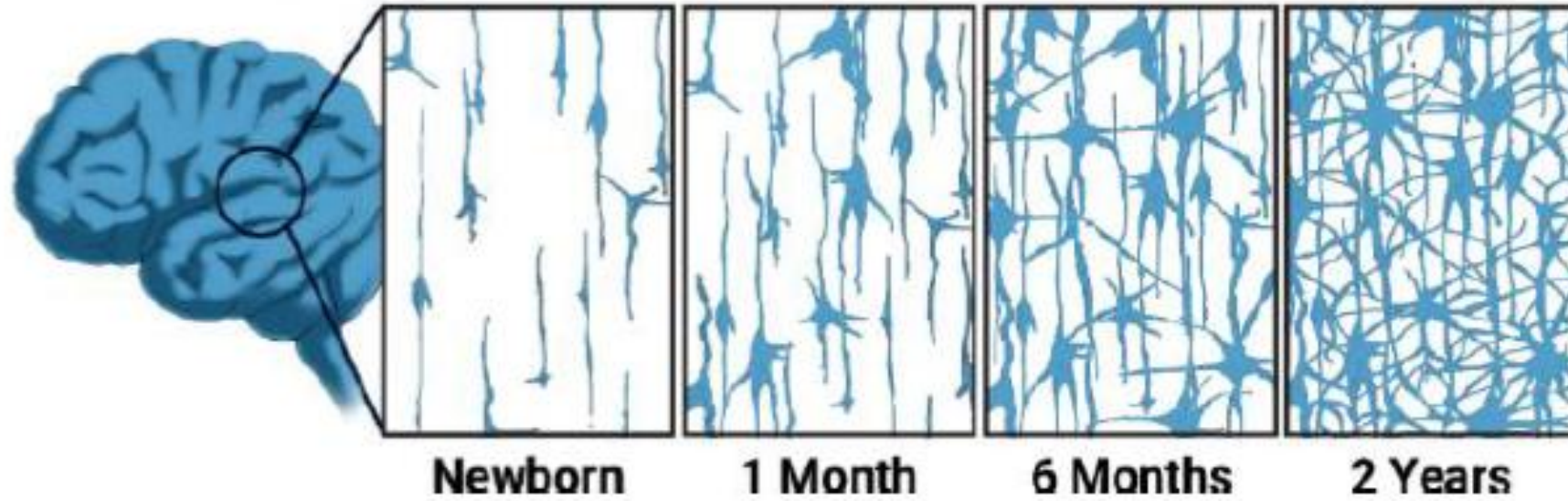


- Exploratory and curious
- Hand to mouth behaviour
- Size – nearer to the ground sources of lead dust
- **DEVELOPING** Nervous system

## An Update on Childhood Lead Poisoning

Marissa Hauptman, MD, MPH<sup>\*,†,‡</sup>, Rebecca Bruccoleri, MD<sup>\*,†,‡,§</sup>, and Alan D. Woolf, MD, MPH<sup>\*,†,‡</sup>

# Risk in Childhood

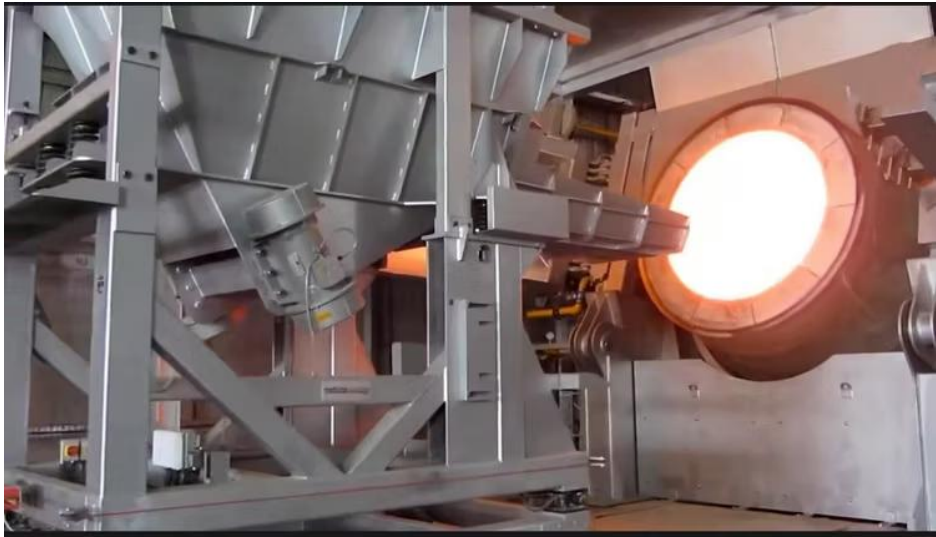


# Occupational Risk

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## Formal Sector

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## Informal Sector

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# Lead absorption & effects on the body

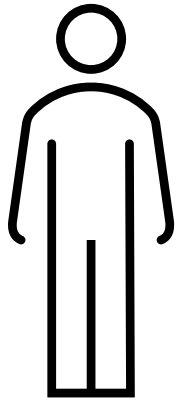
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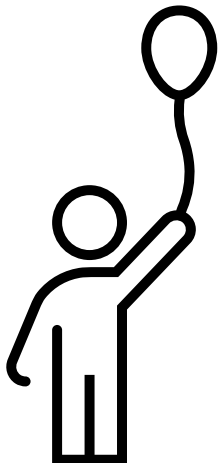
Source: WHO

# Lead ABSORPTION

## Ingestion



3-10% absorbed



**40-50% absorbed**

Increased in Iron  
or Ca Deficiency

## Inhalation

Lead fumes / particles

30-40%

Children > adults

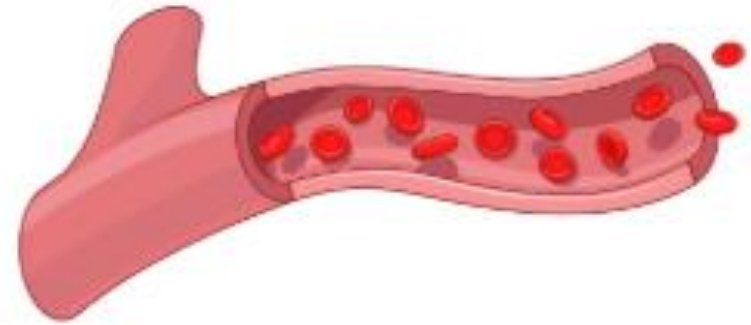
Iron Deficiency is common in South Africa

- Children with nutritional deficiency
- Infants born preterm

ASSOCIATION BETWEEN IRON DEFICIENCY AND BLOOD LEAD LEVEL IN A  
LONGITUDINAL ANALYSIS OF CHILDREN FOLLOWED IN AN URBAN PRIMARY  
CARE CLINIC

ROBERT O. WRIGHT, MD, MPH, SHRNG-WERN TSAI, ScD, JOEL SCHWARTZ, PhD, ROSALIND J. WRIGHT, MD, MPH,  
AND HOWARD HU, MPH

# Lead DISTRIBUTION



# Lead DISTRIBUTION

## Active Pool

Soft Tissue & blood



$T_{1/2} = 40$  days

## Storage Pool

Bone

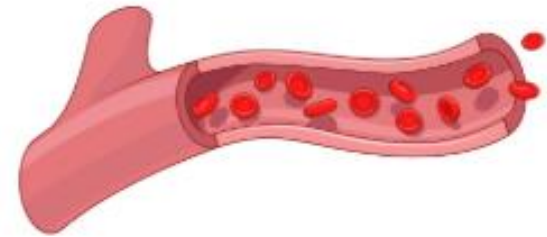


$T_{1/2} =$  up to 20 years

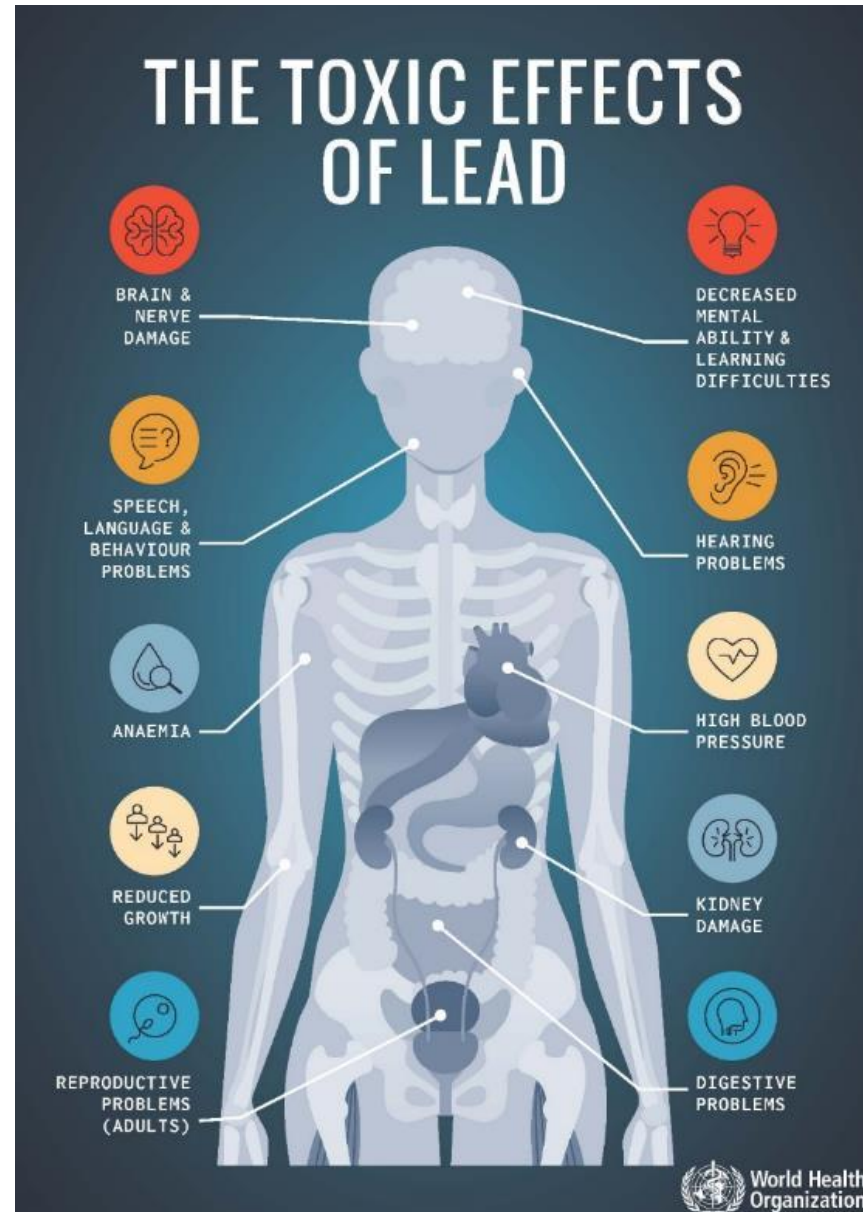
**Excretion:** Kidneys - 75% in urine

# Lead ELIMINATION

Lead is very slowly  
eliminated from bone



# What does lead do?





# Lead poisoning management

# Lead Poisoning – The Great Pretender

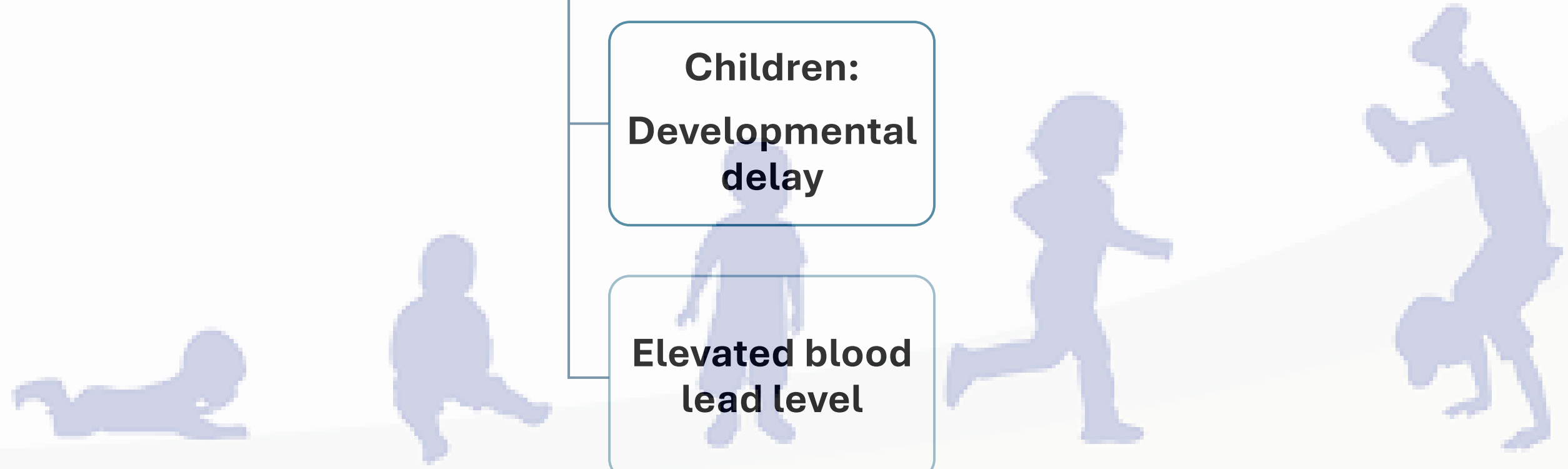


Oh yes!  
I'm the great  
**PRETENDER**

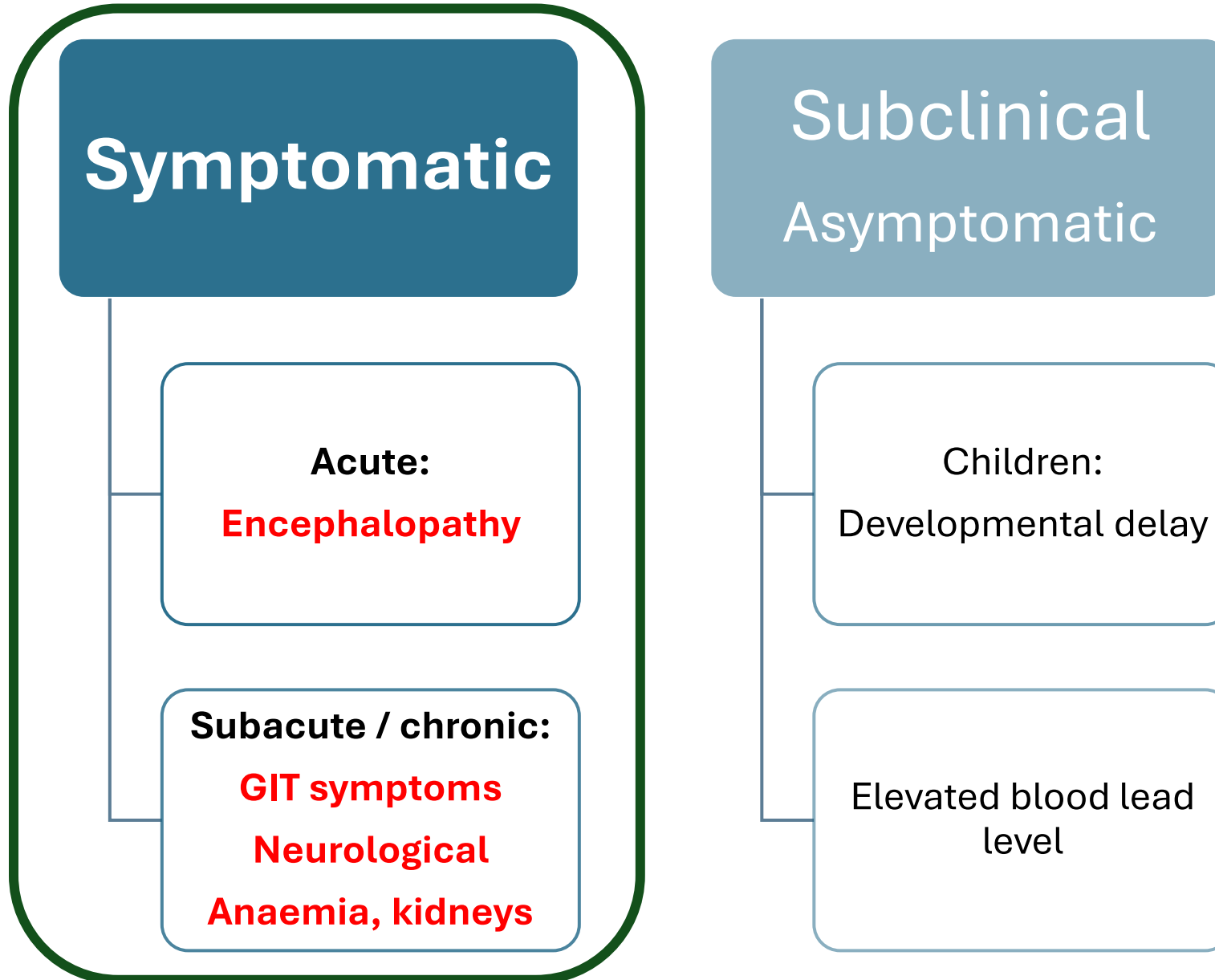
## Subclinical Asymptomatic

**Children:  
Developmental  
delay**

**Elevated blood  
lead level**



# Lead Poisoning



# Symptomatic Lead Poisoning

- Acute symptomatic
- (BLL  $>70 \mu\text{g/dL}$  in children,  $>100$  adults)
- Encephalopathy
  - lethargic, vomiting
  - seizures, coma
  - mortality 25%
  - Survivors: One third neurological disability
- GIT symptoms
- Anaemia



# Symptomatic Lead Poisoning

## Subacute / Chronic (BLL >50 µg/dL)

### BRAIN

- Lethargy
- Irritable, inattentive & poor concentration
- Weakness, motor neuropathy

### GIT

- Anorexia & Pain ('colic')
- Nausea, constipation & vomiting

### HEART

- Ischaemic heart disease

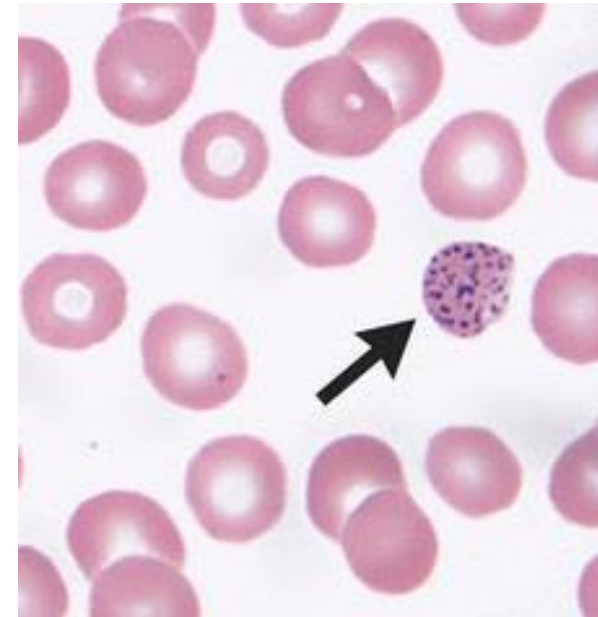
### Other systems

- Anaemia
- Renal dysfunction
- Liver dysfunction



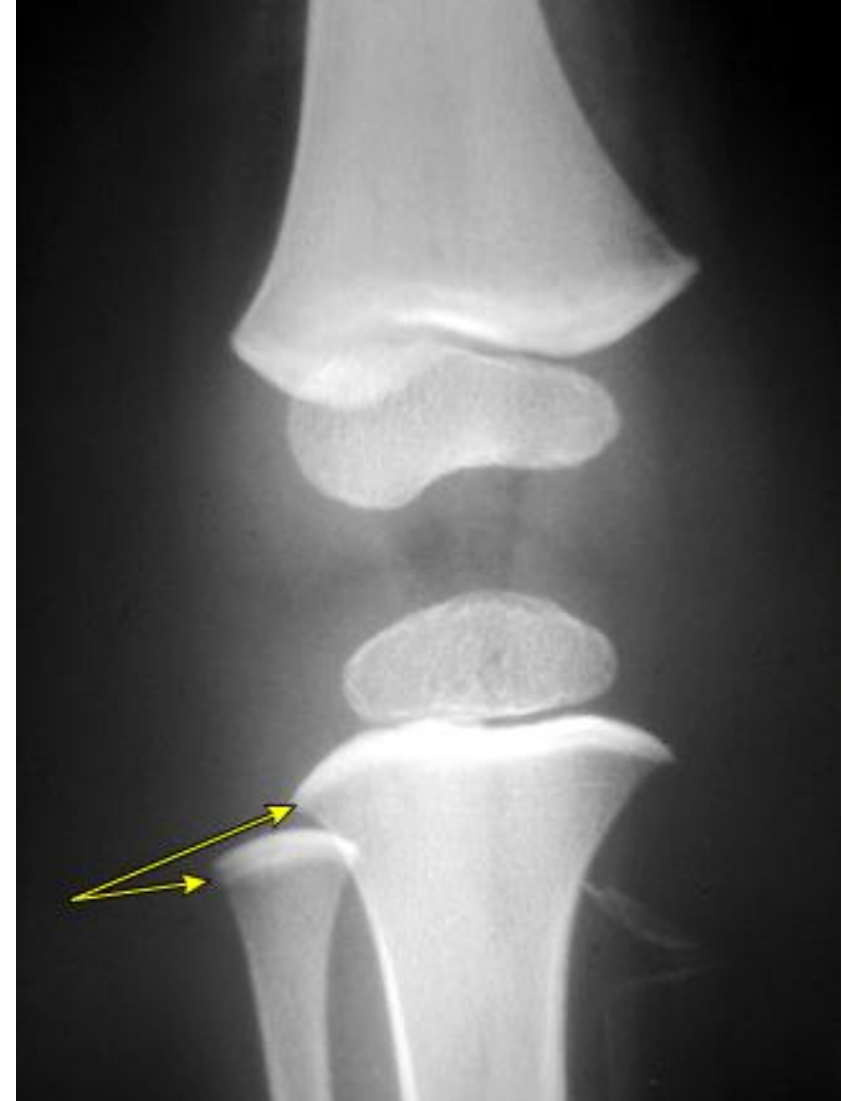
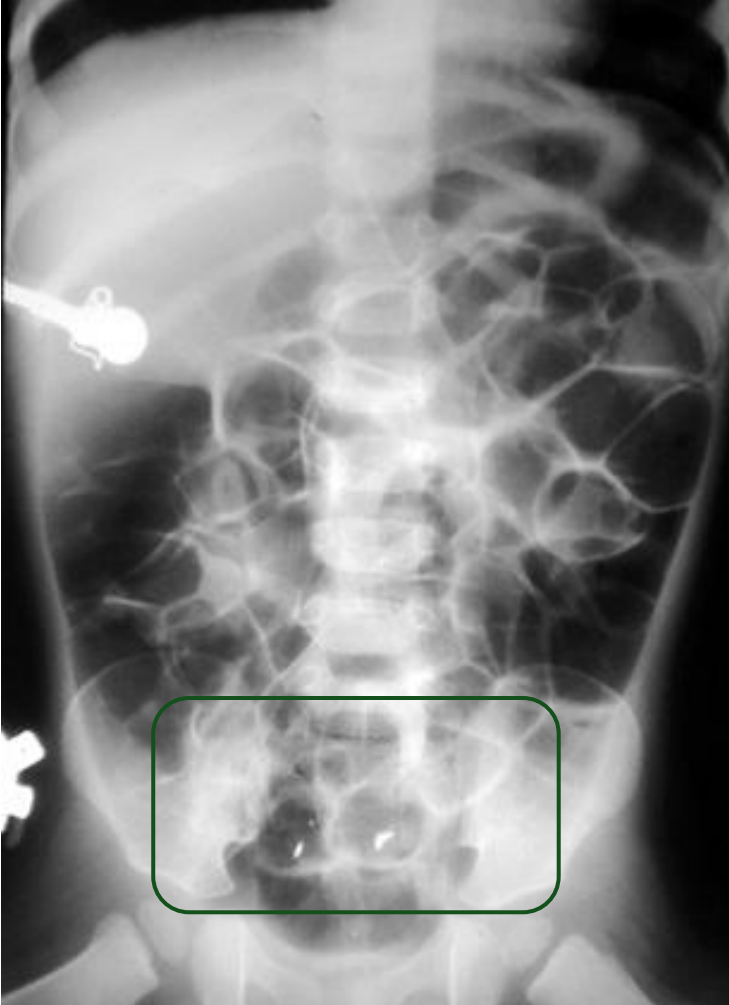
# Lead Poisoning - DIAGNOSIS

- Blood lead levels
  - 3ml whole blood in EDTA tube
  - Cost: R210
- FBC & smear – basophilic stippling



# Lead Poisoning - DIAGNOSIS

Flecks of lead in the pelvis of a child who ingested lead paint chips.



Lead lines in the proximal tibial and fibular metaphyses in a child with chronic lead toxicity.

- Prevent further exposure
  - environmental intervention
  - Remove foreign body:
  - Bowel irrigation, endoscopy, surgery
- Optimise nutritional status
  - Iron & Calcium supplementation
  - Improve developmental outcomes
  - reduce further lead absorption.



## Chelation

- Bind to lead in plasma
- Complexes excreted in urine/bile
- Oral/IV; 3 days to 3 weeks
- Section 21; R1000-R44000



# Lead Poisoning - MANAGEMENT

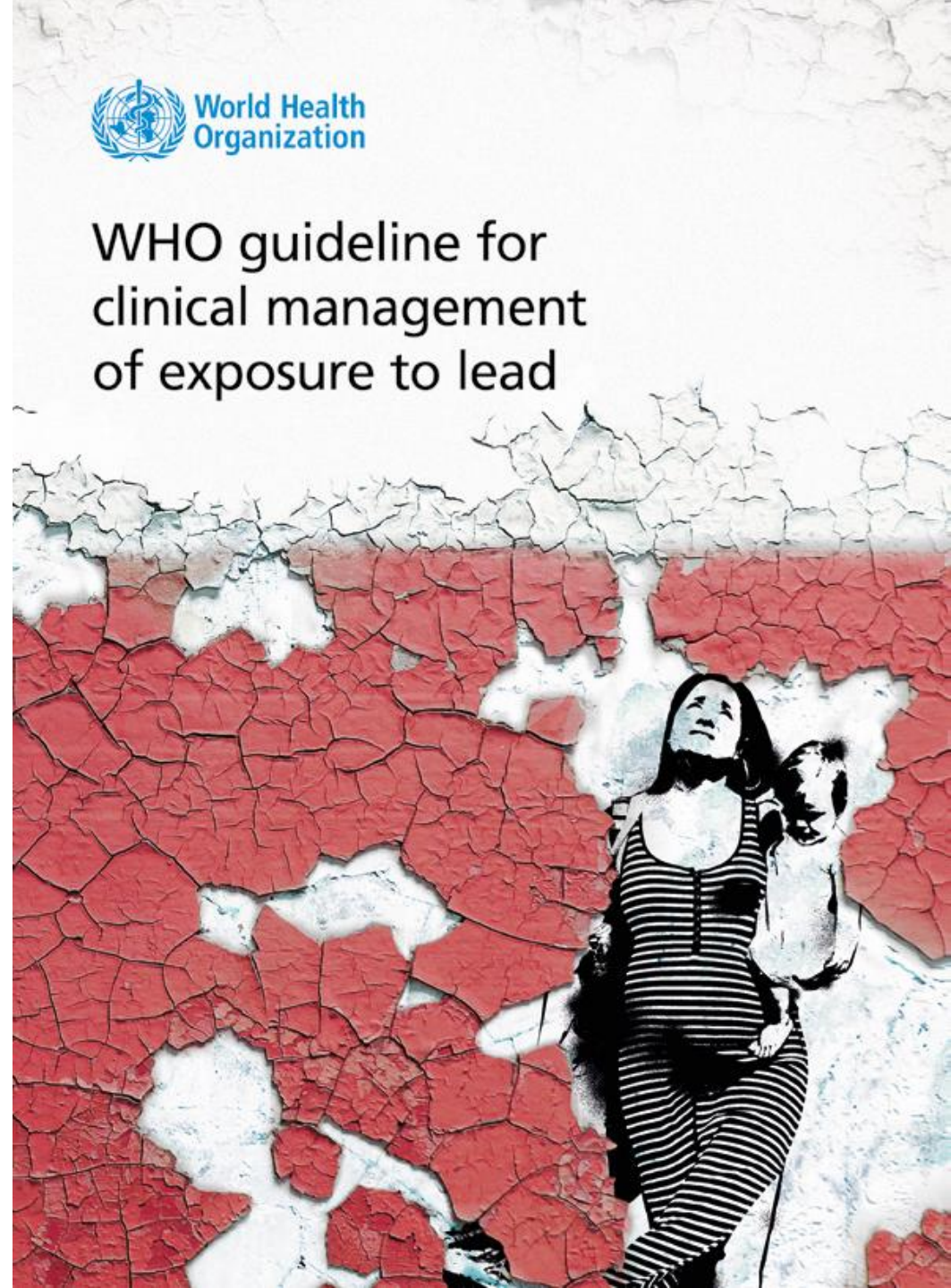
- The quickest and safest way to reduce BLL is **to remove the patient from the source of Exposure.**
- Chelating agents are reserved for sick patients who have already been removed from exposure.

**Notify!!**

Category 2 Notifiable Medical Condition

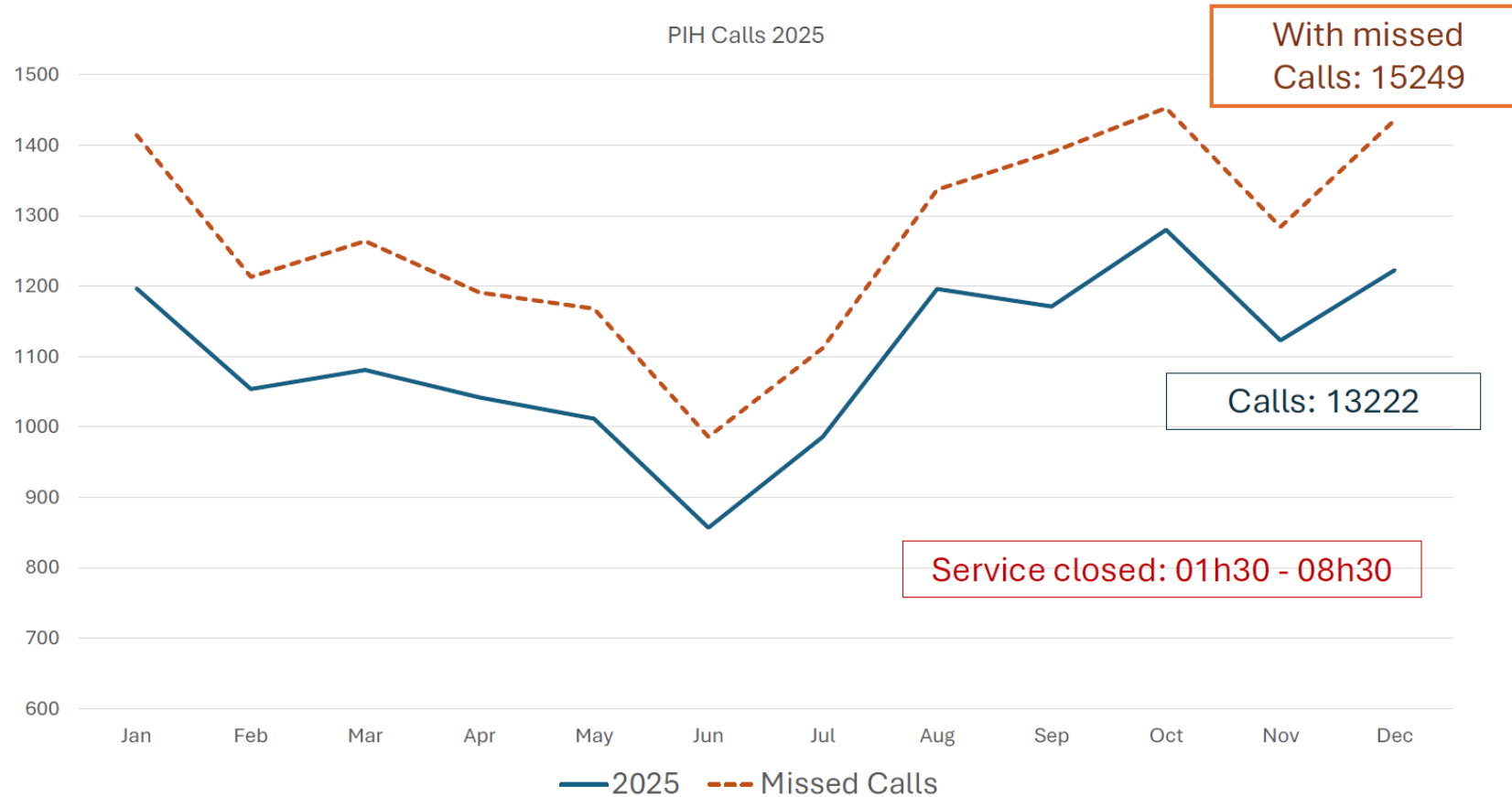


WHO guideline for  
clinical management  
of exposure to lead



# Resources

- AfriTox – Clinical Poisons Database
- National Poisons Information Helpline: 0861 555 777



36 year old male  
PERSISTENTLY high lead levels over 6-8 weeks  
Moderate symptoms

- Repeated high BLL indicates **ongoing lead exposure**
- Best way to reduce BLL and relieve symptoms – **remove from exposure**
- Workplace safety and education
- Repeat BLL 2 weeks
- Consider DMSA if symptoms don't resolve / levels still high thereafter.

# Thank you

[www.afritox.ac.za](http://www.afritox.ac.za)

[Bradley.browne@uct.ac.za](mailto:Bradley.browne@uct.ac.za)



Contribution acknowledgements to Dr Cindy Stephen

