



CHAMPS

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

Causes of Death Identified in Neonates Enrolled Through Child Health and Mortality Prevention Surveillance (CHAMPS), December 2016 – February 2020

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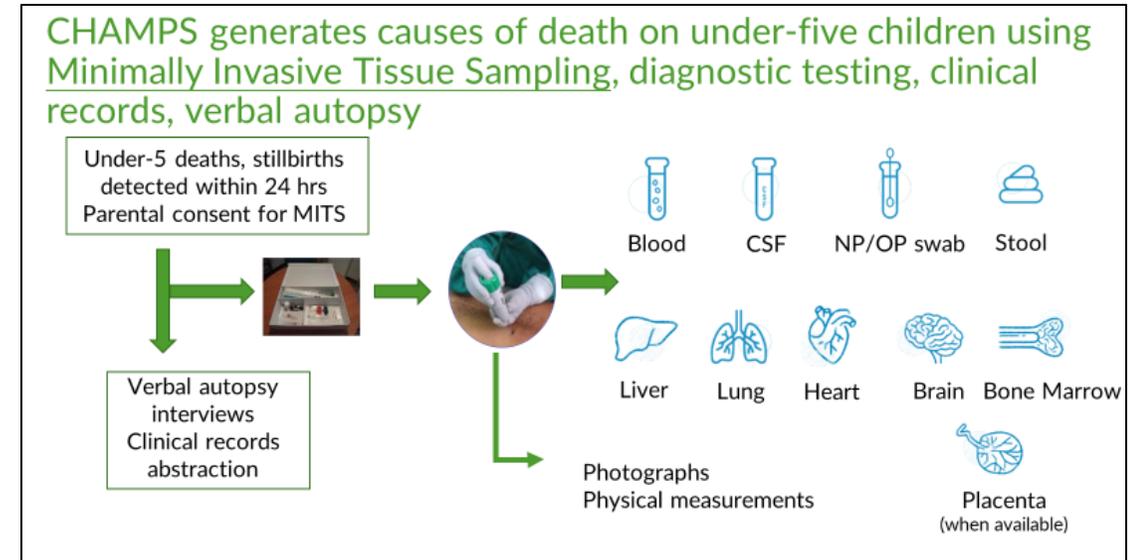


Background

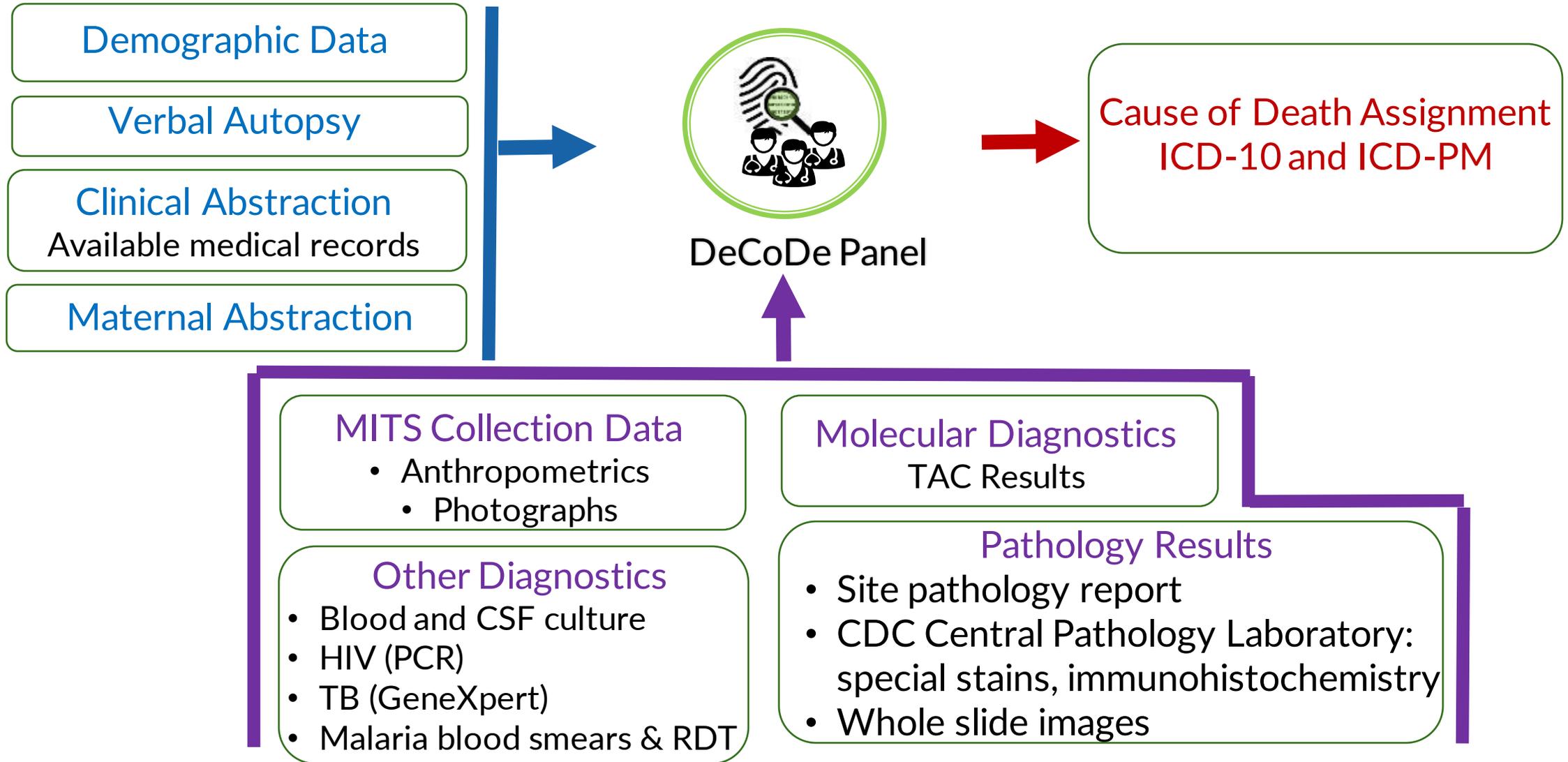
- Globally, 2.4 million deaths occur in neonates (<28 days age) each year.
- Majority of neonatal deaths occur in low- and middle-income countries, with neonatal mortality rates of 27 and 25 per 1000 live-births in sub-Saharan Africa and South Asia, respectively.
- Currently, causes of death attribution in LMIC is mainly based on ante-mortem clinical data and verbal-autopsies.
- Complete diagnostic autopsy is the gold standard for investigating the causes of death, although not feasible in resource constrain settings.
- Post-mortem minimal invasive tissue sampling (MITS) has been shown to have strong concordance in identifying the cause of death, especially for infectious causes.
- The Child Health and Mortality Prevention Surveillance program uses post-mortem MITS to investigate cause of death in <5 children.

Methods

- 0-27 days old neonatal deaths were enrolled.
- From Dec 2016 – Feb 2020. (pre COVID pandemic)
- Sites
 - South Africa
 - Kenya
 - Ethiopia
 - Mali
 - Mozambique
 - Sierra Leone
 - Bangladesh
- The MITS included collection of tissue from liver, lungs and brain and collection of blood, cerebrospinal fluid, stool, and nasopharyngeal swabs.

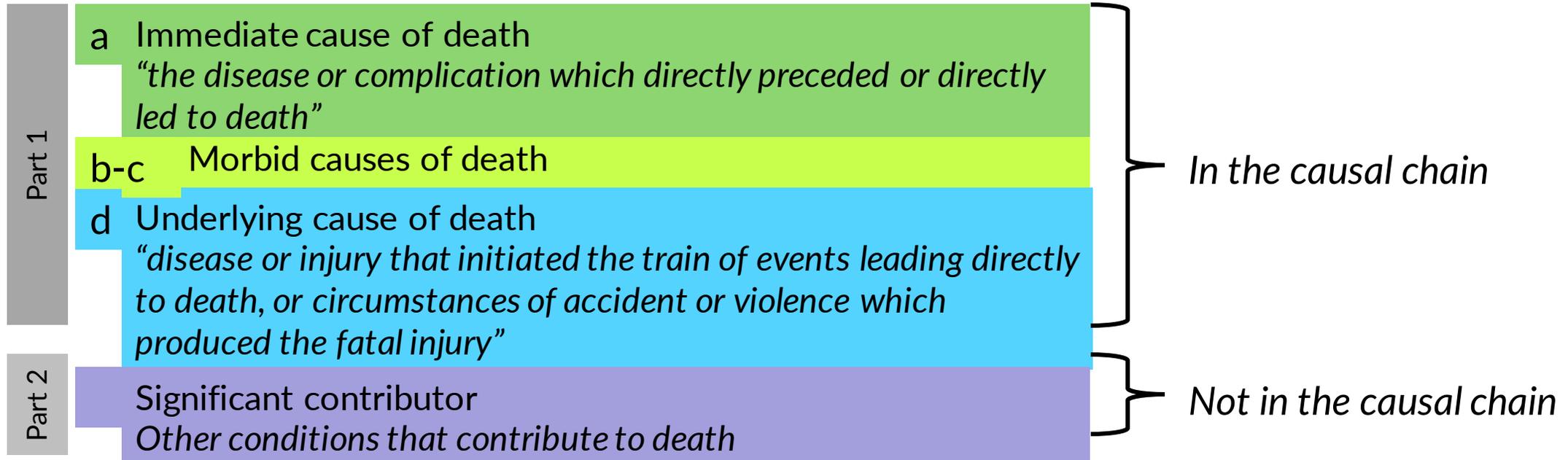


CHAMPS Determination of Cause of Death (DeCoDe)



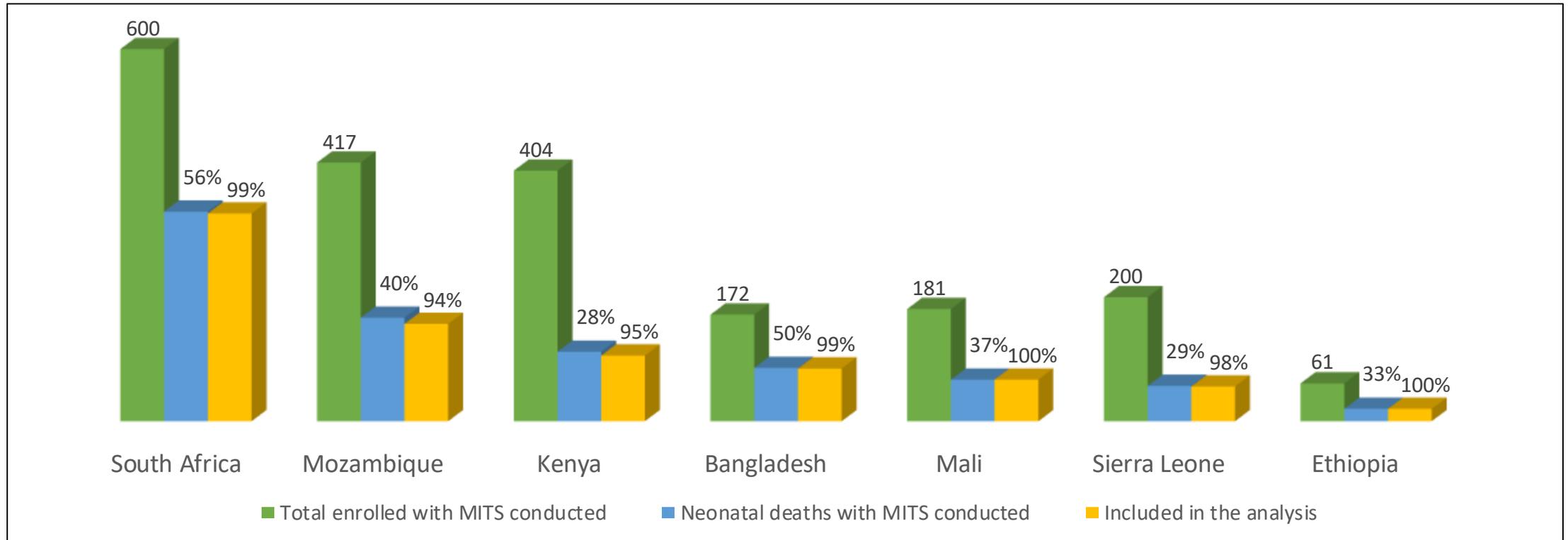
Cause of death assignment following ICD-10 and ICD-PM: importance of causal chain

FRAME A:		► Cause of death		► Time interval from onset to death															
1. Report disease or condition directly leading to death on line a Report chain of events in due to order (if applicable) State the underlying cause on the lowest used line		a																	
	↻	b	Due to:																
	↻	c	Due to:																
	↻	d	Due to:																
2. Other significant conditions contributing to death (time intervals can be included in brackets after the condition)																			



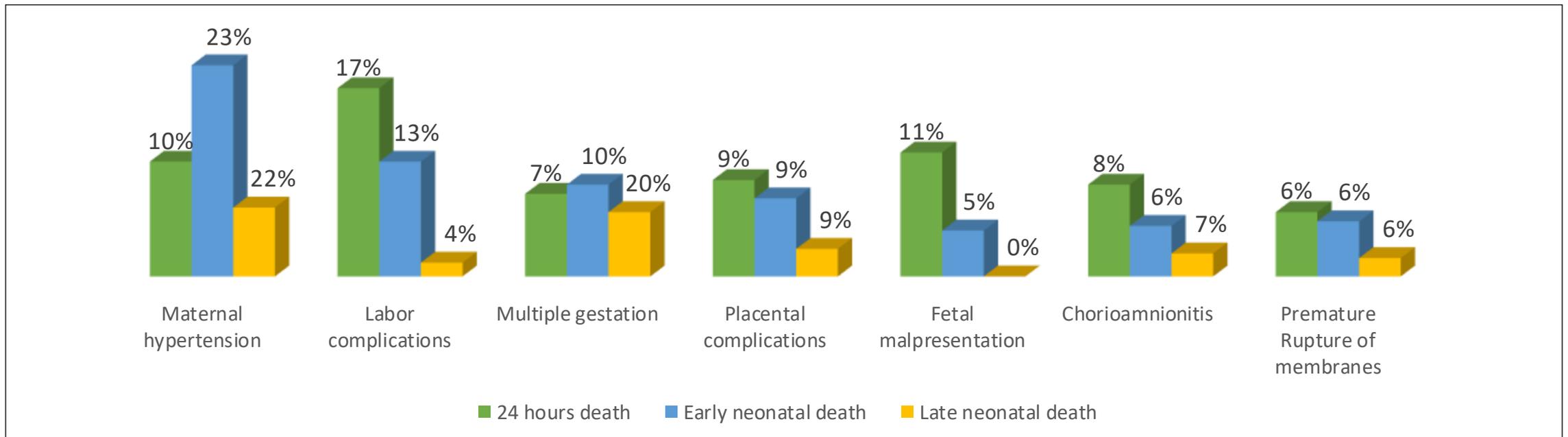
Enrolment by CHAMPS sites

Total neonatal death enrolled 847 and 98% (n=826) included in the analysis



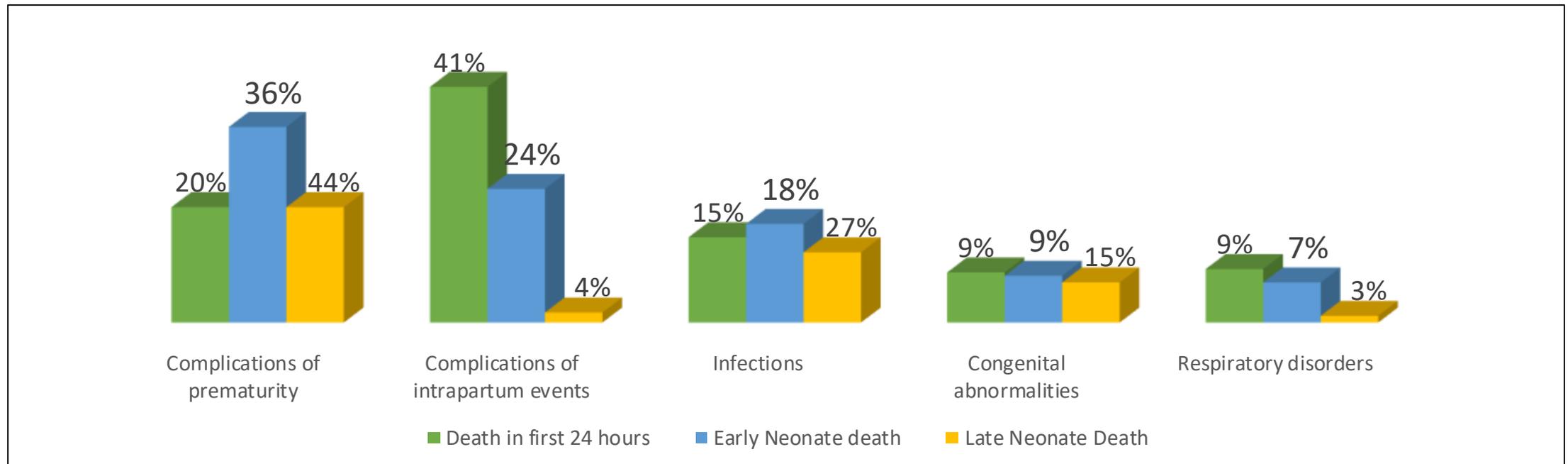
Main maternal condition among neonate, by age group

- **Overall** maternal condition identified in **62%** (n=512/826)
- **Death in 24 hours** maternal condition identified in **72%** (n=244/341)
- **Early neonatal death 1-6 days** maternal condition identified in **61%** (n=199/327)
- **Late neonatal death 7-27 days** maternal condition identified in **44%** (n=69/158)



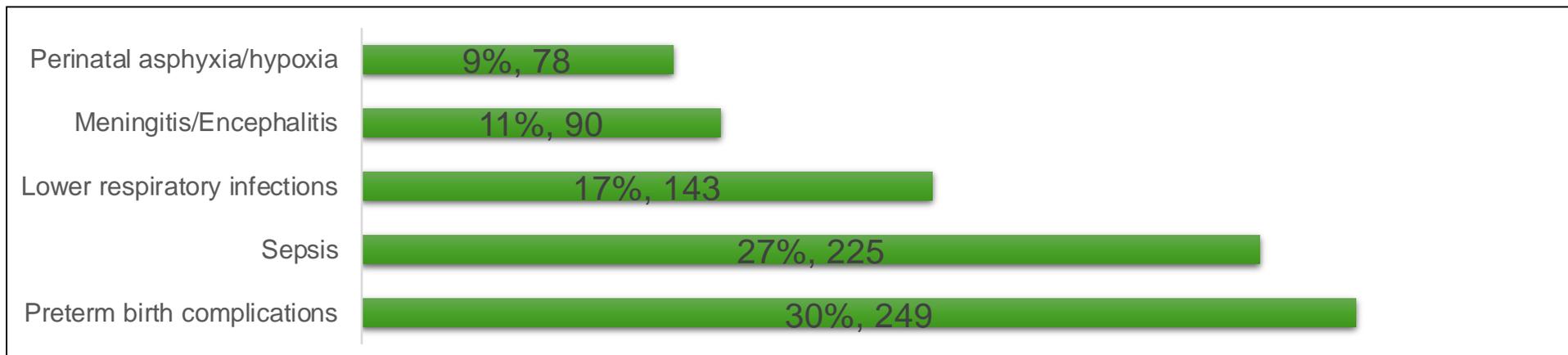
Leading underlying cause of death, by age group

- Overall underlying cause of death was identified in 98% (n=812)
- Death in 24 hours – Intrapartum events (41%)
- Early neonatal death 1-6 days – Prematurity (36%) & Intrapartum events (24%)
- Late neonatal death 7-27days – Prematurity (44%) & Infection (27%)



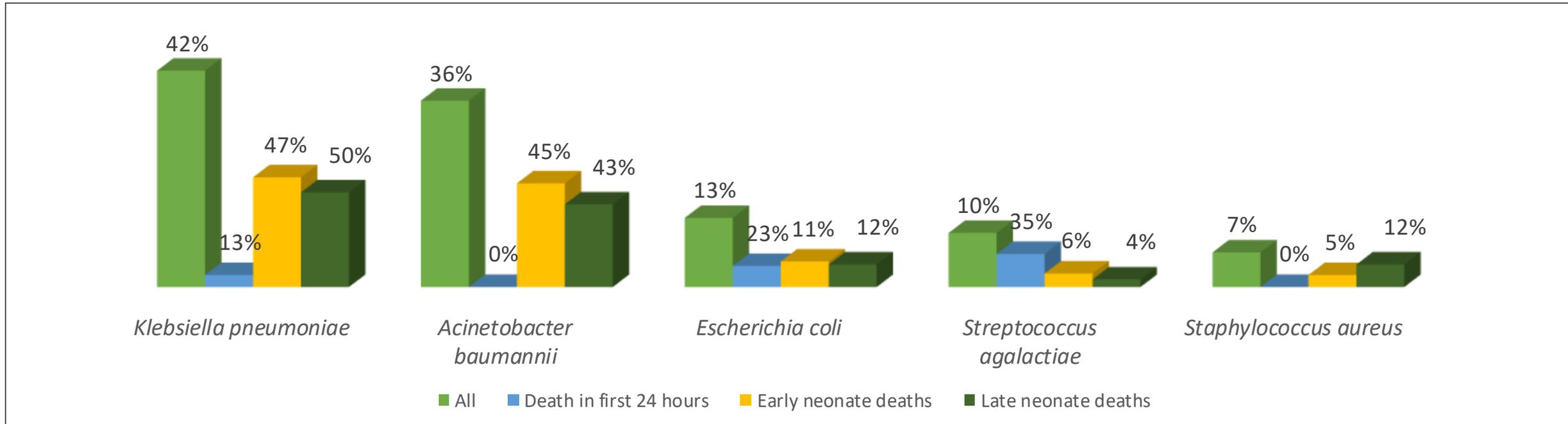
Leading immediate/morbid conditions in the causal pathway

- Immediate condition - the disease or complication which directly led to death
- Morbid condition – antecedent condition in the causal pathway.
- Number of conditions in the causal pathway
 - 32% (N=236) only underlying condition was identified.
 - 32% (N=236) underlying condition along with immediate condition was identified in the causal pathway.
 - 20% (n=168) underlying condition along with immediate and 1 morbid condition was identified in the causal pathway.
 - 15% (n=127) underlying condition along immediate and more than 1 morbid condition was identified in the causal pathway.



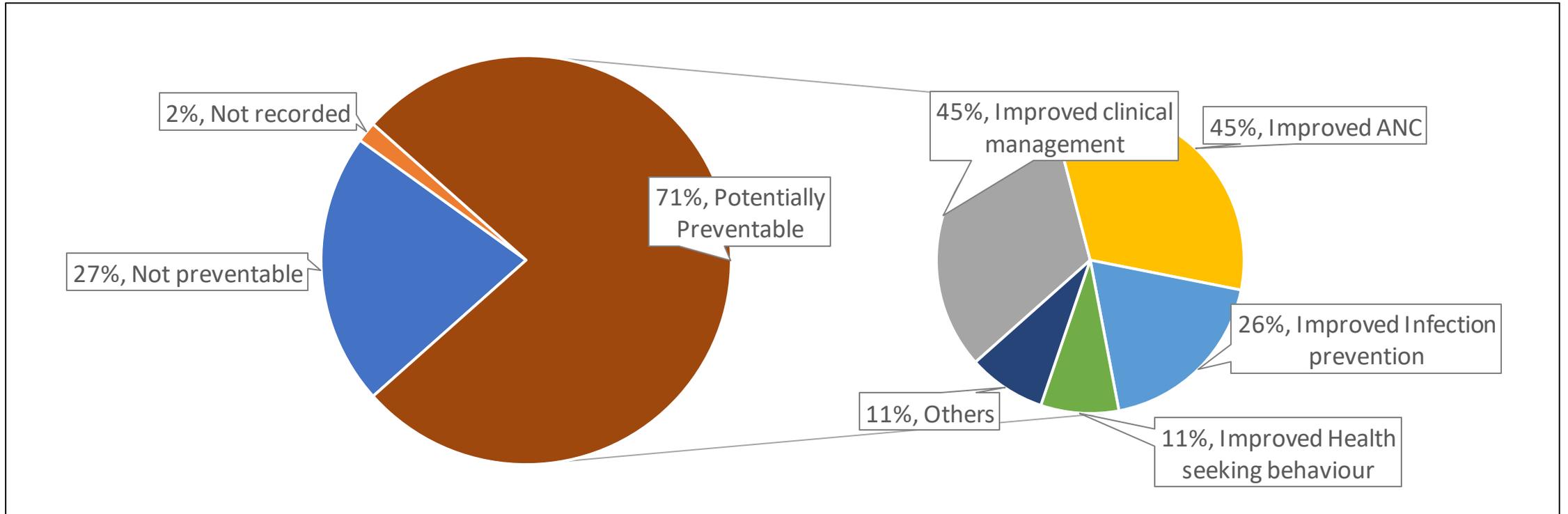
Leading pathogens for infection in the causal pathway

- Infection in the causal pathway was identified among 42% (N=344) neonatal death
- Infection among 18% (n=62) death in 24 hours
- Infection among 47% (n=155) death in early neonates 1-6 days
- Infection among 80% (n=127) death in late neonates 7-28 days



Preventability and recommendations

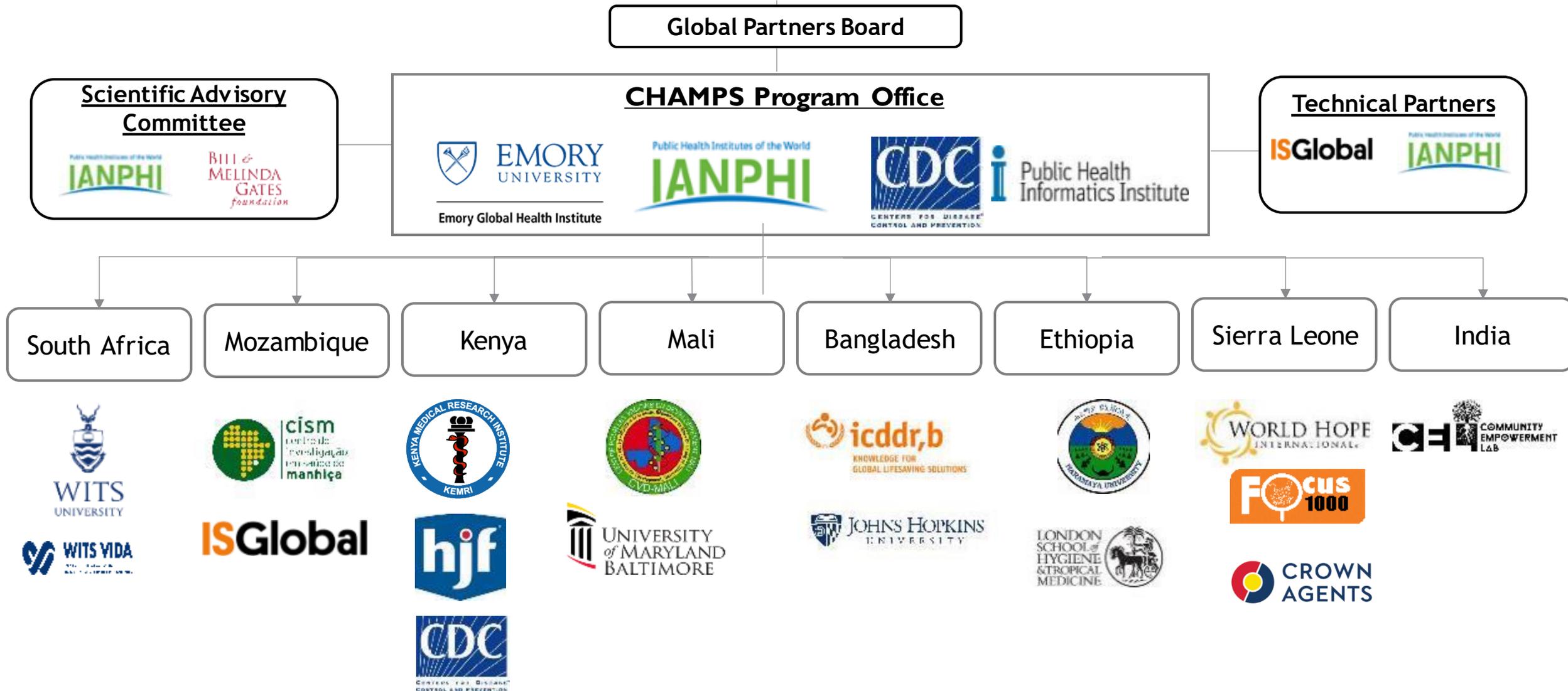
- 71% neonatal deaths are potentially preventable
- Improved clinical management (45%), Improved antenatal care (45%) and Improved Infection preventions (26%) are the main recommendations



Conclusion

- **CHAMPS provides granular detail on the causal pathway to death.**
- **Obstetric care and infection play significant role in neonatal death.**
- **Unravelling the source of infection and development of appropriate preventive and therapeutic measures will help to reduce neonatal death in low- and middle-income countries.**
- **Highlights the complexities involved in each death along with the multiple opportunities for prevention**

The CHAMPS Network





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