

# Acute Gastroenteritis Mortality Among children under 5 years in Soweto, South Africa: Insights from Minimally Invasive Tissue Sampling, 2017-2025

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VACCINES & INFECTIOUS DISEASES ANALYTICS

# Global Burden of Diarrhoeal Disease



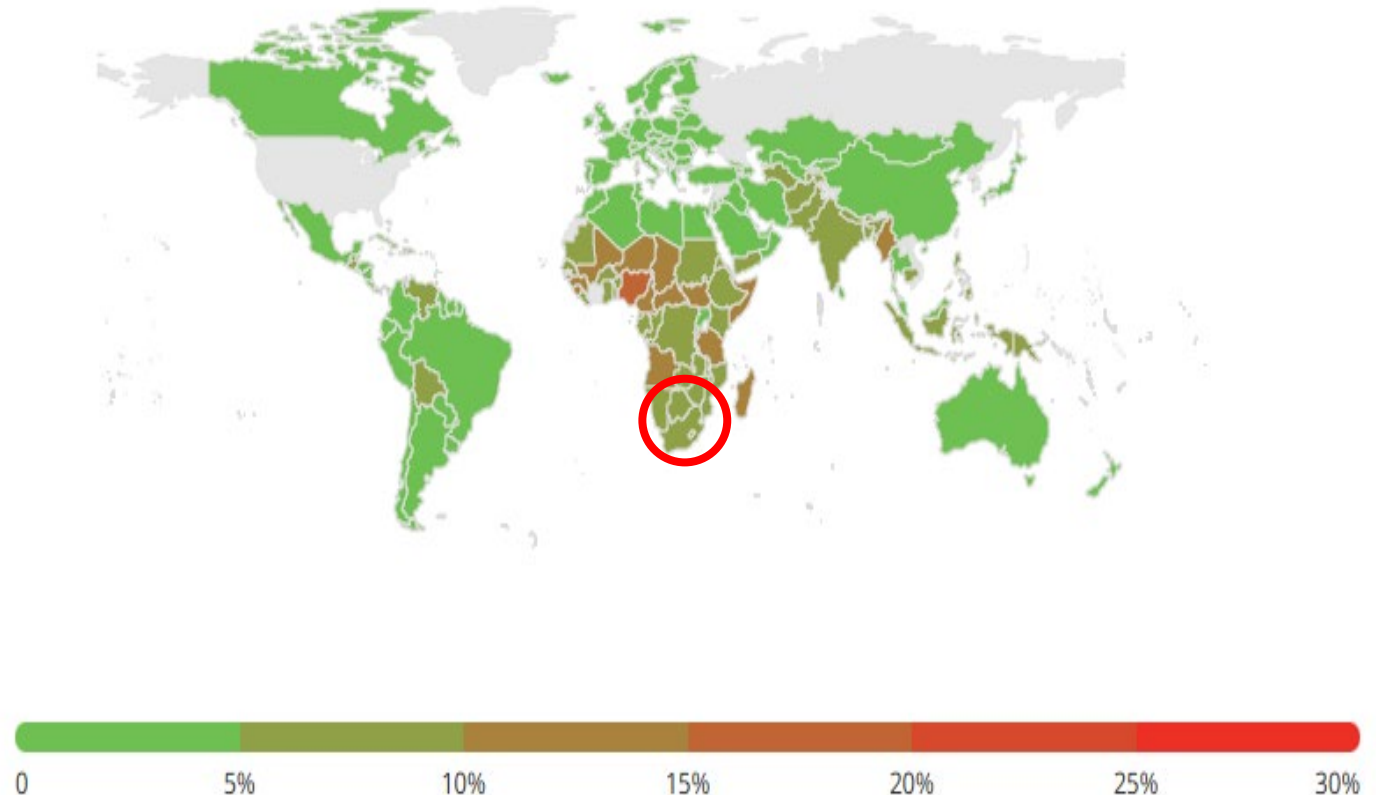
**1.7 Billion** childhood diarrhoeal cases annually<sup>1</sup>.



**1,200+** daily deaths despite a **79% decline** since 1990<sup>2,3</sup>.



**Sub-Saharan Africa:**  
**150+ deaths/100,000** children<sup>3</sup>.

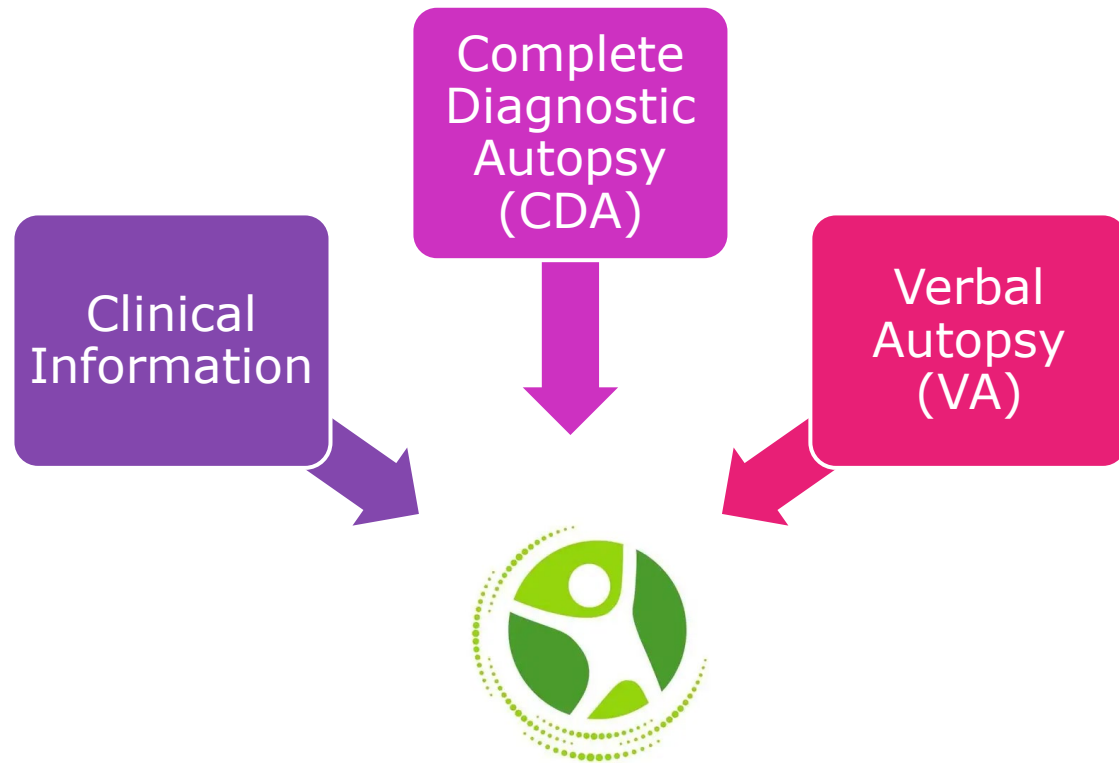


<sup>1</sup>Organization WH. Diarrheal Disease Fact Sheet: World Health Organization; 2024 [Available from: <https://www.who.int/news-room/fact-sheets/detail/diarrhoeal-disease>].

<sup>2</sup>UNICEF. Diarrhea 2024 [Available from: <https://data.unicef.org/topic/child-health/diarrhoeal-disease/>].

<sup>3</sup>Evaluation IoHMa. Diarrheal diseases remain a leading killer for children under 5, adults 70+ 2024 [Available from: <https://www.healthdata.org/news-events/newsroom/news-releases/diarrheal-diseases-remain-leading-killer-children-under-5-adults>].

# Cause Of Death Determination Methods



**CHAMPS**

**Child Health and Mortality  
Prevention Surveillance Network**

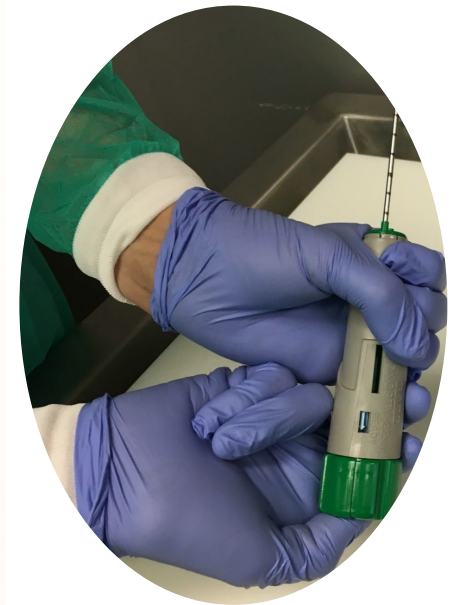
## Purpose



**Collect accurate data**

To collect accurate, standardized data on the causes of death in children under 5 years and stillbirths, particularly in low- and middle-income countries

Minimally invasive tissue sample



# Study Aim and Objectives

## AIM

To determine the prevalence of acute gastroenteritis (AGE) mortality in children <5 years in Soweto, South Africa

## Objective

1: Use minimally invasive tissue sampling (MITS) to determine the prevalence of AGE by; age group, gender, HIV status.

2: Determine the aetiology of AGE deaths among children < 5 yrs

# Study Design

## Active Mortality Surveillance

- Prospective Enrolment
- Retrospective clinical data reviews
- Recruitment: Soweto hospitals, forensic pathology, and community.

## Eligibility

- <5yr children
- Stillborn (>28/40 and/or >1000g birth weight)
- Death within 72hrs
- Residing in catchment area

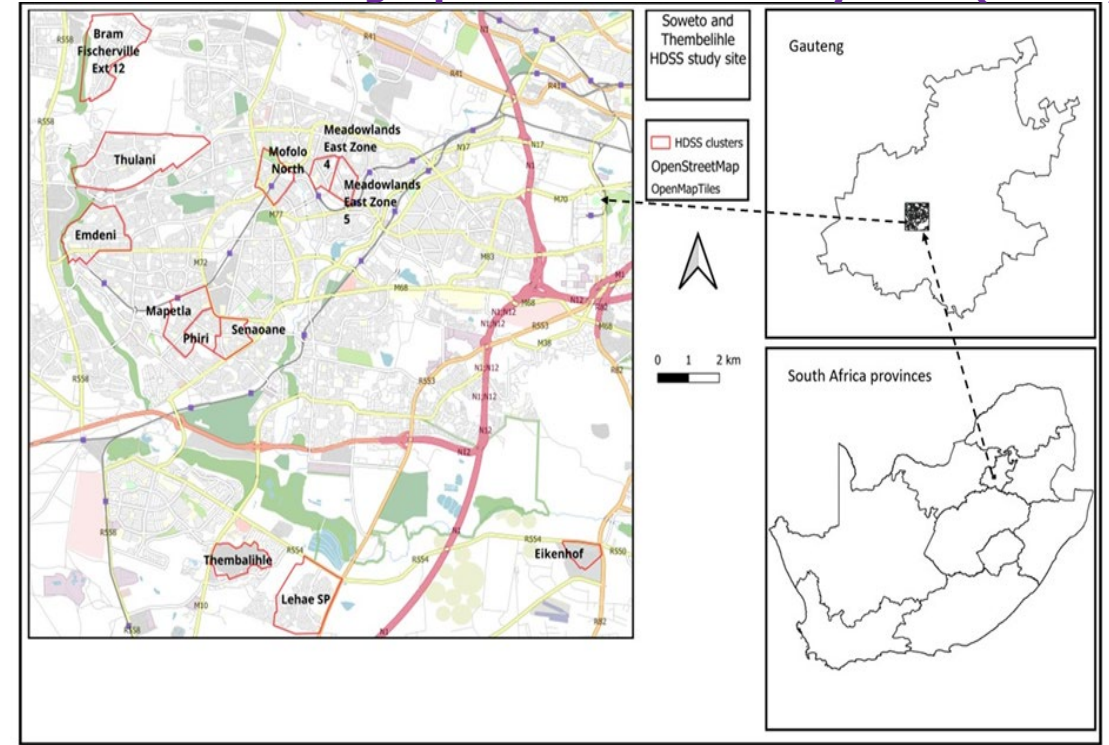
## Informed Consent and verbal autopsy (VA)

## MITS Procedure

## Determining cause of death (DeCoDe) panel

## Target Sample: 180 per year

## Health and Demographic Surveillance System (HDSS)



- HDSS – defined the **CHAMPS** Catchment Areas.
- Conducted in 8 clusters in Soweto and 6 clusters in Thembelihle.



# MITs Procedure



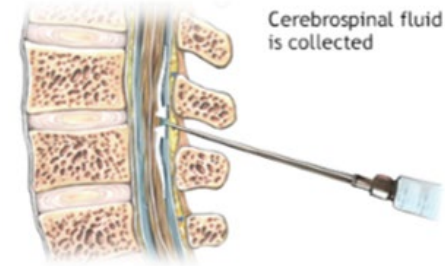
**Identification and Preparation**



**Measurements**



**Pictures**



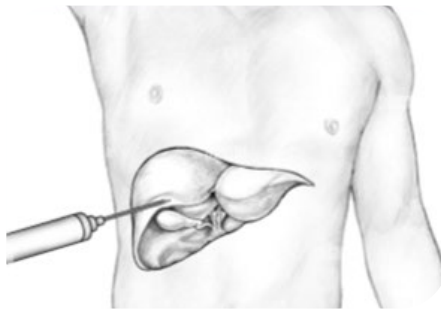
**Aspiration of cerebrospinal fluid**



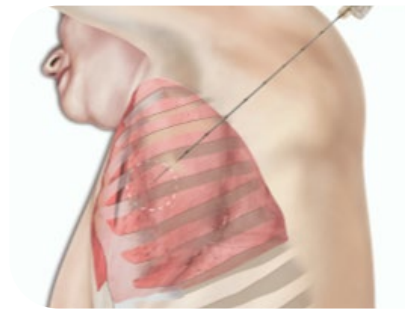
**Blood Collection**



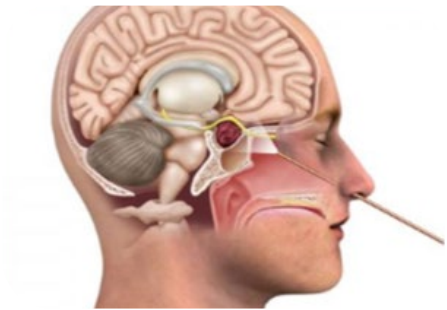
**Nasopharyngeal swab**



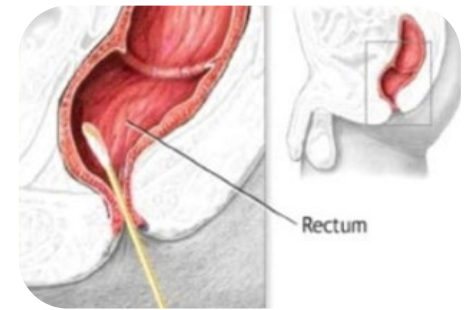
**Liver tissue collection**



**Lung tissue collection**



**Brain tissue collection**



**Rectal swab**

**Tests Done:** Microbiology (culture, gram stain), HIV PCR/ELISA, GXP TB, Malaria, Taqman Array (TAC) and Histology.

# MIT S Methodology

Death Notifications

Consent Process

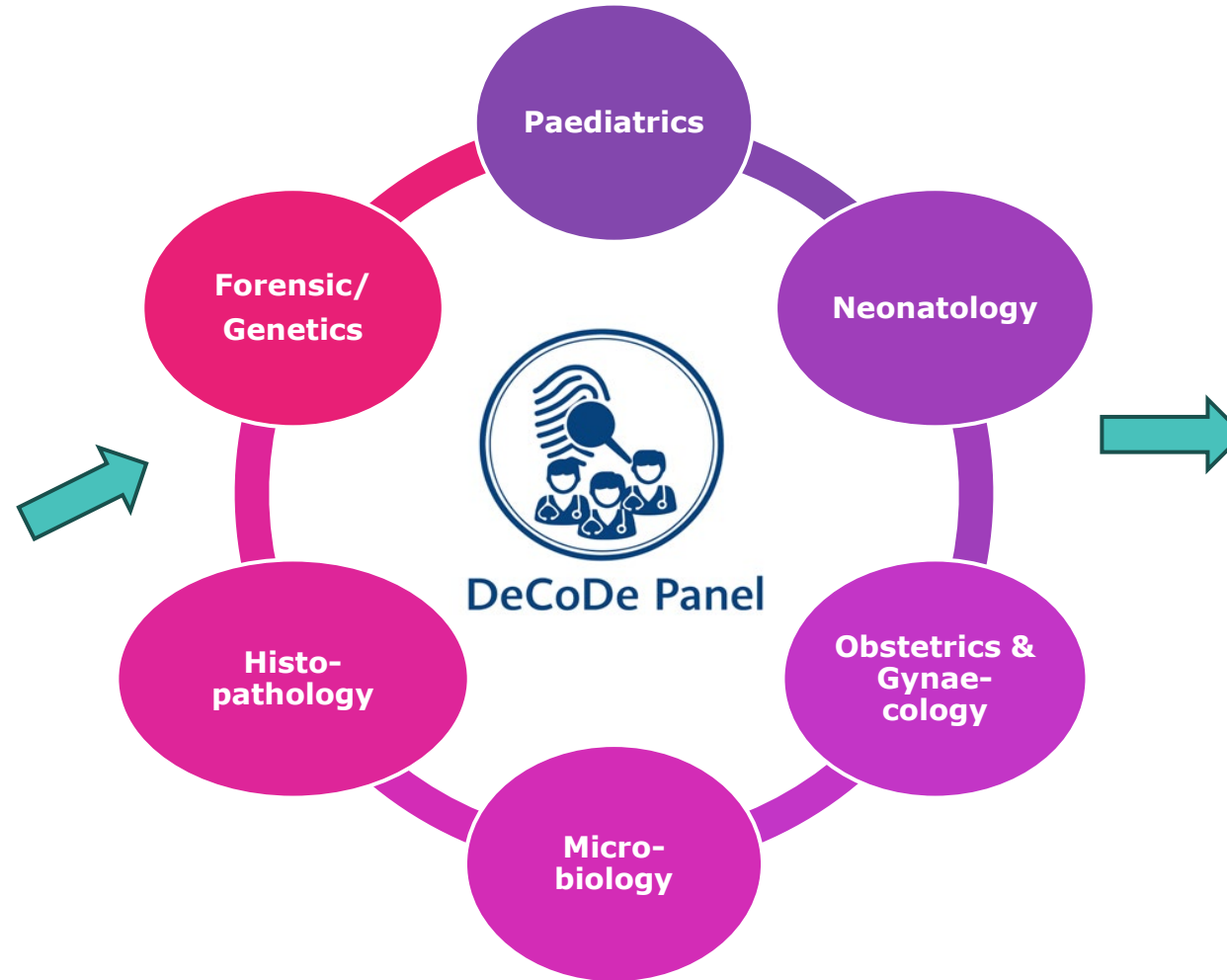
MIT S Procedure

Verbal Autopsy (VA)

Clinical Diagnostics

Histology Results

Clinical Data Review



Family Feedback



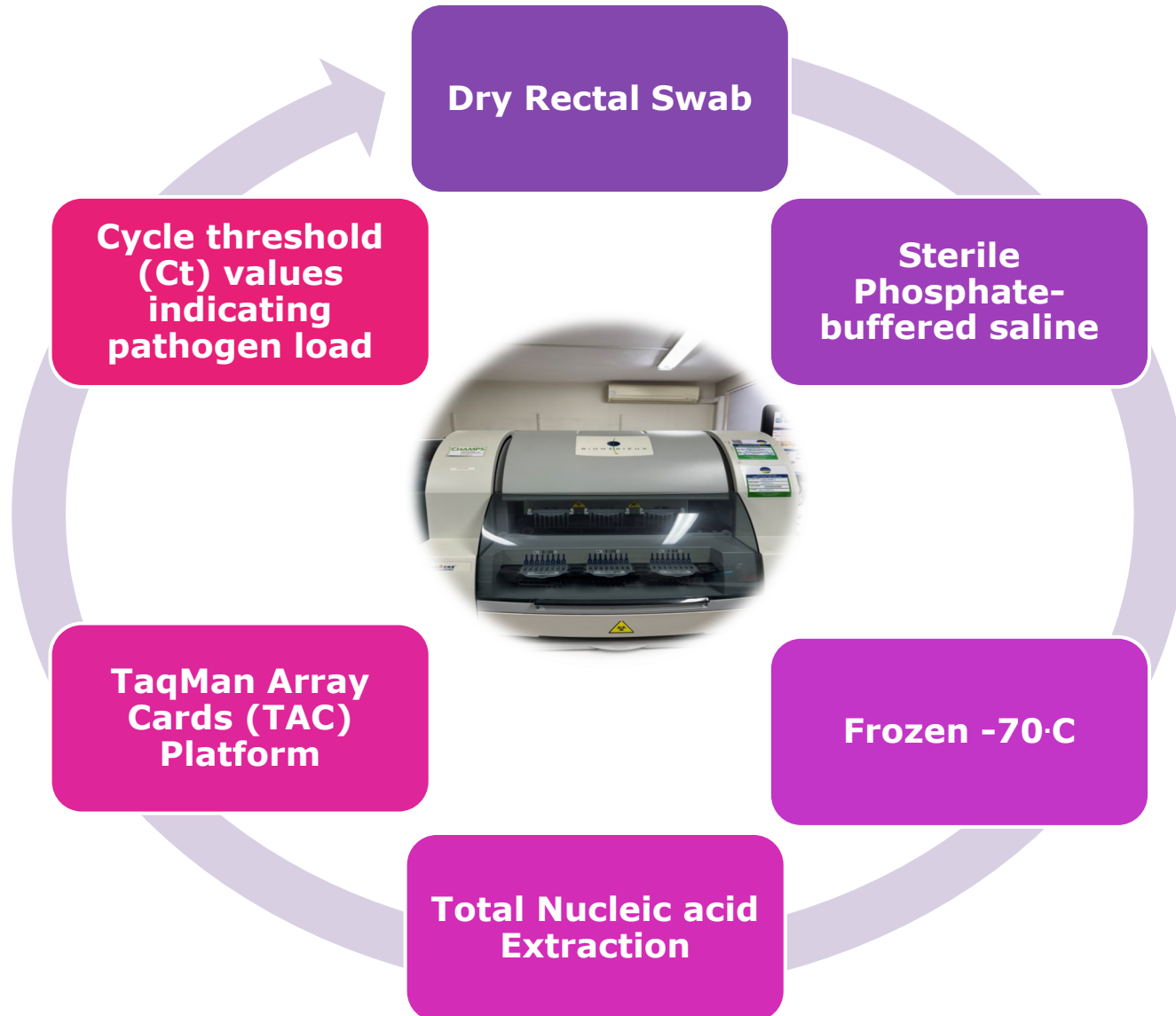
Cause of Death Assigned + ICD 11 code

- Underlying
- Immediate
- Comorbid
- Other significant



Public Health Recommendations

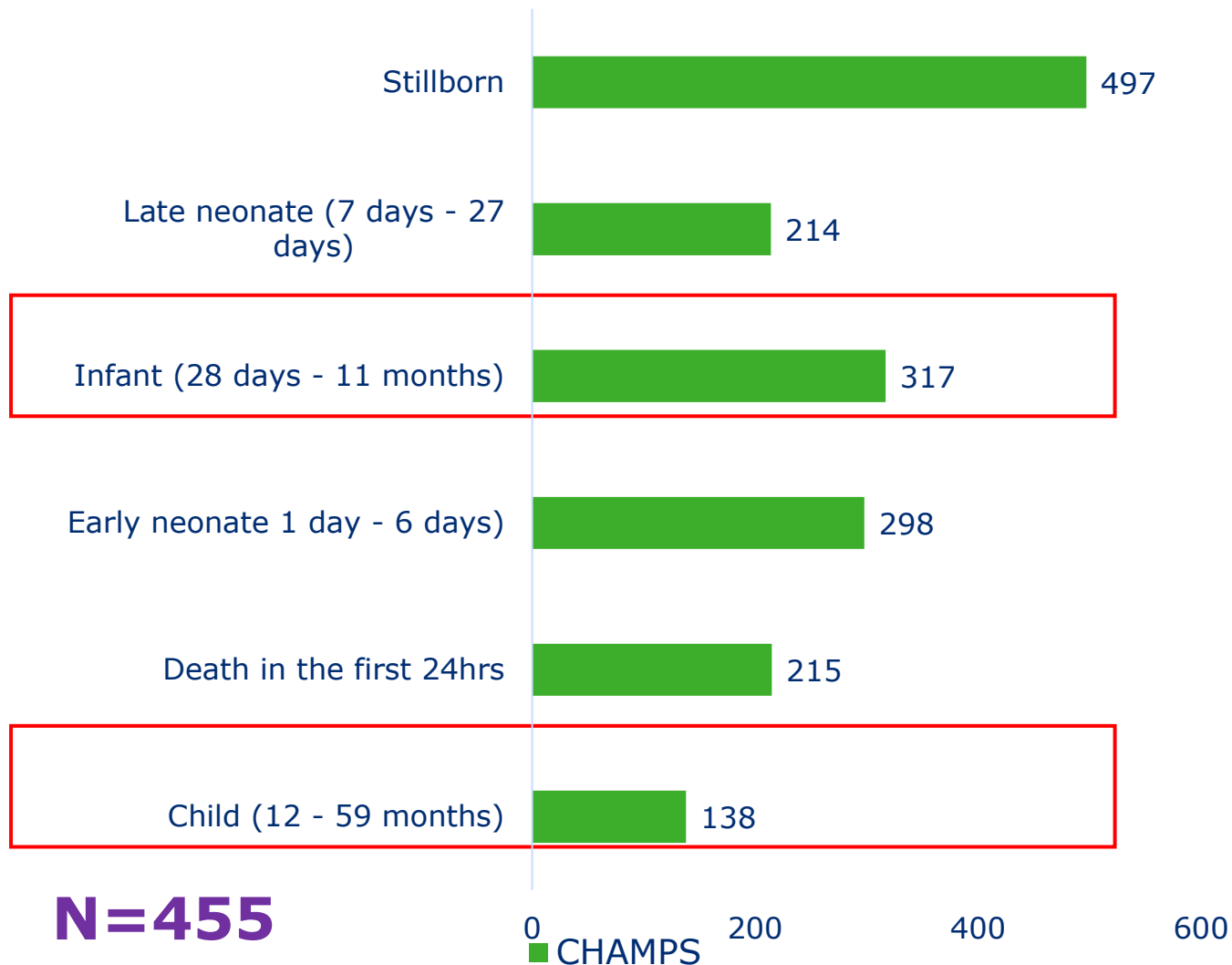
# Rectal Swab



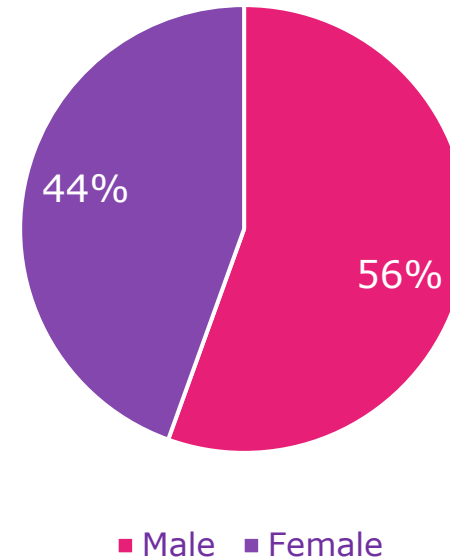
**45**  
Pathogens Tested  
Including Rotavirus

# Total CHAMPS Deaths <5 years

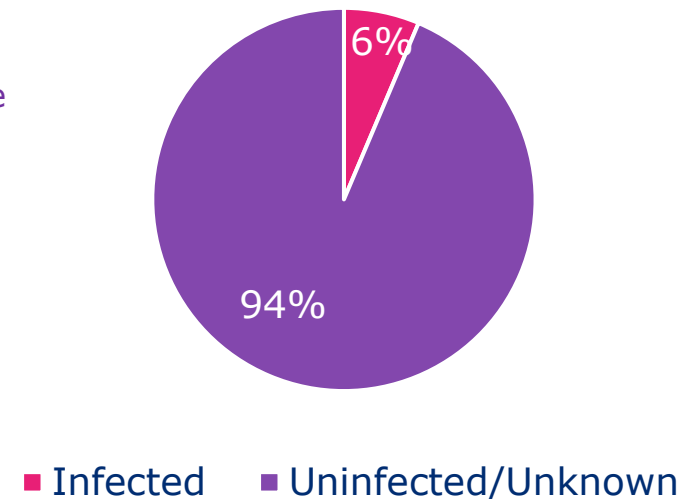
## Age Group



## Sex of child



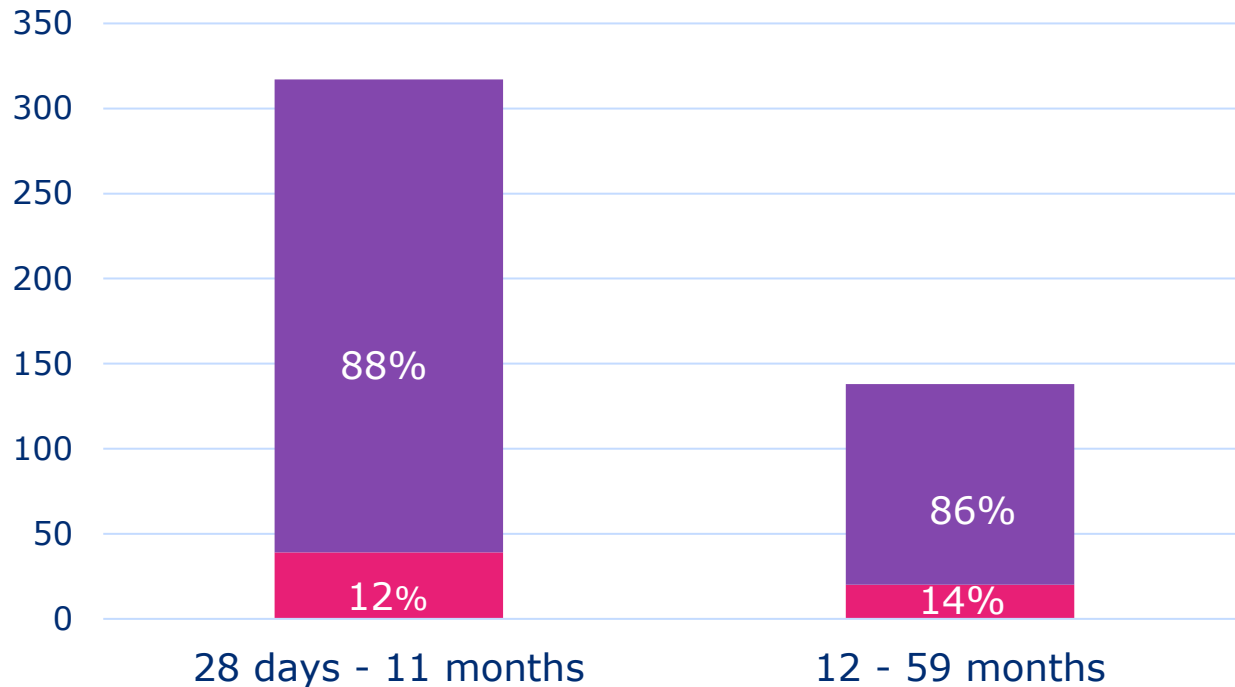
## HIV status



# Deaths – Acute Gastroenteritis

AGE = **13%** of Analysed Deaths

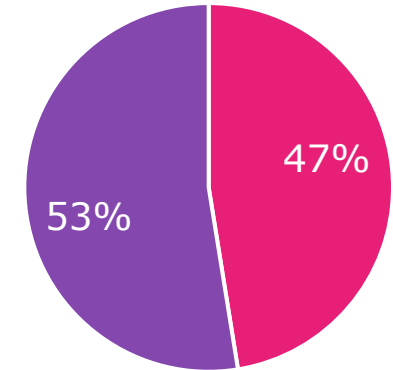
### Number of deaths



**Infants = 66%**

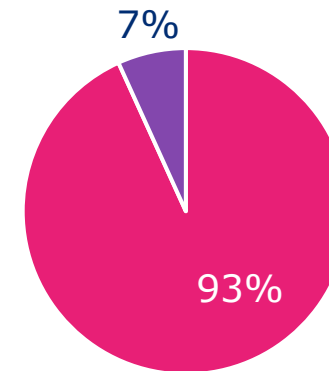
■ AGE ■ Non AGE

### Sex of child



■ Male ■ Female

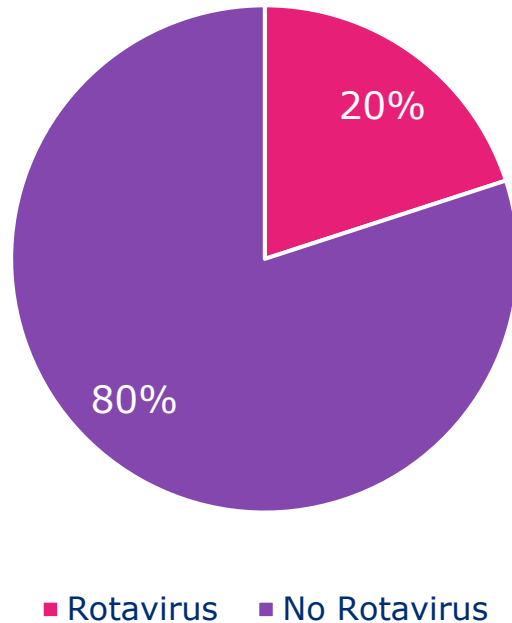
### HIV status



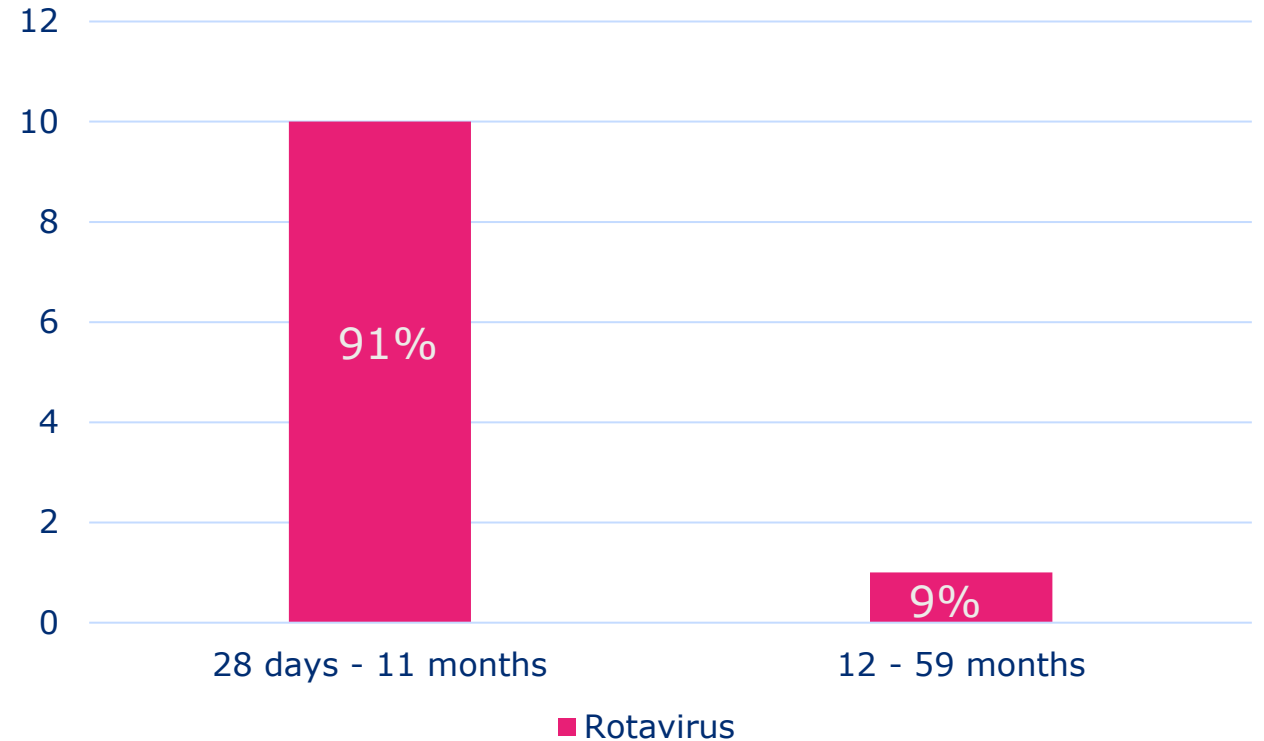
■ Positive ■ Negative/unknown

# AGE Deaths – Rotavirus-Specific

## Rotavirus detection on rectal swab



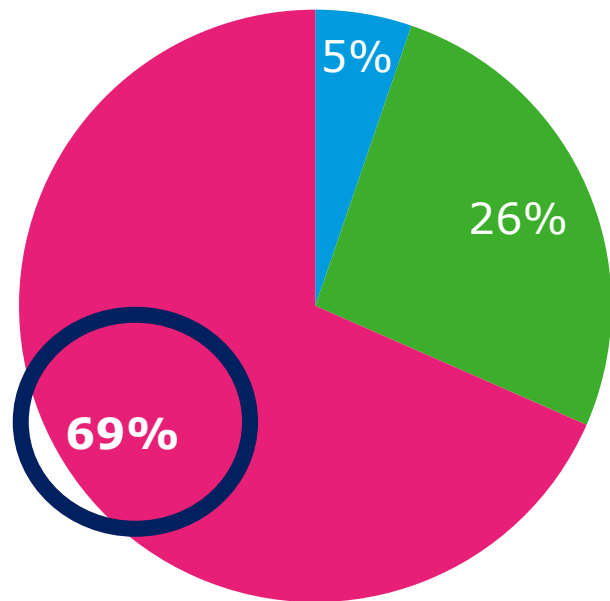
## Rotavirus deaths by age group



55/59 (93%) AGE deaths had laboratory result available

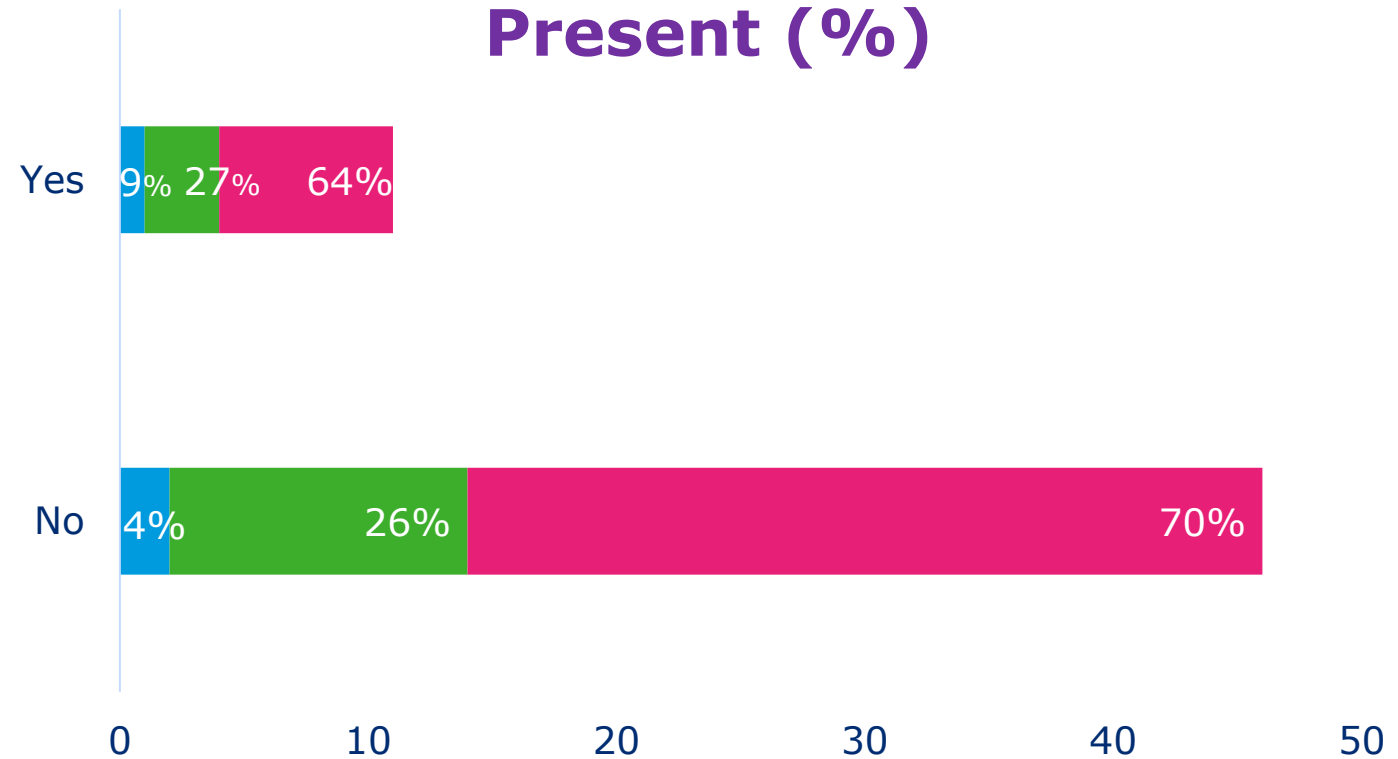
# DeCoDe Panel Assessment - Preventability

## Total AGE Preventability



- Not possible to determine
- Not preventable
- Preventable given the current situation

## Preventability with Rotavirus Present (%)



- Not possible to determine
- Not preventable
- Preventable given the current situation

# Conclusion

AGE accounted for 13% of total deaths <5 years

Majority of AGE deaths occurred in children aged 28 days to 11 months (66%)

Rotavirus was detected in 11/55 (20%) of AGE deaths;

10 (91%) in children aged 28 days to 11 months

Vaccination status not known but high vaccine coverage in Soweto (>90%)

DeCoe panel – 69% of AGE deaths were preventable

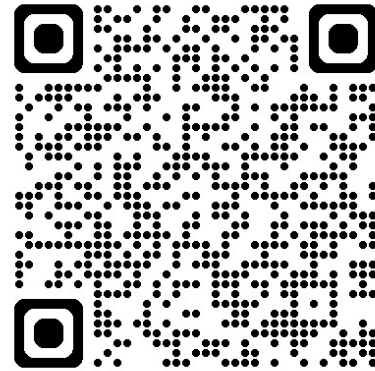
Analysis underway to assess other pathogens

# Acknowledgments

- **Funding:** Gates Foundation
- **Clinical Support:** Hospital wards, mortuary facilities, and staff.  
Department Heads of Paediatrics.
- **Laboratory Support:** National Health Laboratory Service and Digipath  
Histology Laboratory staff.
- **Scientific Contributions:** DeCoDe Panelists and Collaborators.
- **Overall:** Study participants and their parents/relatives.



Scan for further local underlying cause of death data



Scan for CHAMPS Data or view: <https://champsh.earth.org/data/>

# THANK YOU

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