

NEURODEVELOPMENTAL ASSESSMENT OF CHILDREN IN SELECTED LOCATIONS OF KABWE, ZAMBIA.

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Zambia's child poisoning tragedy

By Penny Dale
BBC, Kabwe

Every time children play in the dusty streets of the small Zambian town of Kabwe, they are putting their health at risk, according to environmentalists.

What sets Kabwe apart from other places is the extent of its lead pollution, a grim, but for years hidden, legacy of the town's now disused lead mine.

In its heyday, Kabwe boasted one of the largest and richest lead mines in Africa.

But from the time the mine opened in 1902 and closed in 1994, there were few pollution controls and as a consequence Kabwe's vegetation, soil and water are heavily contaminated with the highly poisonous metal lead.



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What is Lead?

Pb Lead

Atomic Number: 82

Atomic Mass: 207.20

Lead is a bluish gray metallic element which occurs naturally (in small amounts) in the earth's crust.

It is dense, hence its use as a ballast, ammunition, or radiation shield.

Lead is insoluble in water, but some salts are soluble.

Prevent Childhood Lead Poisoning

Exposure to lead can seriously harm a child's health.



Damage to the brain and nervous system



Slowed growth and development



Learning and behavior problems



Hearing and speech problems

This can cause:

- Lower IQ
- Decreased ability to pay attention
- Underperformance at school



Lead can be found throughout a child's environment.

Research Questions

- What are the blood lead levels of the mothers and children in selected locations of Kabwe?
- “Is there any association between blood lead level and neurodevelopmental outcomes in selected communities in Kabwe?”

Study Objectives

General Objective

To quantify blood lead levels and study neurodevelopment outcomes in children of selected communities in Kabwe.

Specific objectives:

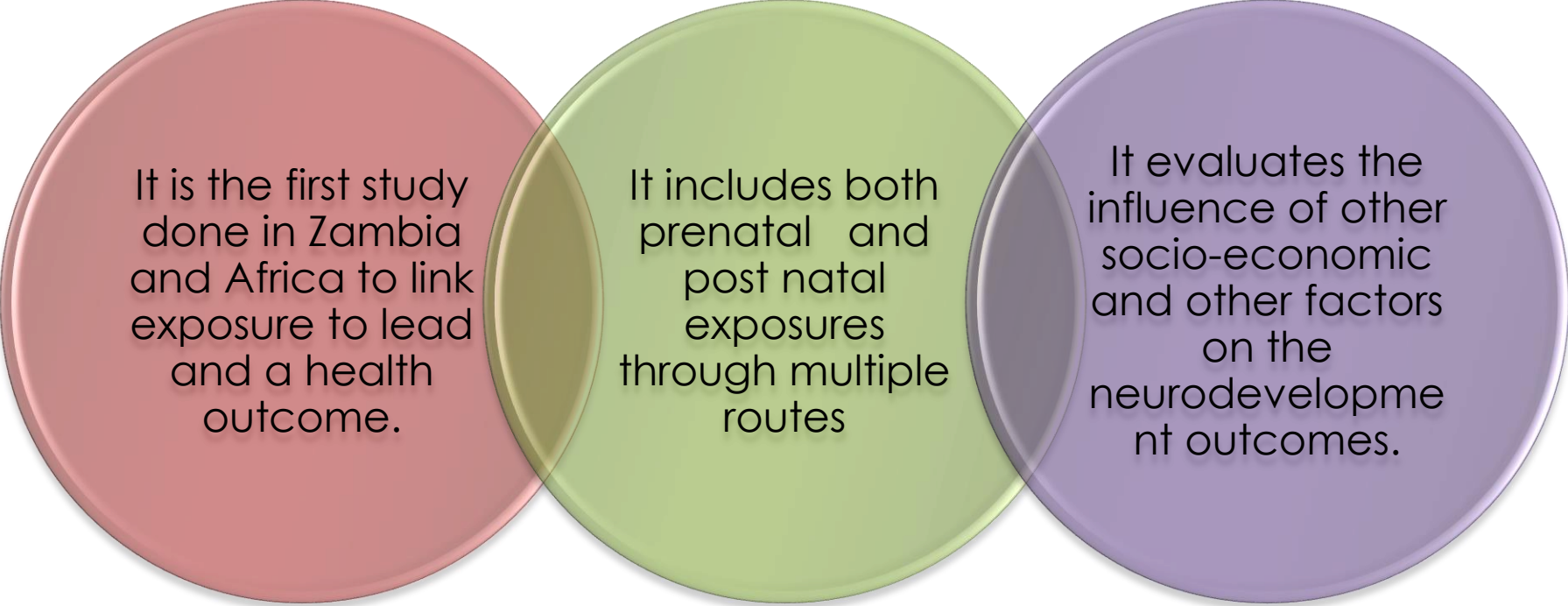
To measure lead levels in Mother and child pairs in selected communities;

To describe lead exposure pathways at community and individual levels;

To determine Neurodevelopmental outcomes in the targeted populations;

To evaluate other factors that may be associated with the observed outcomes.

How will this study bridge the research gap?

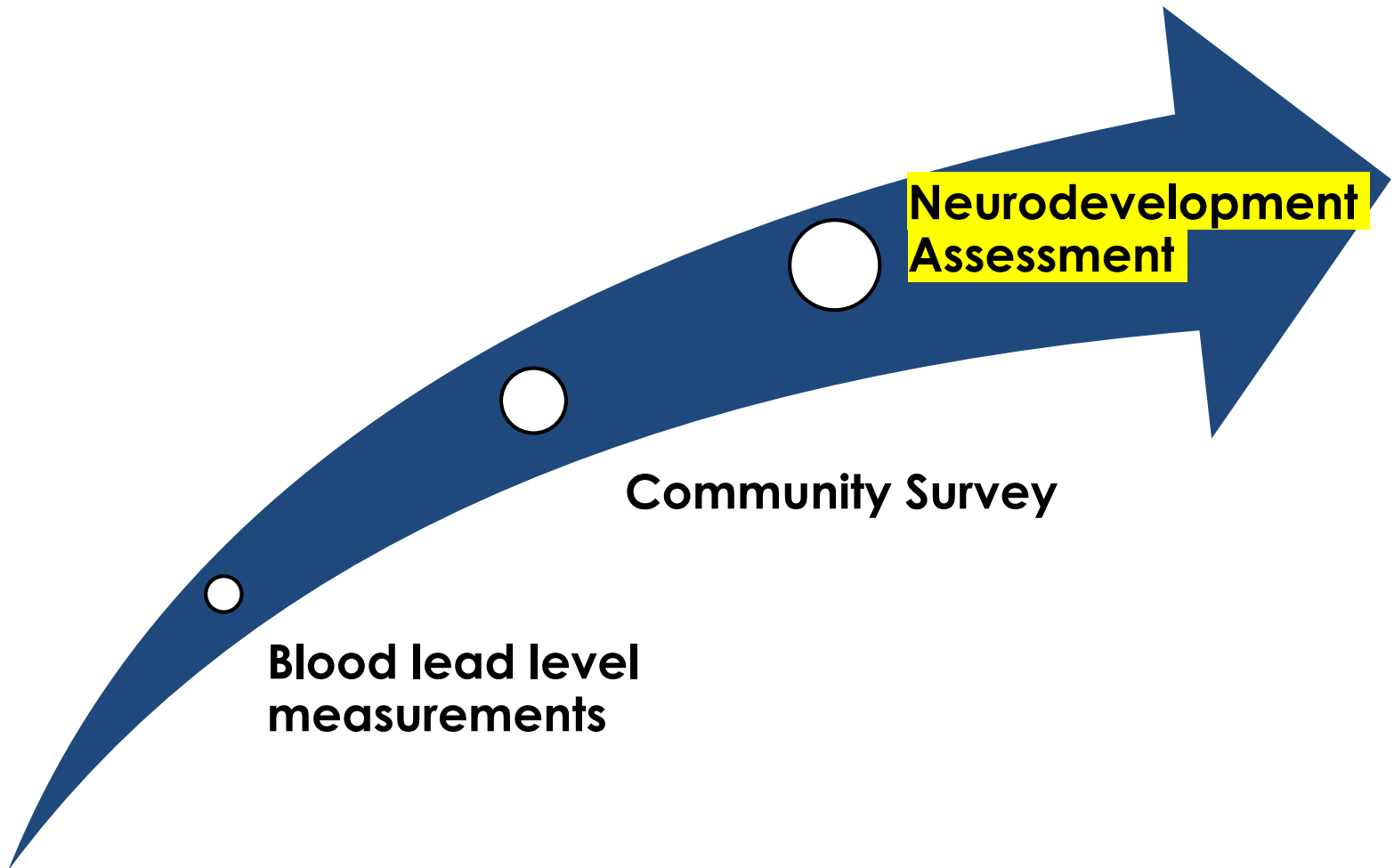


It is the first study done in Zambia and Africa to link exposure to lead and a health outcome.

It includes both prenatal and post natal exposures through multiple routes

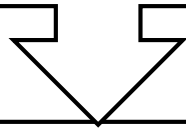
It evaluates the influence of other socio-economic and other factors on the neurodevelopment outcomes.

Study Design

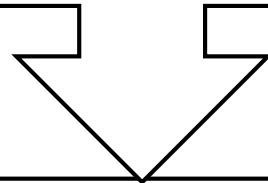


Sampling design

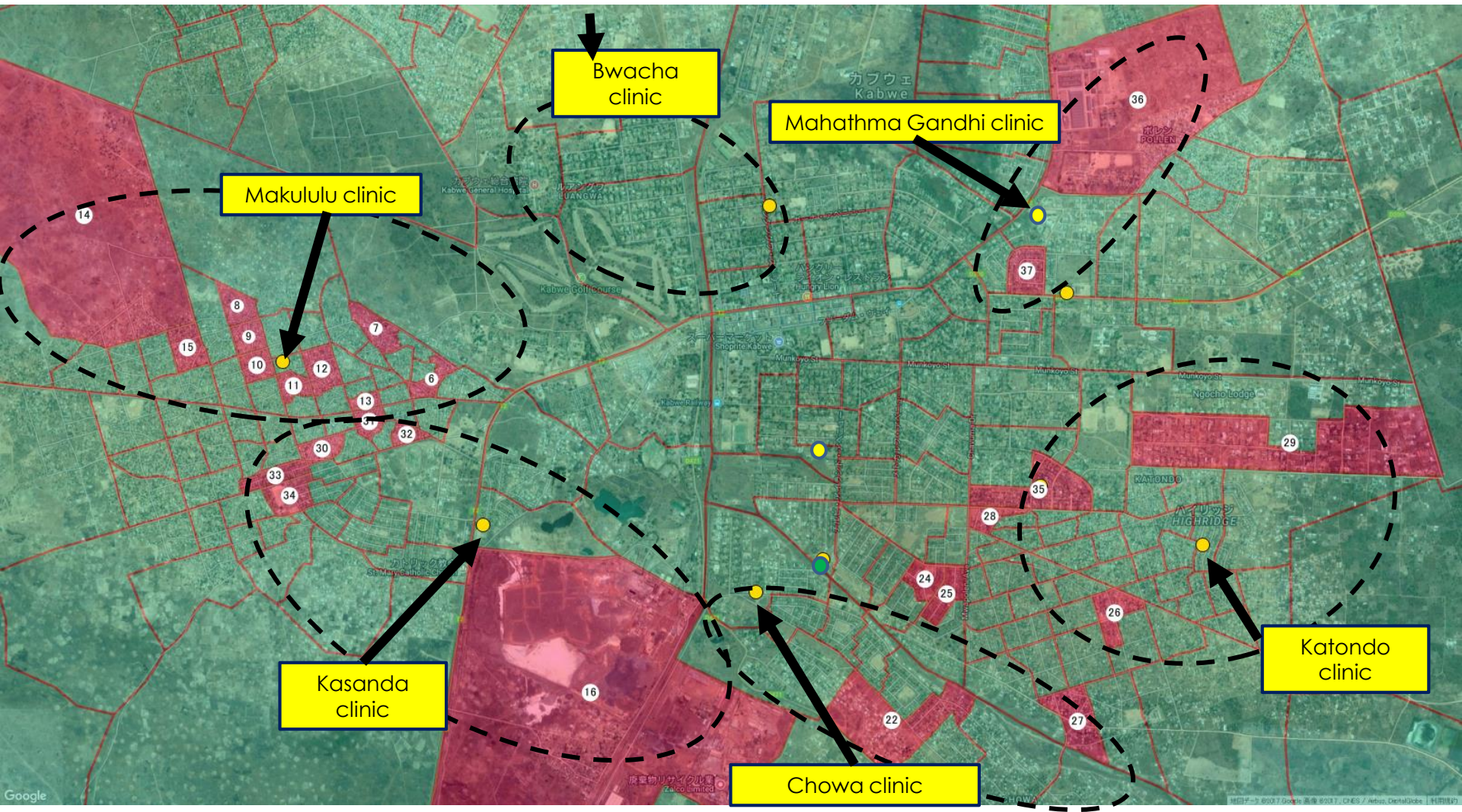
The 2010 Zambia Census Sampling Frame was used for the study areas



One Census Supervisory Area (CSA) was selected and thereafter Standard Enumeration Areas (SEAs) randomly selected.



After stratifying by zones within each area, the CHVs recruited mother and child pairs according to the pre-calculated sample size.



Makululu clinic

Bwacha clinic

Mahatma Gandhi clinic

Kasanda clinic

Chowa clinic

Katondo clinic

Eligibility criteria

Mother above 18
years of age

Consent was given

Singleton Birth

N= 185

Makululu- 40; Chowa- 28;

Kasanda- 40;

Bwacha- 35; and

Mahatma-Ghandi- 42

Data Collection

- To determine Neurodevelopmental outcomes in the targeted populations.



Assessing children



11/9/2017



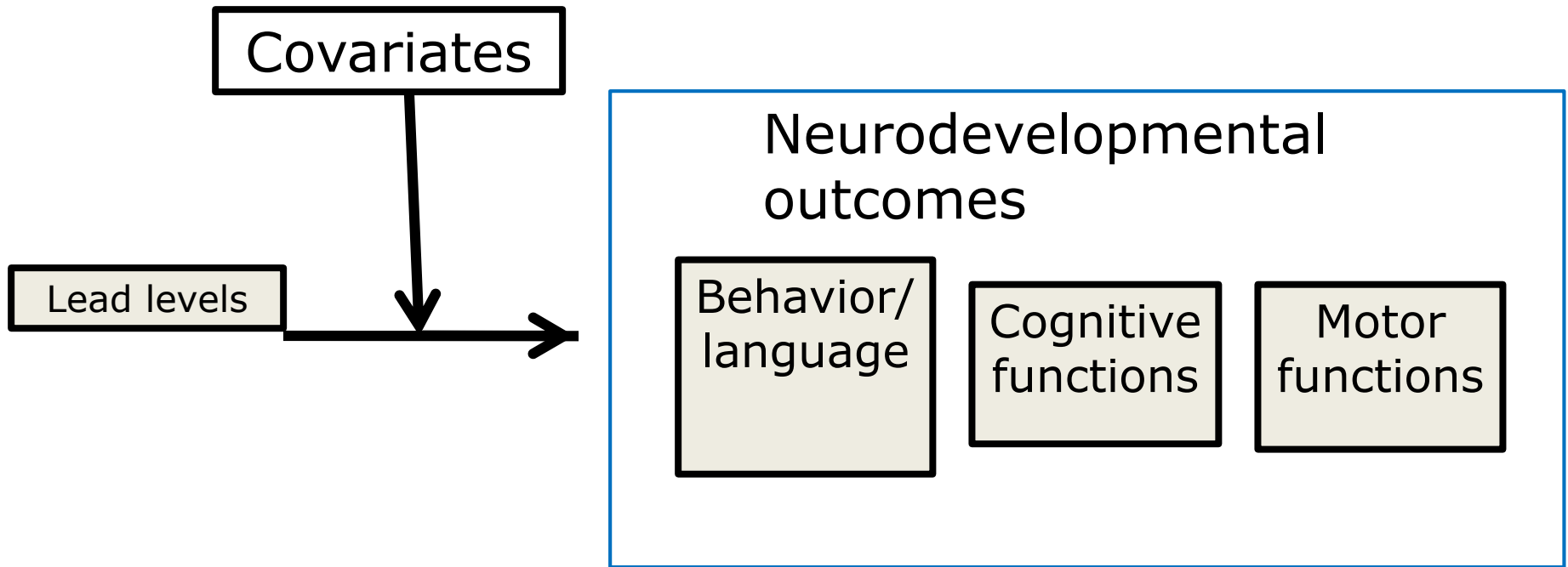


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Cross- Sectional Study



Blood lead level measurements

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- Using a lancet, a trained laboratory technician drew a 5ml sample of blood from the thumb;
- This was stored at 4⁰C pending analysis using lead care kit;



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Anthropometric Measurements

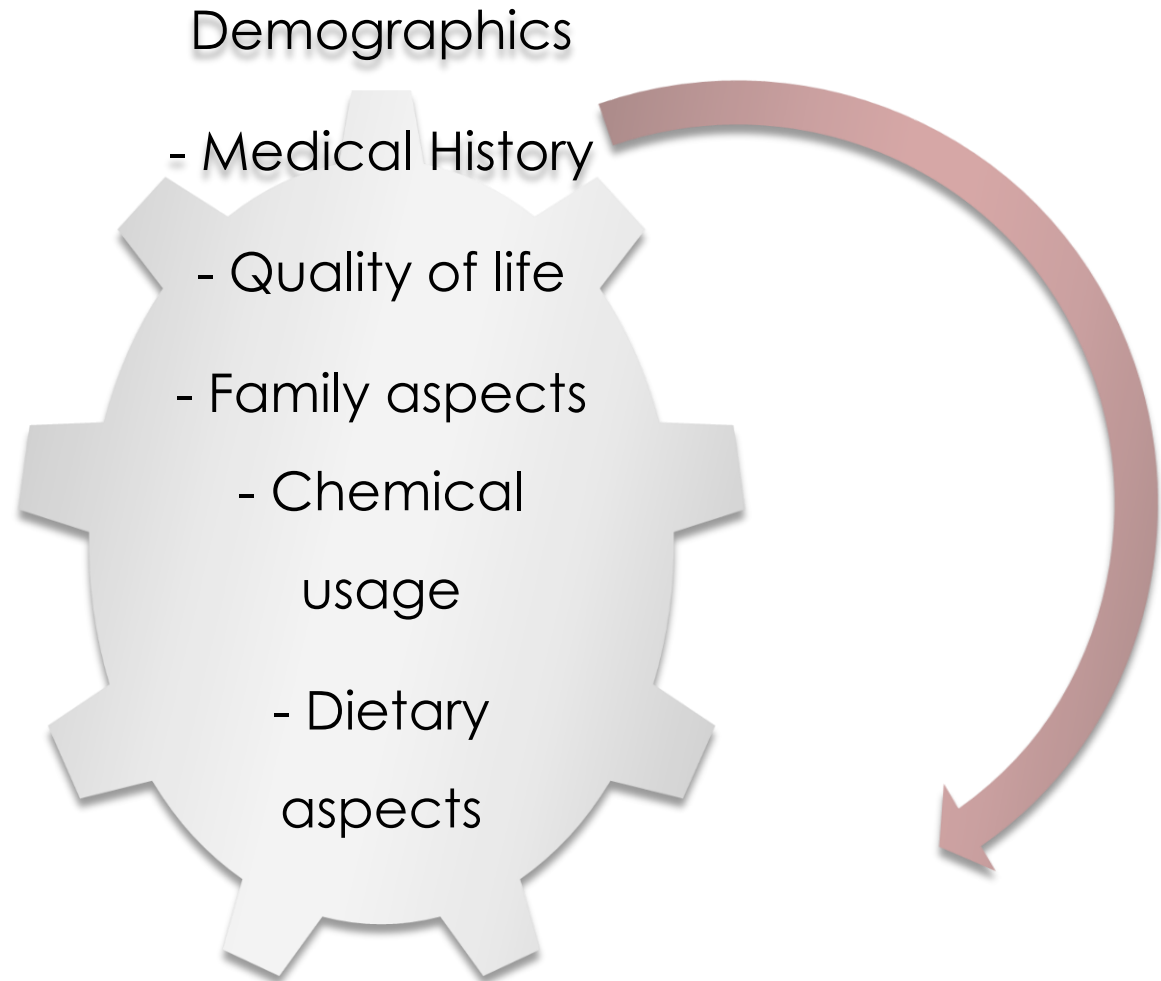
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- Both height and weights of the mothers and children were taken.



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Interviewer administered questionnaire.



Administering the questionnaire

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Community Team

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	CHV	Lab Technicians
□	Makululu Mr Godfrey Bwalya Mrs Justina Mutale	Mrs Beatrice Mulenga
□	Chowa Mr Zulu	Mrs Bertha Nankonona
□	Kasanda Mr Seke	Mr Sumaili
□	Bwacha Mrs Theresa Libai Mrs Mutale	Mrs Mary Mukalipi
	Mahatma Mr Banda	Ms. Sharon Sinyinza

Transporter: Mr Bright Chishala

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Ethical Considerations

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Informed consent was obtained from the parents.

Presence of the parent/caregiver during the Neurodevelopmental testing.

Blood was drawn by trained laboratory personnel and minimum intrusion and risk were upheld.

Confidentiality was assured.

Milk was given to the mothers for the babies;

In instances where the assessment showed adverse outcomes, advice was given to take the child for further assessment and therapy.



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Public Voice

Concerns from the Nurses in Charge

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What measures will be put in place for those with high lead exposure??



People in the community have been asking the health personnel what will be done and the health personnel in these centres have been the ones to face the wrath of the community when nothing is being done for them



Who will be the one to provide the intervention and when will intervention come?



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Concerns from Parents

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Mothers threatened not to have their children in the study if they are not given something.

Parents also wanted to find out what measures are available for them after all the exposure and issues that they face.

They would appreciate to see results in terms of interventions.

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Prevention of Lead Poisoning




Prevention of lead poisoning is a superior public health measure; medical treatment alone is disappointing.

The key to treatment is cessation of exposure, and the public health need is to consider and find other possible victims.

Next Steps


Commence Data Analysis in line with Research Questions and Objectives



Disseminate results to Kabwe District Medical Team and thereafter the mothers;



Liaise closely with the ZMERIP World bank Project to ensure interventions commence for children with blood lead levels above $45\mu\text{g}/\text{dl}$;



Plan and commence recruitment of expectant mothers for the birth cohort study.

Helpful Web Sites

- ATSDR
<http://www.atsdr.cdc.gov/HEC/CSEM/lead/index.html>
- ATSDR Toxicological Profiles
<http://www.atsdr.cdc.gov/toxpro2.html>
- ATSDR ToxFAQs™
<http://www.atsdr.cdc.gov/toxfaq.html>
- CDC-NCEH
<http://www.cdc.gov/nceh/lead/lead.htm>
- NIOSH
<http://www.cdc.gov/niosh/leadpg.html>



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“We do not inherit the earth from our ancestors, we borrow it from our children.”

Thank You!!!!