

Gastroenteritis-associated deaths among children aged 1-59 months in rural and urban western Kenya, 2017-2021

Findings from the Child Health and Mortality Prevention Study (CHAMPS)

Richard Omore^{1*}, Kitezo Aggrey Igunza¹, Billy Ogwel¹, Joyce Were¹, Sammy Khagayi¹, Dickson Gethi¹, Dickens Onyango², Marc Bulterys³, Beth A. Tippet Barr^{4,5}, Victor Akelo⁴

¹ *Kenya Medical Research Institute, Center for Global Health Research, Kisumu, Kenya,*

² *Kisumu County Health Department, Kisumu, Kenya,*

³ *US Centers for Disease Control and Prevention, Nairobi, Kenya,*

⁴ *US Centers for Disease Control and Prevention, Kisumu, Kenya,*

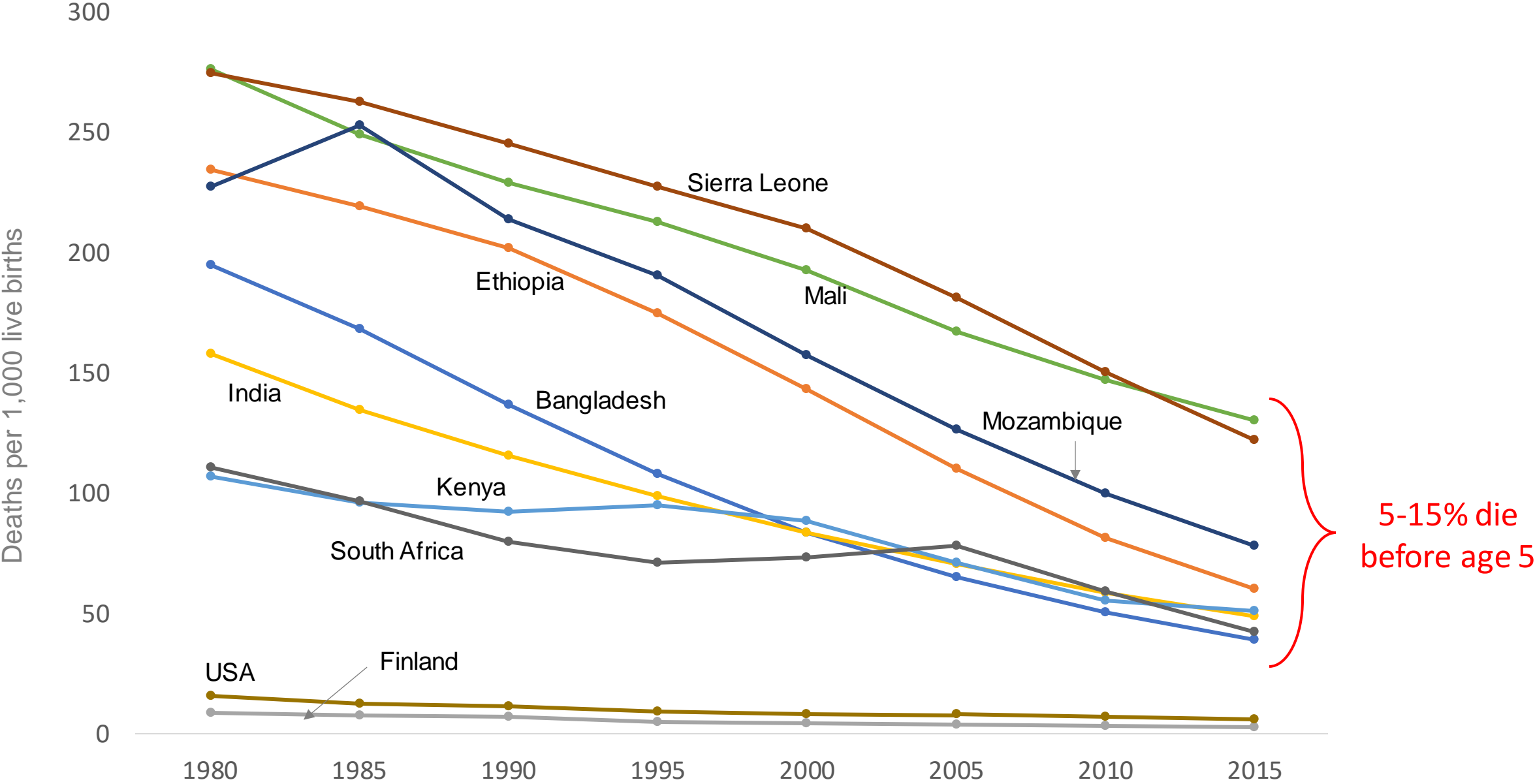
⁵ *Nyanja Health Research Institute, Salima, Malawi*

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Declining under-5 mortality, but still high in sub-Saharan Africa and South Asia



Gastroenteritis (GE)

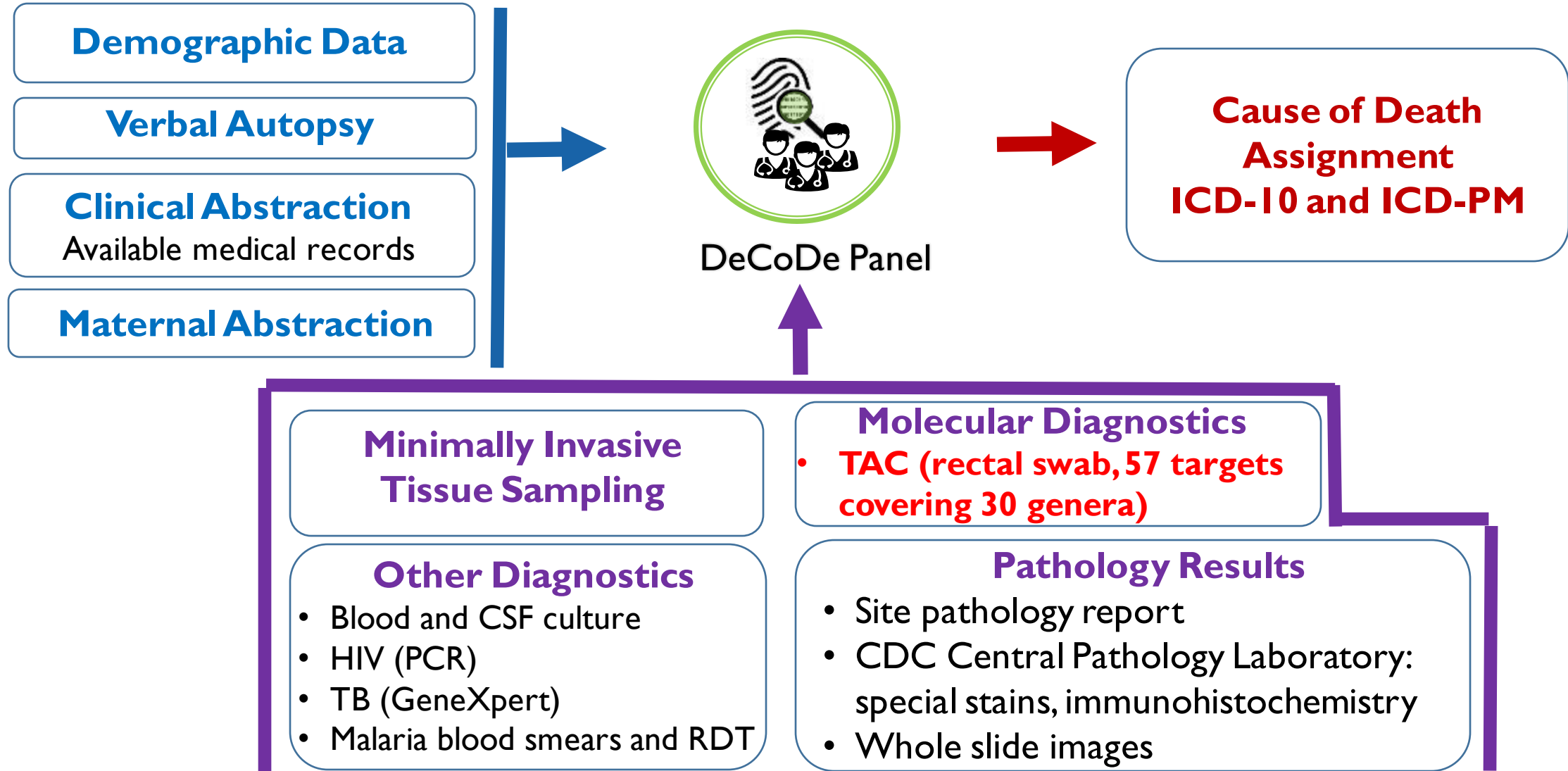
- GE: Inflammation of the intestinal lining
 - Caused by a virus, bacteria, or parasites
 - Accompanied with vomiting and diarrhoea
 - Untreated: Dehydration, kidney failure, and death
- Understanding GE mortality in children aged <5 years
 - Inform resource allocation for research and programs
 - Improve prioritization of prevention and treatment interventions

Child Health and Mortality Prevention Surveillance (CHAMPS)

- Prospective multisite under-5 mortality surveillance network
- Leveraging ongoing Health and Demographic Surveillance Systems (HDSS)
- Sites located in Sub-Saharan Africa and South Asia
- Identify the most preventable causes of mortality among children under-five years of age
- Produce and disseminate high quality data to inform policy and public health action
- Strengthen surveillance and health services infrastructure to prevent child mortality

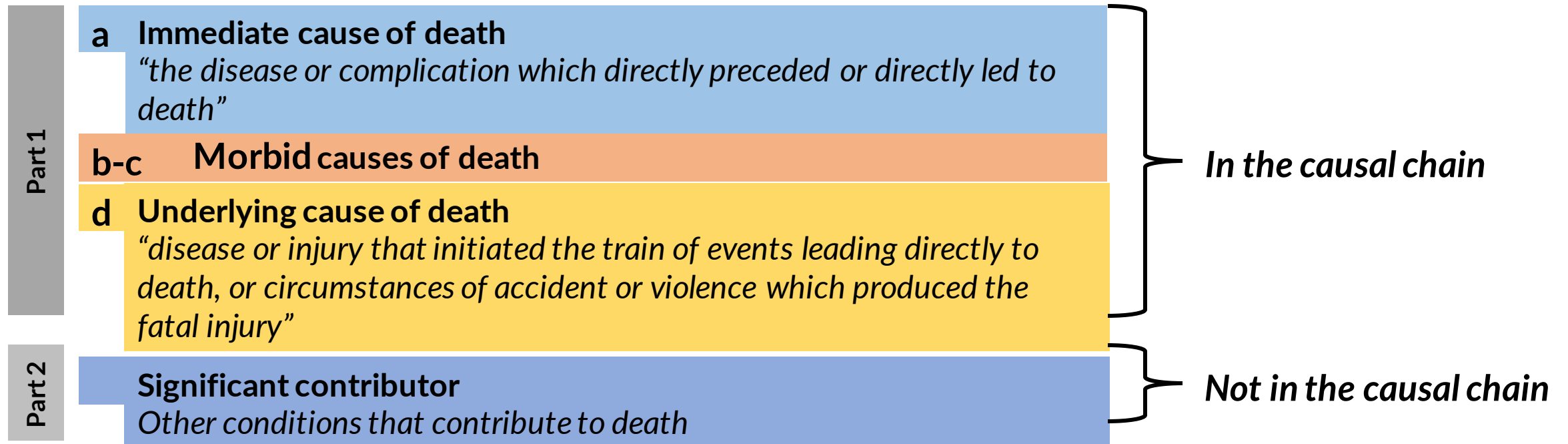


CHAMPS determination of cause of death (DeCoDe)

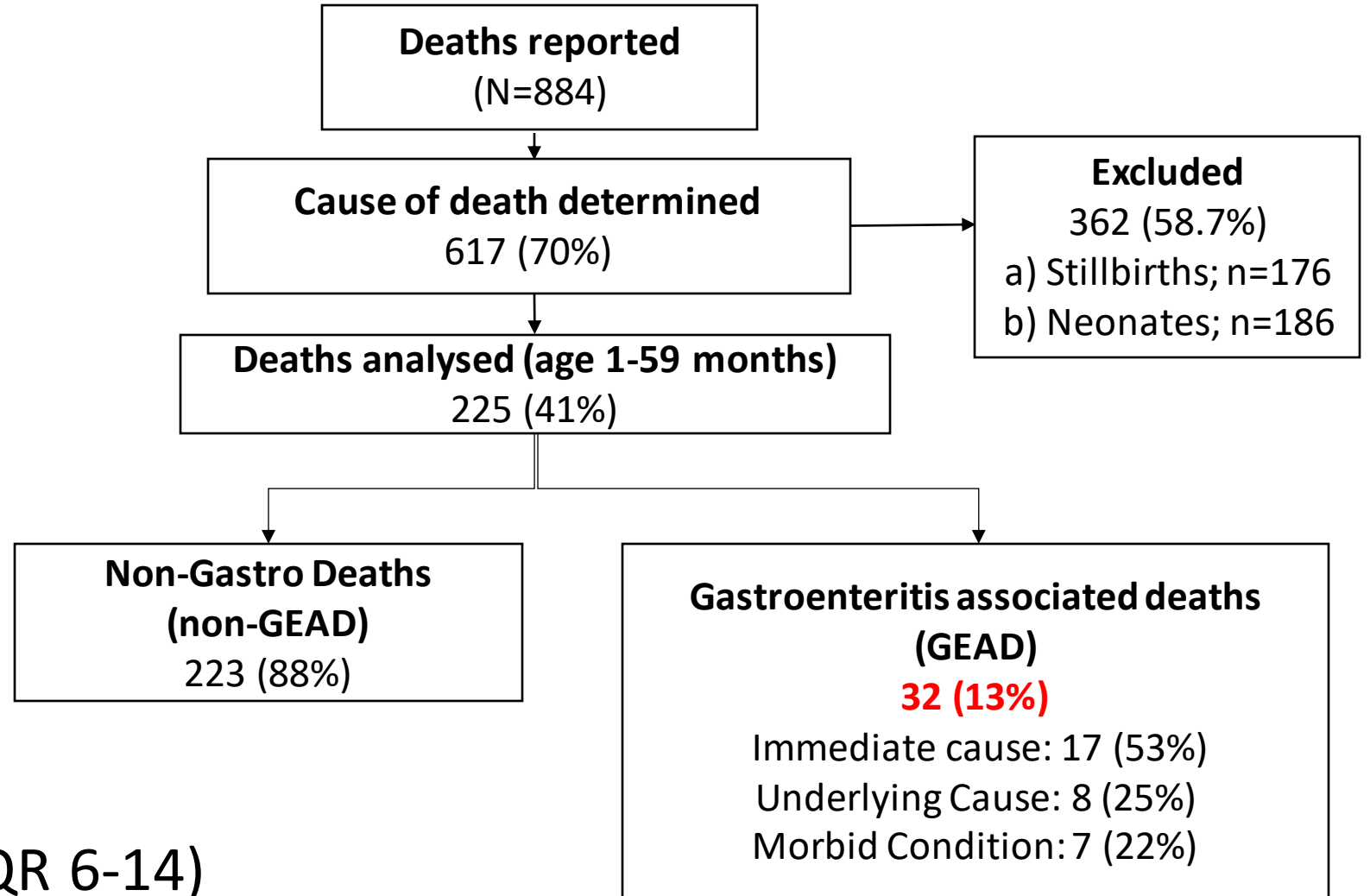


Case definition and causal chain determination of death from ICD-10 and ICD-PM

- **Gastroenteritis-associated Death (GEAD)** case definition: A deceased child aged 1-59 months, enrolled in the CHAMPS-Kenya study, and having gastroenteritis in the casual chain of death
 - GEAD : Gastroenteritis is the immediate, morbid or underlying cause of death



Deaths with Gastroenteritis in the causal chain, CHAMPS-Kenya, May 2017 to December 2021



GEAD

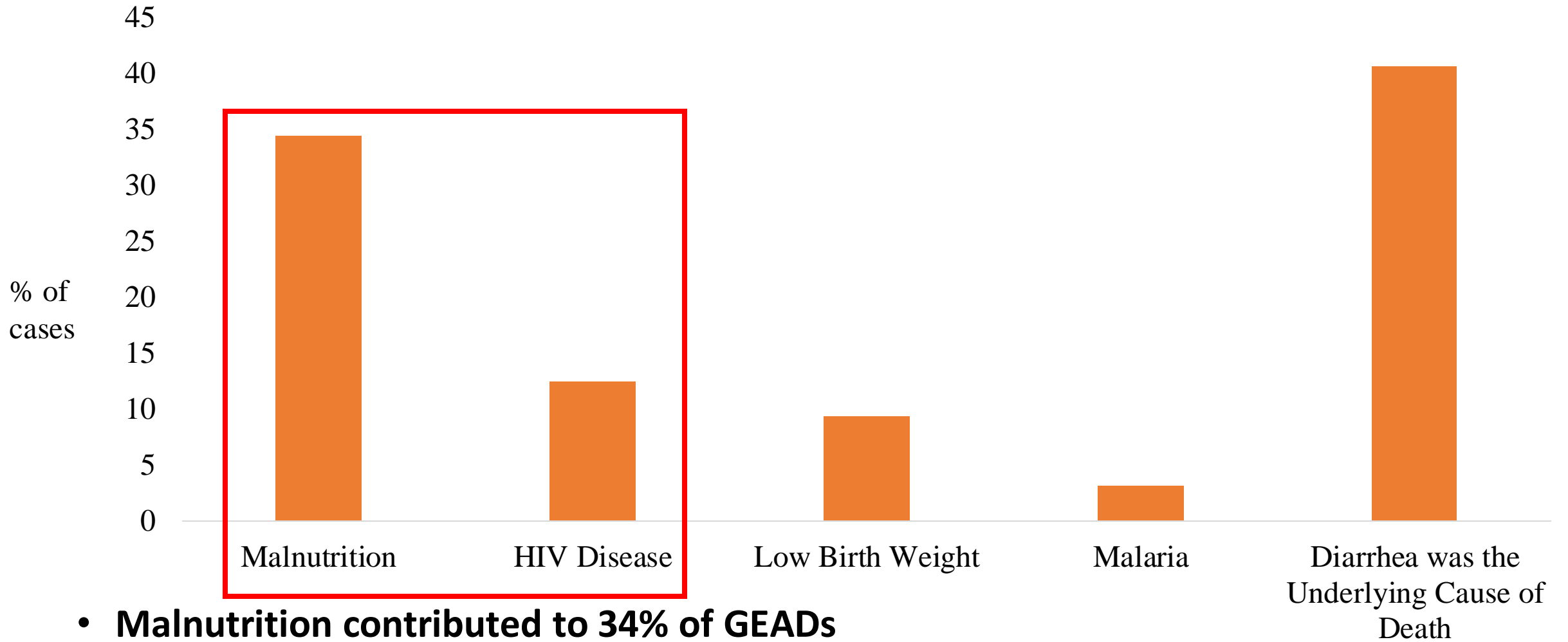
- Median age 9 months (IQR 6-14)
- Female: 50%
- No change in frequency of GEAD from 2018 to 2021
 - 11% of deaths per year

Characteristics of GEADs vs. non-GEADS

	Total Deaths (255) n (%)	GE Deaths (n=32) n (%)	Non-GE Deaths (n=223) n (%)	OR (95% CI)
Place of Death				
Community	102 (40.0)	6 (18.7)	96 (43.0)	Ref
Hospital	153 (60.0)	26 (81.3)	127 (57.0)	3.28 (1.30-8.27)
Residence				
Karemo (Rural)	123 (48.2)	8 (25.0)	115 (51.6)	Ref
Manyatta (Urban)	132 (51.8)	24 (75.0)	108 (48.4)	3.19 (1.38-7.42)
Maternal Education				
1-8 years	127/200 (63.5)	10/23 (43.5)	117/177 (66.1)	Ref
>8 years	73/200 (36.5)	13/23 (56.5)	60/177 (33.9)	2.54 (1.05-6.12)

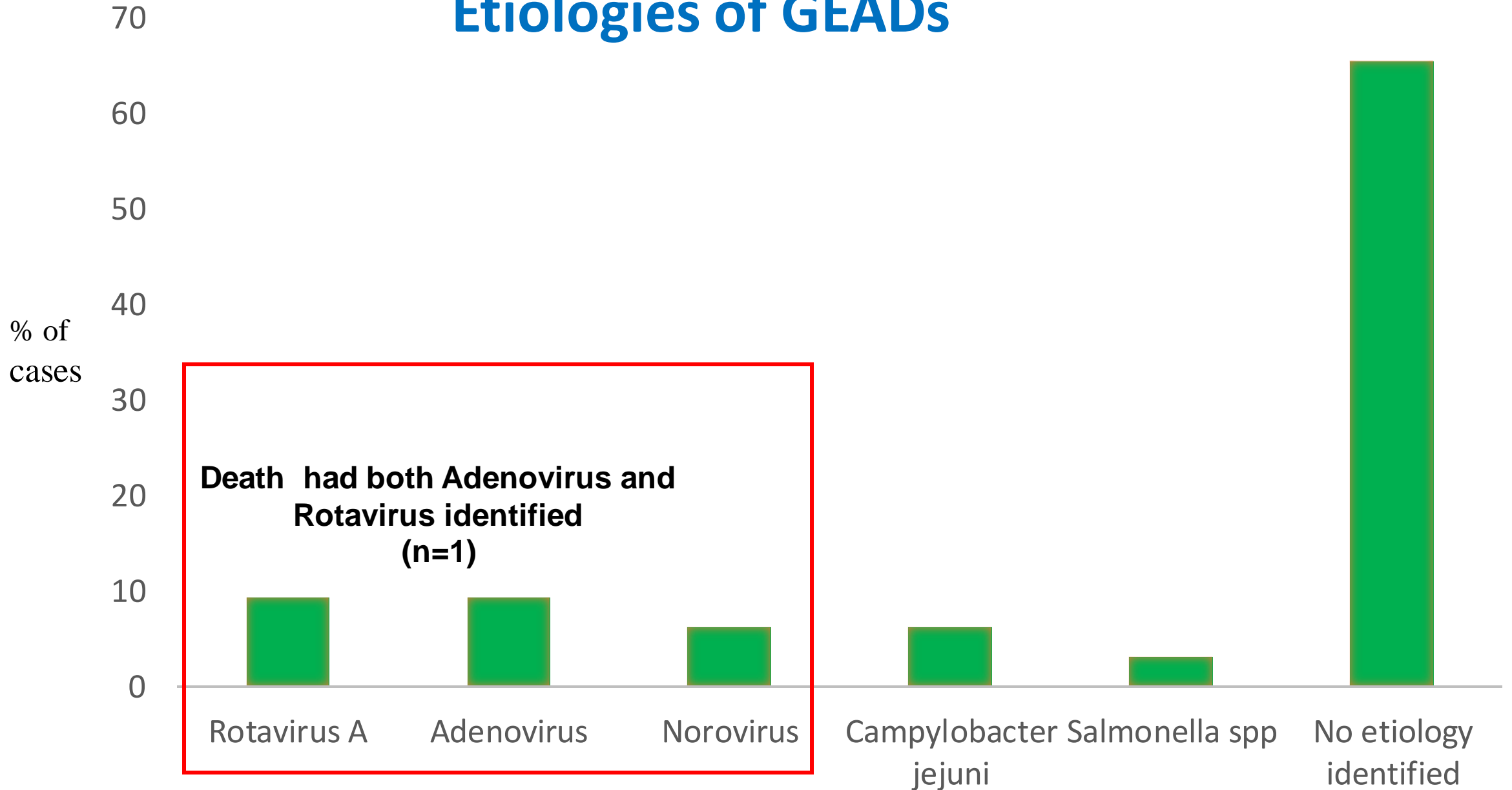
**Age, Gender, HIV status, Current immunization, malnutrition, drinking water source and treatment, and maternal socioeconomic status were not associated with GE vs non-GE deaths*

Underlying Causes of Death Among GEADs



- **Malnutrition contributed to 34% of GEADs**
- **Malnutrition and HIV together contributed to 47% of GEADs**

Etiologies of GEADs



Limitations

- Potential for missed deaths in 2017 and 2020
 - 2017: Study initiation included primarily facility deaths
 - 2020: COVID-19
- Multivariable analysis not feasible due to limited data

Summary and Recommendations

- Between 2018 and 2021, the rate of GEAD was stable (~11%)
 - Most deaths are preventable
 - Current clinical interventions may not be completely effective
- Children from families in urban areas with caregivers with more education were more likely to die of GE-related causes
- GEAD dominated by viral etiologies
- Malnutrition important underlying cause of death in GEAD
- Mortality surveillance using MITS is an important source of data to action for public health interventions
- Re-evaluation and update of GE clinical management guidelines important

Acknowledgements

- The Communities of the CHAMPS site
- The Family members of enrolled deaths
- The Ministry of Health of Kenya , Kisumu and Siaya counties
- CDC–Atlanta and Kenya
- The Kenya Medical Research Institute (KEMRI)
- CHAMPS staff
 - Determination of Cause of Death (DeCoDe) panelists
 - Clinic, Field, HDSS, Data, Laboratory , and collaborative project staff
- The CHAMPS project team and Investigators
- Bill & Melinda Gates Foundation
- Henry Jackson Foundation (HJF)
- Emory University Team- CHAMPS Network central coordination team

Thank you!

Supplement

	2017	2018	2019	2020	2021	p-value*
	(n=28)	(n=61)	(n=88)	(32)	(46)	
Non-GEAD	75%	89%	90%	88%	89%	0.23
GEAD	25%	12%	10%	13%	11%	

**Cochrane-Armitage trend test*