



# CHAMPS

**Building  
Knowledge.  
Saving  
Children's  
Lives.**

## **Gaps/challenges in pediatric HIV service delivery – Experiences and Lessons from Kenya Child Health and Mortality Prevention Surveillance (CHAMPS)**

**Webinar PEPFAR - UNAIDS Faith Initiative**

**May 30, 2023**

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**On Behalf of Kenya CHAMPS team**

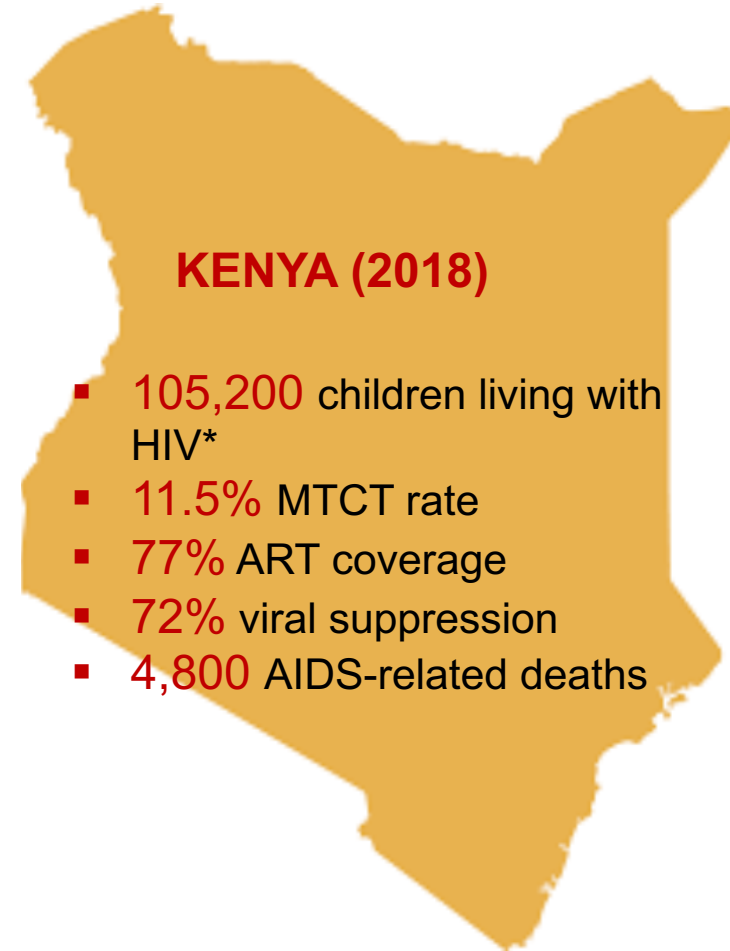


# Background: HIV Burden in Children <15 years

Despite significant reductions in new HIV infections among children, HIV/AIDS-related illnesses remain leading causes of child mortality

Global burden (UNAIDS):

- **1.8** million children living with HIV – 2018
- **180,000** new child infections – 2017
- **210,000** AIDS-related deaths in children - 2012
- There are limited data on impact of the HIV response on AIDS-related mortality
- Academic Consortium of the UNAIDS-PEPFAR Faith Initiative, October 2022:
  - “... cannot know the number of deaths in children 0-9,...data moot because HIV infection not a terminal condition in children living with HIV....”
  - “...data indicate that a significant gap exists in PMTCT coverage for women, especially for women unaware of their status..”
- We reviewed the HIV care continuum for 39 HIV-infected child deaths enrolled in Kenya Child Health and Mortality Prevention Surveillance (CHAMPS)
  - May 2017 – June 2021
  - Goal to identify areas for improvements

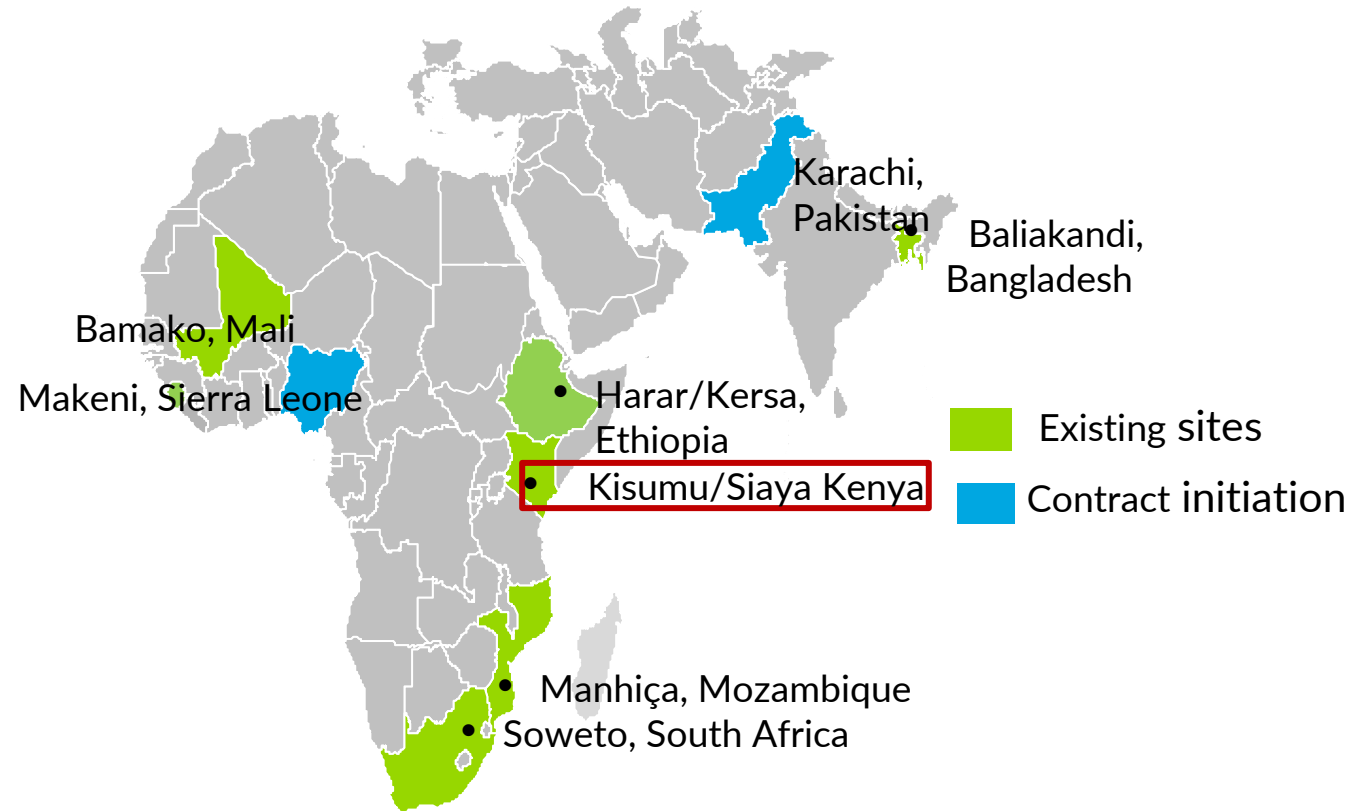


\*Numbers differ by reports, year and age grouping e.g., UNICEF 2021: 48,000 (0-9 yrs)

- Citations:
  - UNAIDS Reports 2017, 2018
  - Kenya AIDS Progress report 2018

# KENYA CHILD HEALTH AND MORTALITY PREVENTION SURVEILLANCE (CHAMPS)

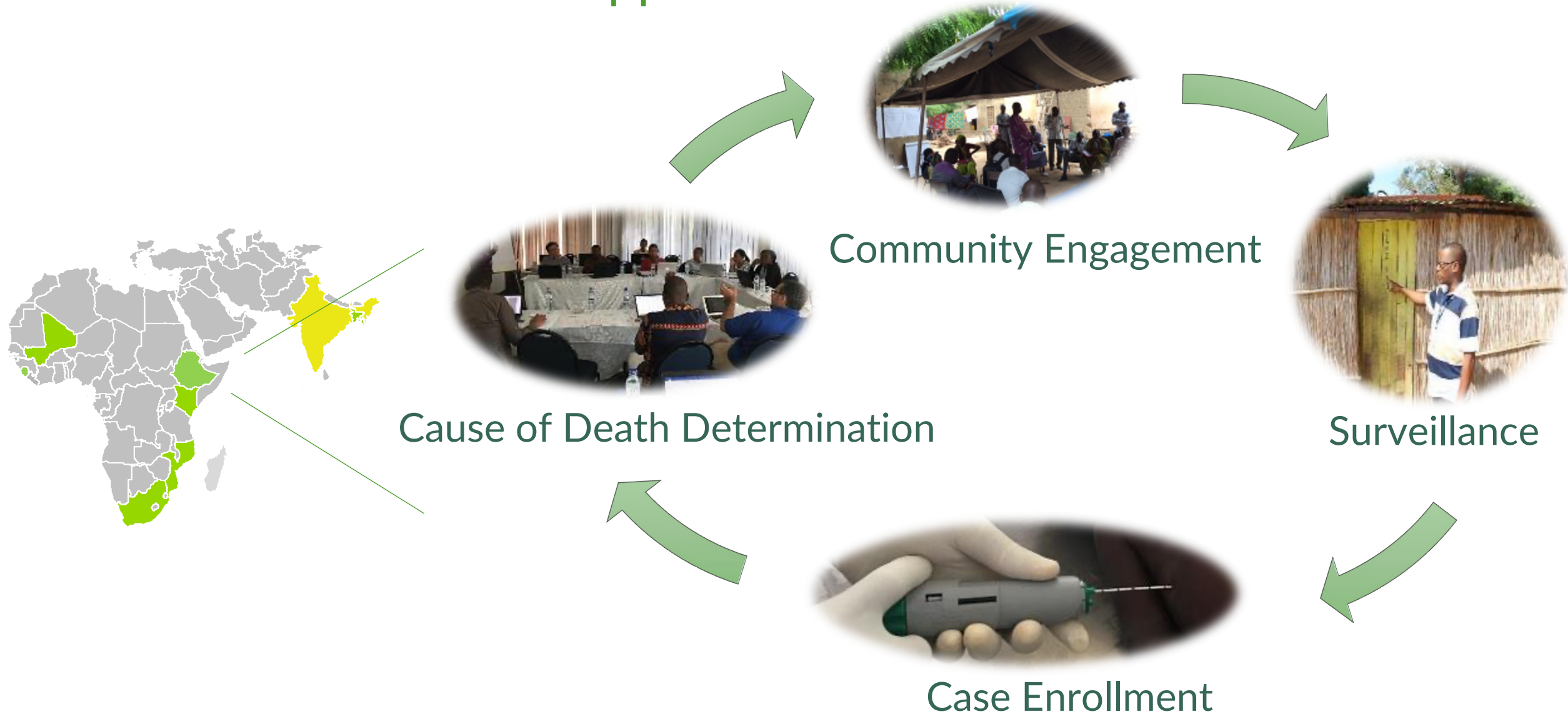
- CHAMPS is a multi-country surveillance program that systematically **tracks definitive causes** of under-five mortality from defined catchment areas
- Objective: **Produce and disseminate high quality data** to inform policy and public health action
- Kenya site: data obtained from participating residents from Siaya and Manyatta HDSS in Siaya and Kisumu county, respectively
  - **Among top 10 priority counties with high HIV burden and new infections nationally**
  - Significant number of Faith-based health facilities providing HIV care and treatment



County*	HIV cases (2018)*	New infections (2018)*
Kisumu	122,000	4,000
Siaya	123,000	4,000

\*A Report of the Academic Consortium of the UNAIDS-PEPFAR Faith Initiative, October 2022

# Overview of CHAMPS Approach



# CHAMPS Study Methods

## Stillbirths and <5 deaths

- Notification from facility or community
- Eligibility assessed
- Consent and enrolment (within 24hrs of death)

## Data collection

- Clinical record abstraction (Facility and patient-held records)
- Verbal autopsy
- Health & demographic surveillance (HDSS): **Kenya - Kisumu and Siaya counties**

## Sample collection

- Minimally Invasive Tissue Sampling (MITS): Lung, liver, brain, heart, CSF, blood, bone marrow, placenta (if available)
- Other: NP Swab, Stool, anthropometrics, photographs

## Sample analysis

- On site: TaqMan array, HIV & malaria PCR, TB GeneXpert, blood & CSF culture
- CDC Central Pathology Laboratory: Special stains, immunohistochemistry

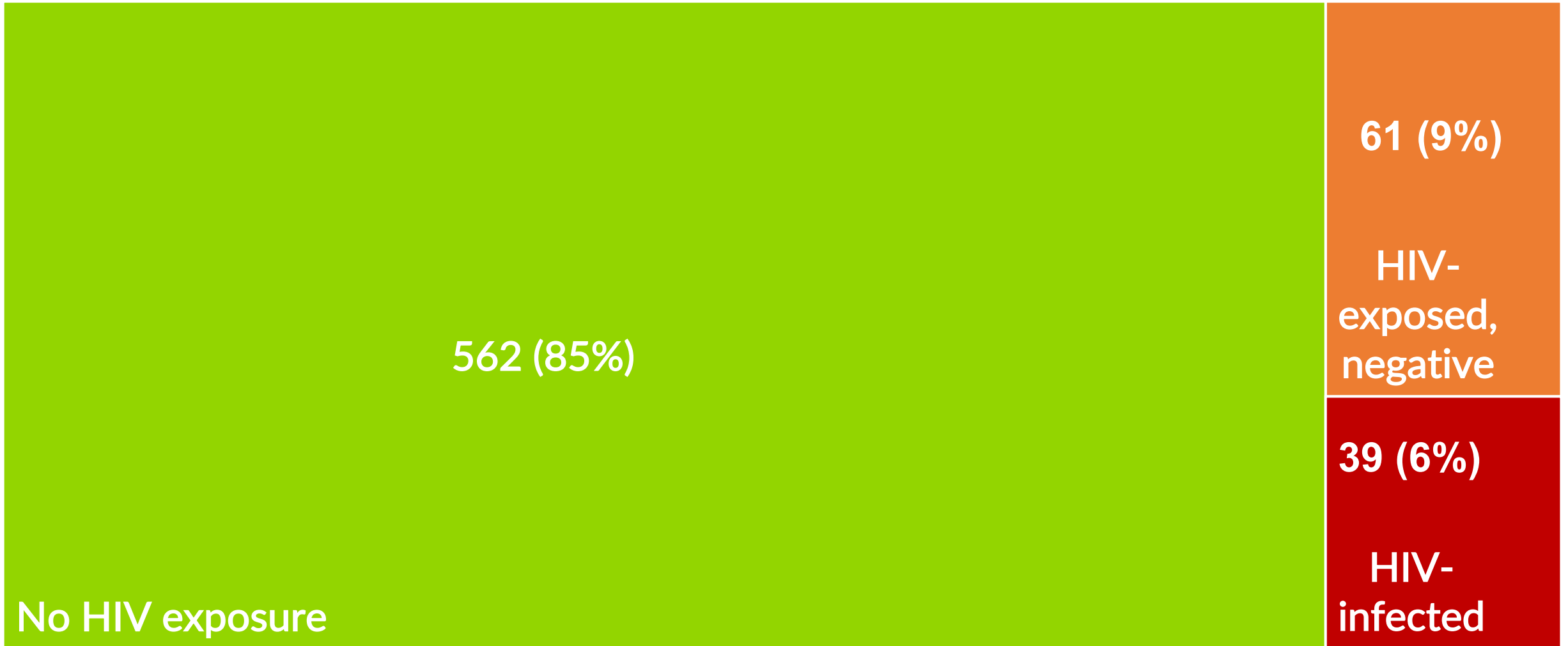
## Decide Cause of Death (DeCoDe)

- Expert panel convenes ~monthly
- Reviews complete case records (~150 pages, >8000 data elements)
- Assigns causes of death using ICD-10/11 and ICD-PM

# RESULTS

## KENYA: MAY 2017 – DECEMBER 2021

# Prevalence of HIV-exposure and infection in <5 deaths (N=662): Kenya Site 2017-2021



# Age-type Distribution of HIV-infected Stillbirths and <5 Child Deaths: Kenya Site (N=39)

Stillbirth 1 (3%)

- **88%** HIV-infections in children and infants
- **13%** Intrauterine transmission (stillbirth and neonates)

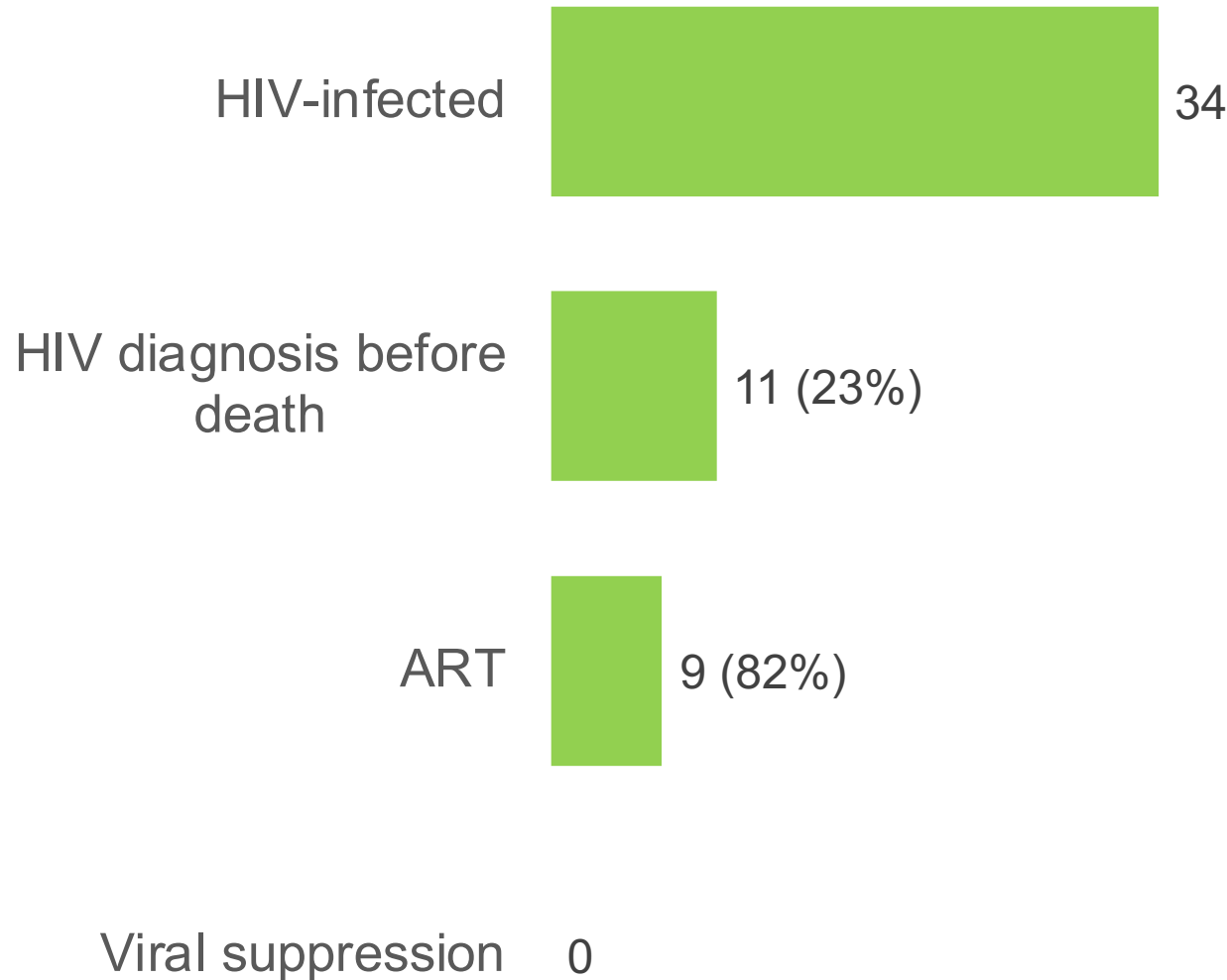
Neonates (<28 days) 4 (10%)

Infant (1-<12 mos) 8 (21%)

Child (12-59 mos) 26 (67%)

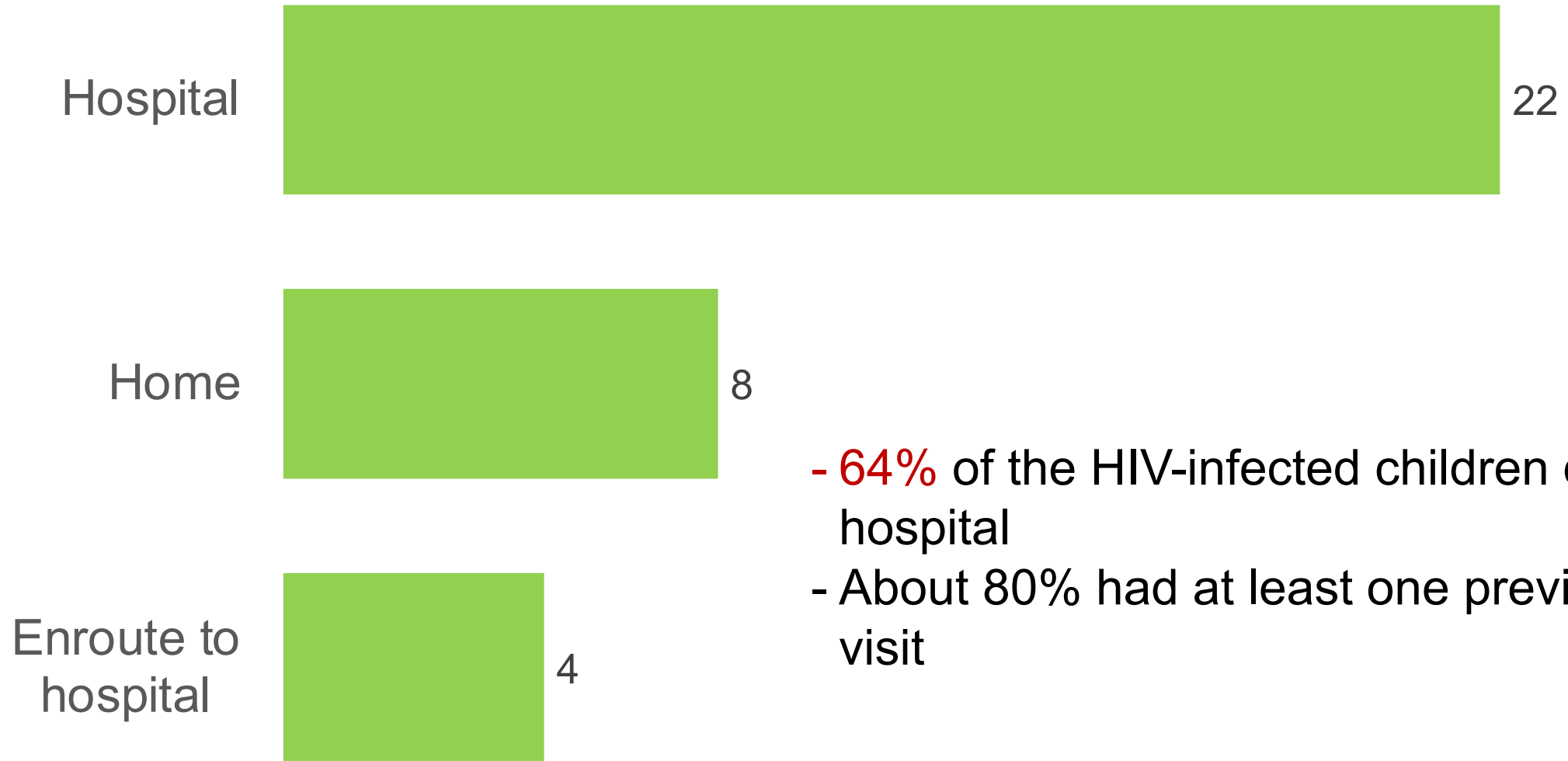


## Characterizing HIV infected Infant and children >12mos, Kenya site (n=34): Missed opportunities



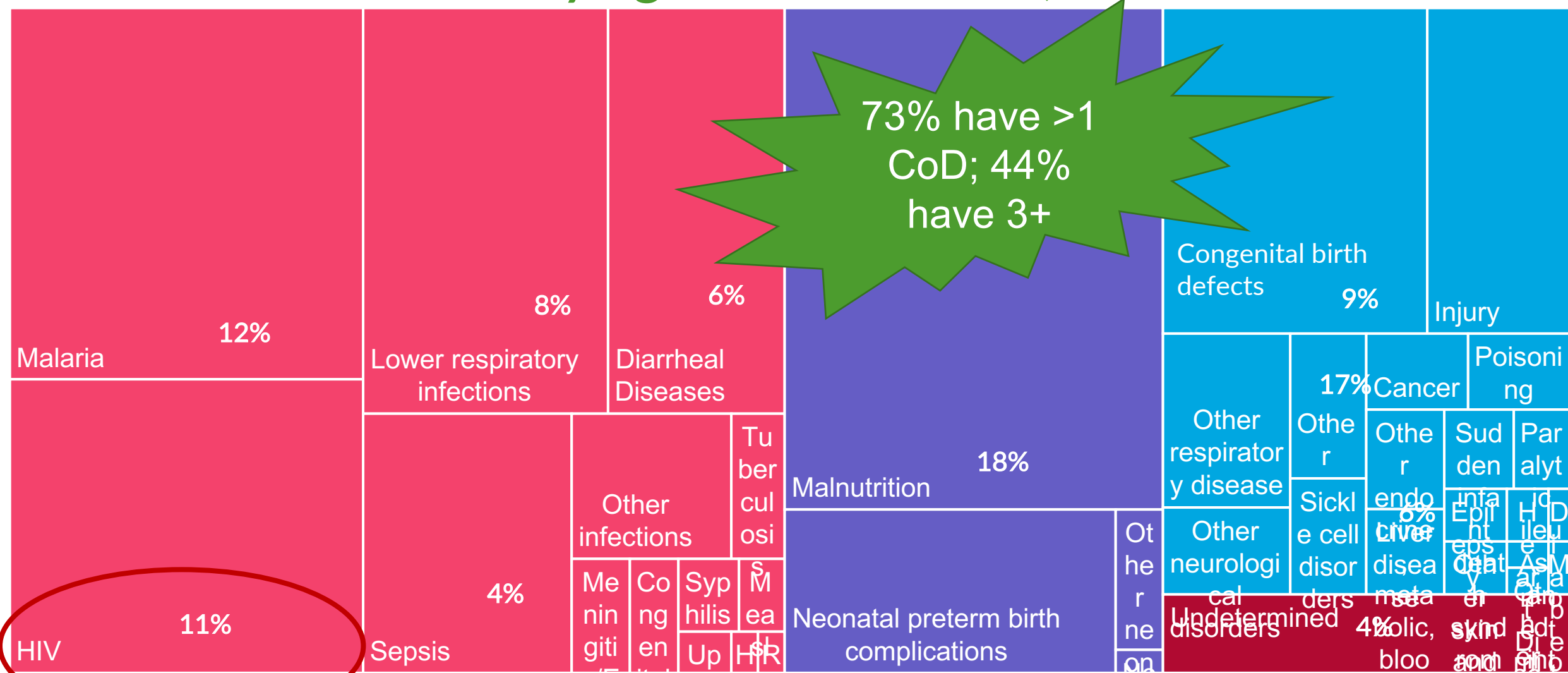
- 23/34 (67%) – unknown/no HIV diagnosis
  - 6 were on ARVs prophylaxis: 3 infants and 3 children  $\geq 12$  mos
    - Managed as sero-exposed?
- 9/11 (82%) known +ve children on ART
  - 1 infant and 8 children  $\geq 12$ mos
  - None virally suppressed, VL range: 1,451-90,3701 copies/ml
- Maternal HIV during ANC:
  - 19 (56%) documented as HIV +ve
    - 13/19 (68%) HIV +ve on ART
  - 4 (10%) documented as HIV negative
    - 1 neg. maternal HIV test in 2<sup>nd</sup> trim, no repeat test
- 11 (28%) had unknown HIV status

## Location of death For the HIV-infected children n=34



- 64% of the HIV-infected children died at the hospital
- About 80% had at least one previous hospital visit

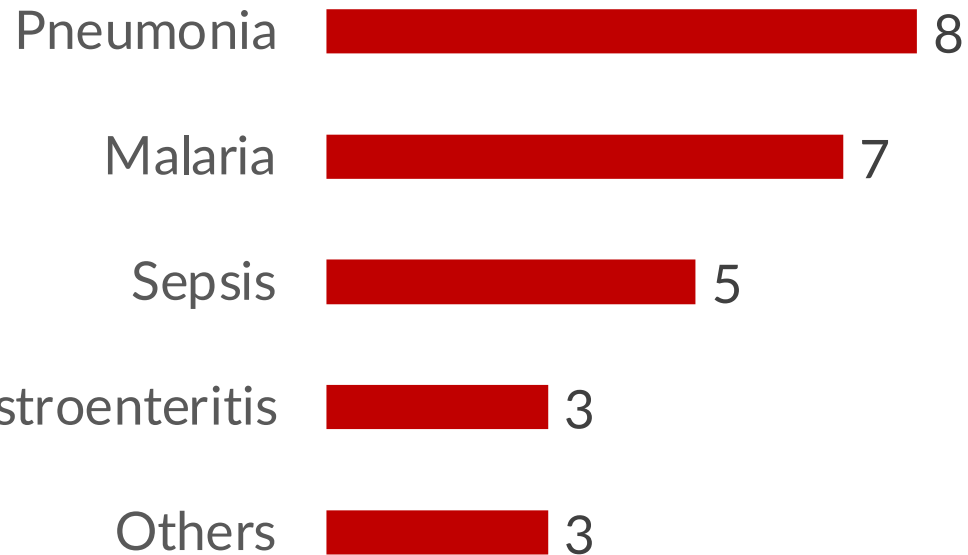
# In-context: Malnutrition, Malaria, HIV remains major Infant/Child Underlying Cause of Death, CHAMPS Network



SOURCE: CHAMPS data as of 16 September 2022

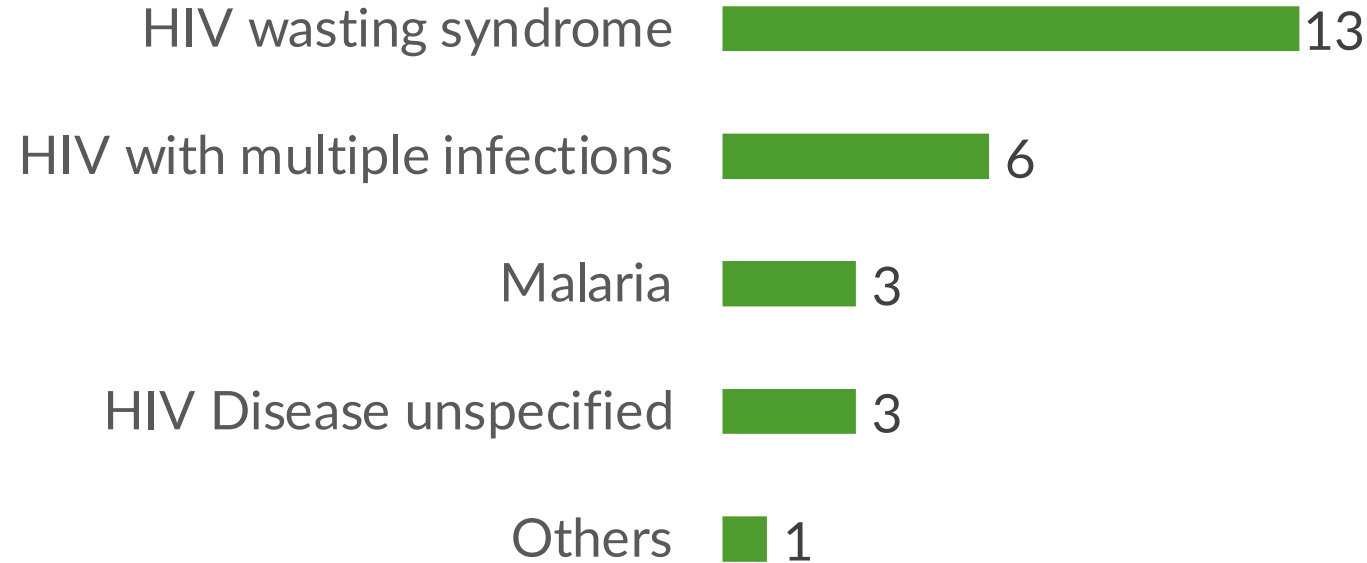
# Immediate and Underlying Causes of Death Among HIV deaths in children $\geq 12$ months: Kenya site (n=26)

## Immediate/intermediate Cause of Death



- Etiologies for pneumonia and sepsis:
  - *Streptococcus pneumoniae*(8); *Klebsiella pneumoniae* (7); Cytomegalovirus(2); *Streptococcus* species (2)

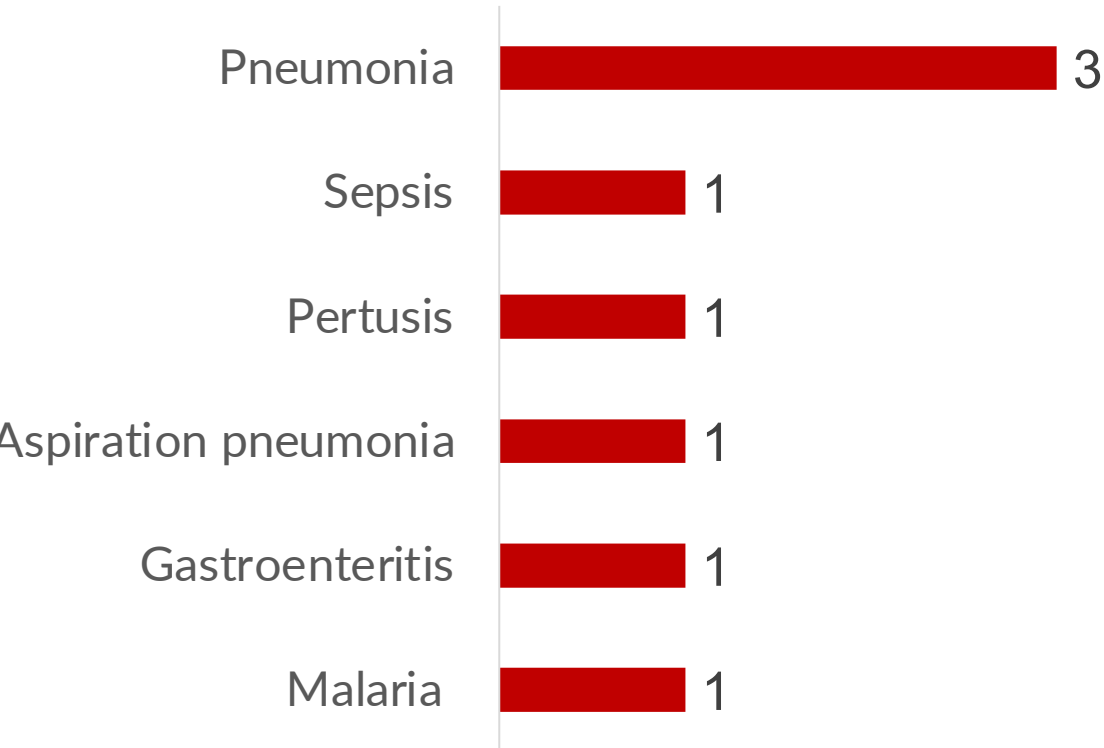
## Underlying Causes of Death



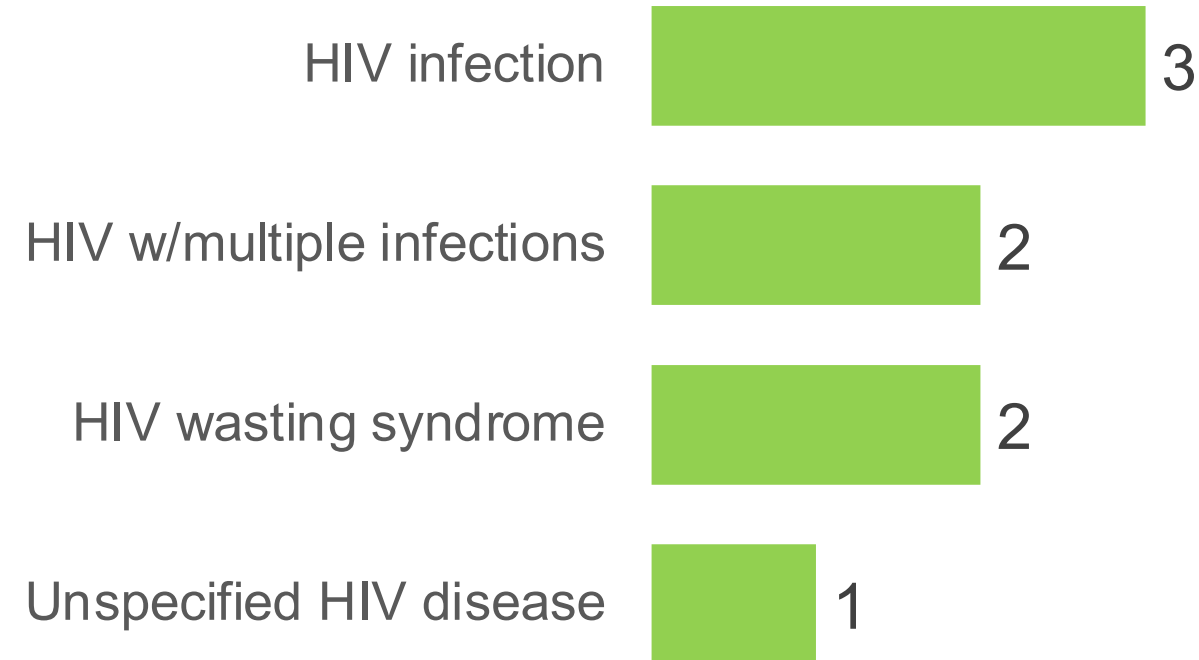
Majority of the cases (13/26) - WHO stage 4/severe symptomatic stage

# Immediate and Underlying Causes of Death Among infants 29 days – <12 months: Kenya site (n=8)

## Immediate cause of death



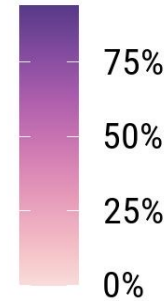
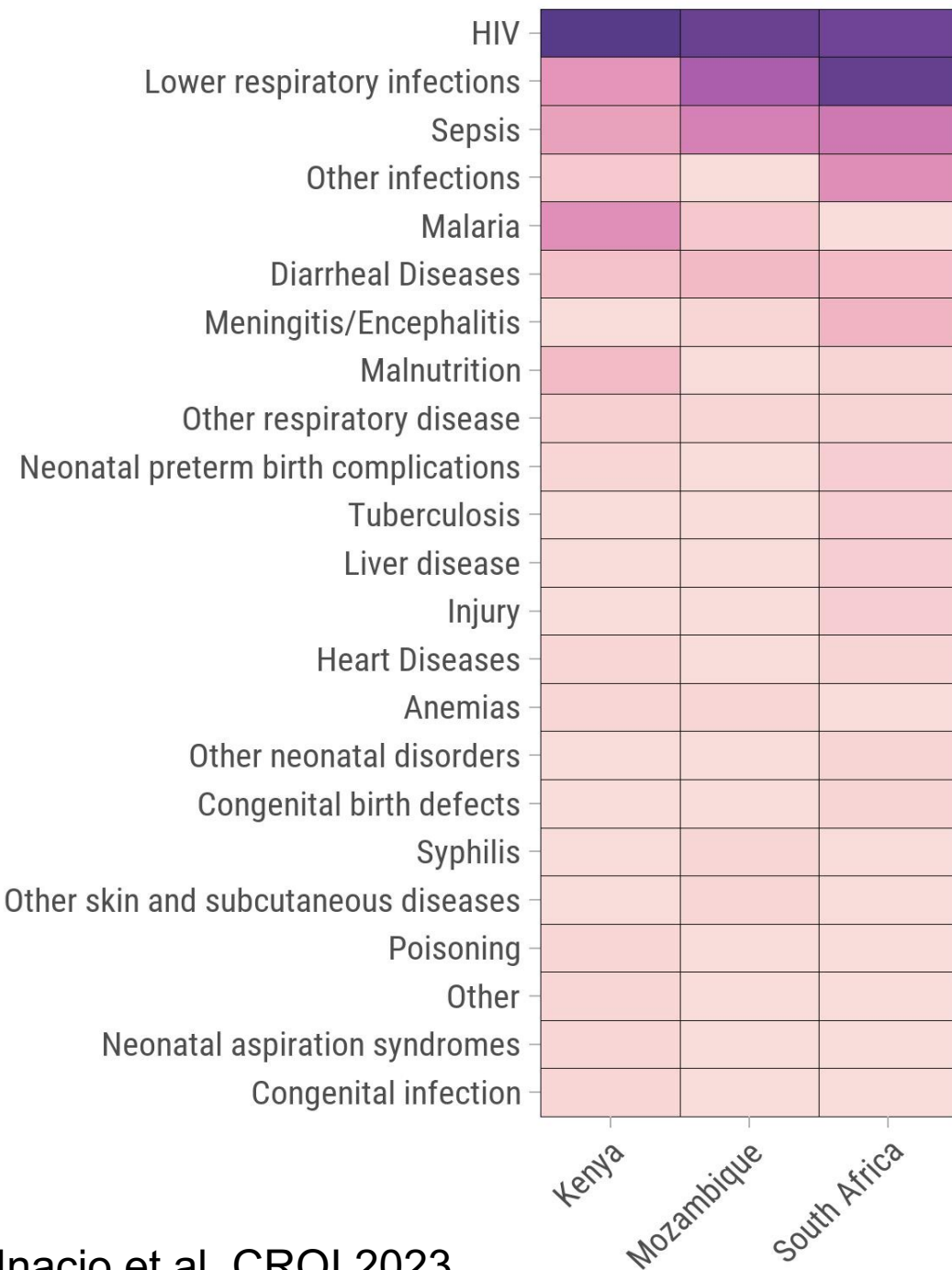
## Underlying cause of death



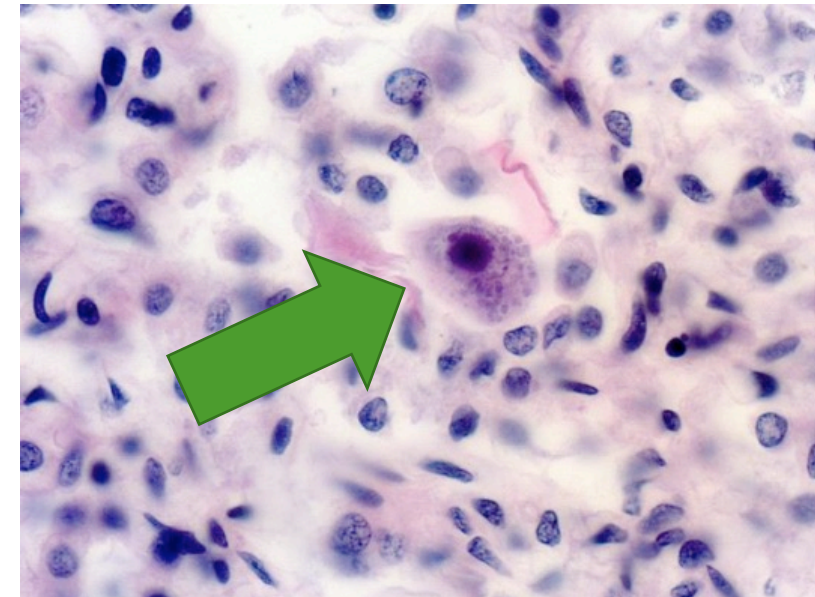
### Etiologies for pneumonia and sepsis all cases:

- *Klebsiella pneumoniae* (3); *Streptococcus pneumoniae* (3); Cytomegalovirus (2); Respiratory syncytical virus (1); salmonella (1); Parainfluenza virus type 2 (1); *Bordetella pertussis* (1); *Pneumocystis jirovecii* (1)

## Other infections found as intermediate and immediate causes of death: CHAMPS Network

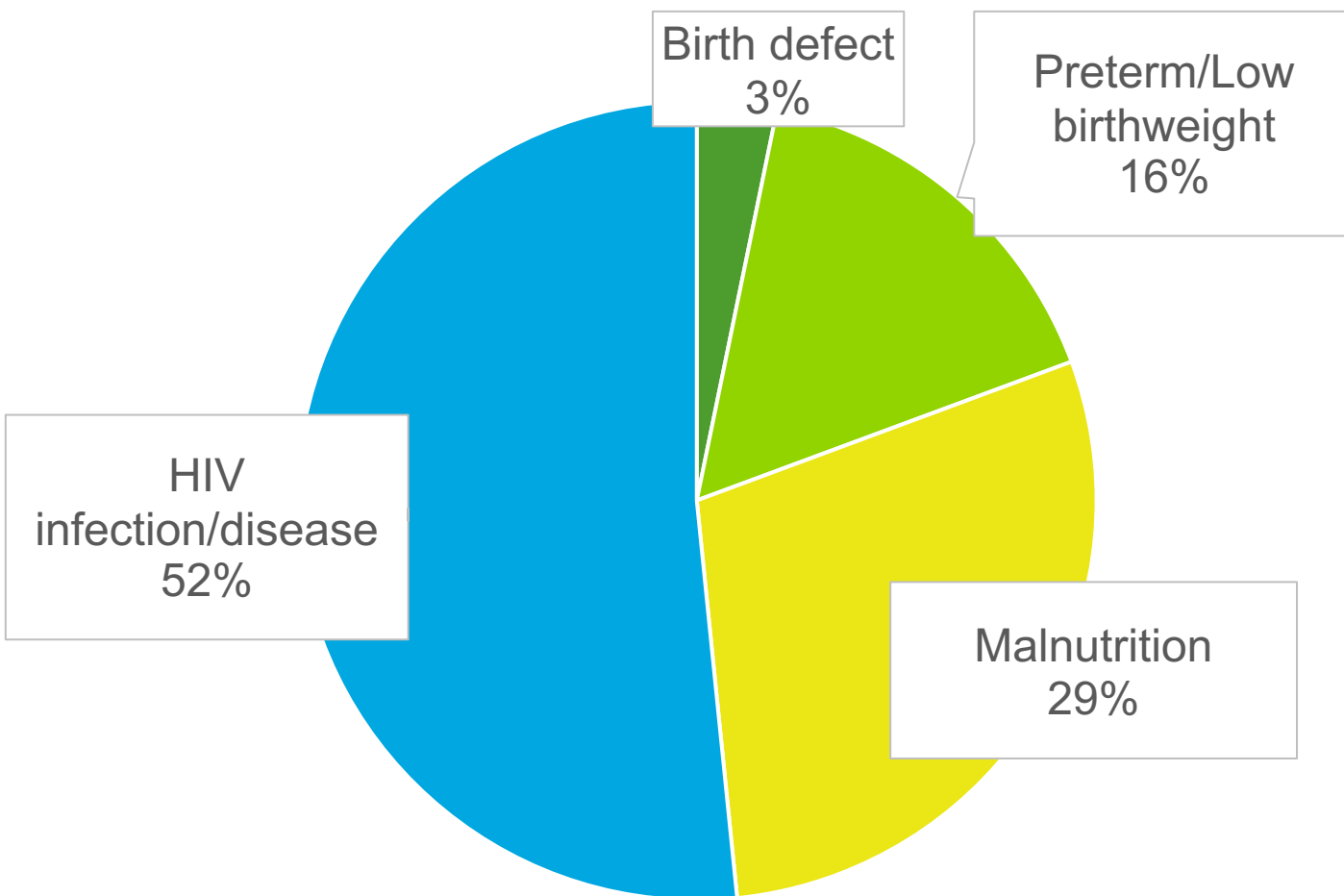


- 97% of HIV deaths had other infectious processes in causal chain
  - Lower respiratory infections & sepsis most common
- Top pathogens
  - CMV
  - *Klebsiella pneumoniae*
  - *S. pneumoniae*
  - *Pneumocystis jirovecii*
  - Malaria



Cytomegalovirus (CMV) inclusion in lung tissue

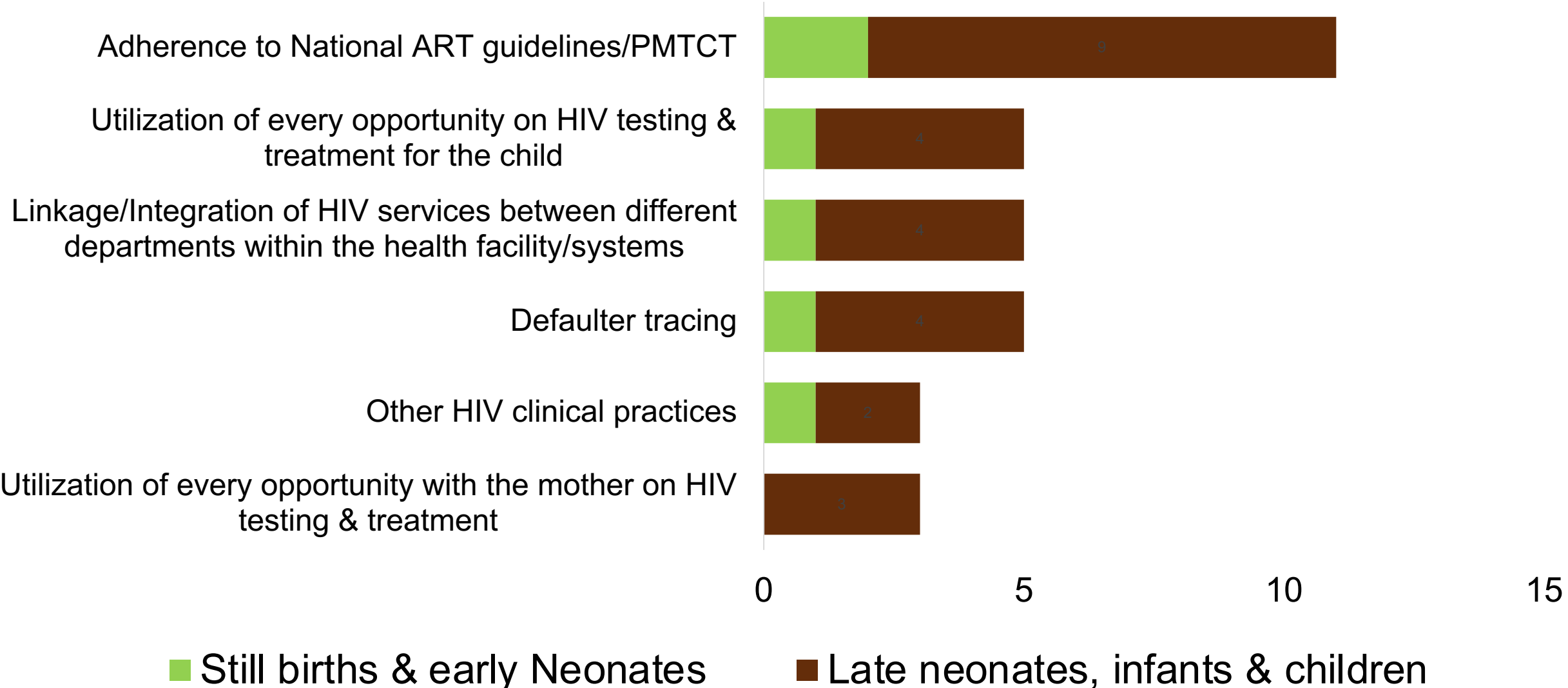
# CHAMPS Network: 97% CMV deaths underlined by HIV infection/disease, Malnutrition or Low birthweight



- Among the 31 children with CMV disease as immediate/morbid COD, pre-existing conditions were
  - HIV infection/disease (52%)
  - Malnutrition (29%)
  - Low birthweight/prematurity (16%)
  - Birth defect (3%)

Looking at more than one cause of death e.g., what other conditions did CMV associated deaths have?

# Frequency of DeCoDe Public Health Actions for HIV-infected cases: Kenya site





# Summary of Findings

- Majority of HIV-associated deaths had advanced HIV infection:
  - HIV disease with wasting syndrome; HIV disease multiple infections; opportunistic infection e.g., PCP
  - Streptococcus pneumoniae, Klebsiella pneumoniae and Cytomegalovirus – most common pathogens causing sepsis and pneumonia
  - Immediate cause of death: mixed infections – some cases of both bacterial and viral infections
  - For those who died of malaria – most presented with severe and complicated malaria – cerebral malaria
- Several missed opportunities:
  - Child: Unknown HIV diagnosis before death; known HIV status but undocumented ART status; unsuppressed viral load
  - Maternal: Unknown HIV testing; lack of repeat testing; known positive not on ART
  - Give credence to the Academic Consortium of the UNAIDS-PEPFAR Faith Initiative’s conclusion “...a reasonable conclusion from these data is that the gap in care is high not only in pediatric cases but also among young adolescents...”
    - CHAMPS data could be used for HIV impact evaluation on HIV-associated mortality and/or answer hypotheses?

# Limitations

- Small sample size for this analysis, but highlight system failures
- CHAMPS only enrolls deaths
  - likely over-estimate population-level MTCT
  - could be representative of 'hard to reach children' who under-utilizes health care services
- Inadequate medical records documentation
- Data not disaggregated by faith-based and non-faith-based facilities

# Conclusions

- HIV remains a major cause of child death
- While Kenya has made huge strides in PMTCT, CHAMPS highlighted that there are still important gaps in maternal and child HIV care:
  - Missed child and maternal HIV diagnosis, treatment
  - HIV-related pediatric deaths and other co-infections that would have otherwise been unreported
  - Deaths in children with diagnosed HIV may only have a single cause of death documented in public sector (ie. Lived with HIV, died of malaria)
- Children who were living with HIV tend to have multiple conditions contributing to death
  - Clinicians seeing children with recurrent infections and/or failure-to-thrive should (re)test for HIV
- The most common other causes of death in children with HIV yield insight into interventions beyond pediatric ART that could have the greatest impact in reducing child deaths
- Improved, focused antenatal care, a high index of clinical suspicion for HIV infection, and routine clinical audits of the HIV care cascade should be encouraged to eliminate pediatric HIV deaths and improve maternal HIV care

## ACKNOWLEDGEMENTS

- The families who graciously agreed to participate in CHAMPS during a very difficult time in their lives
- The Bill & Melinda Gates Foundation
- Emory University, CHAMPS Program Office
- Technical partners supporting implementation across in Kenya: MOH, Siaya and Kisumu counties, CDC-Kenya, HJF-MRI
- A wide array of stakeholder organizations who support the work of CHAMPS and will use CHAMPS data to reduce child mortality

## DISCLAIMER

- This presentation and conclusions are those of the author and do not necessarily represent the official views of the U.S. Centers for Disease Control and Prevention

Thank you!

<https://champshealth.org>

