

# Hyaline membrane disease in deceased neonates enrolled in the Kenya Child Health and Mortality Prevention Surveillance (CHAMPS) Study

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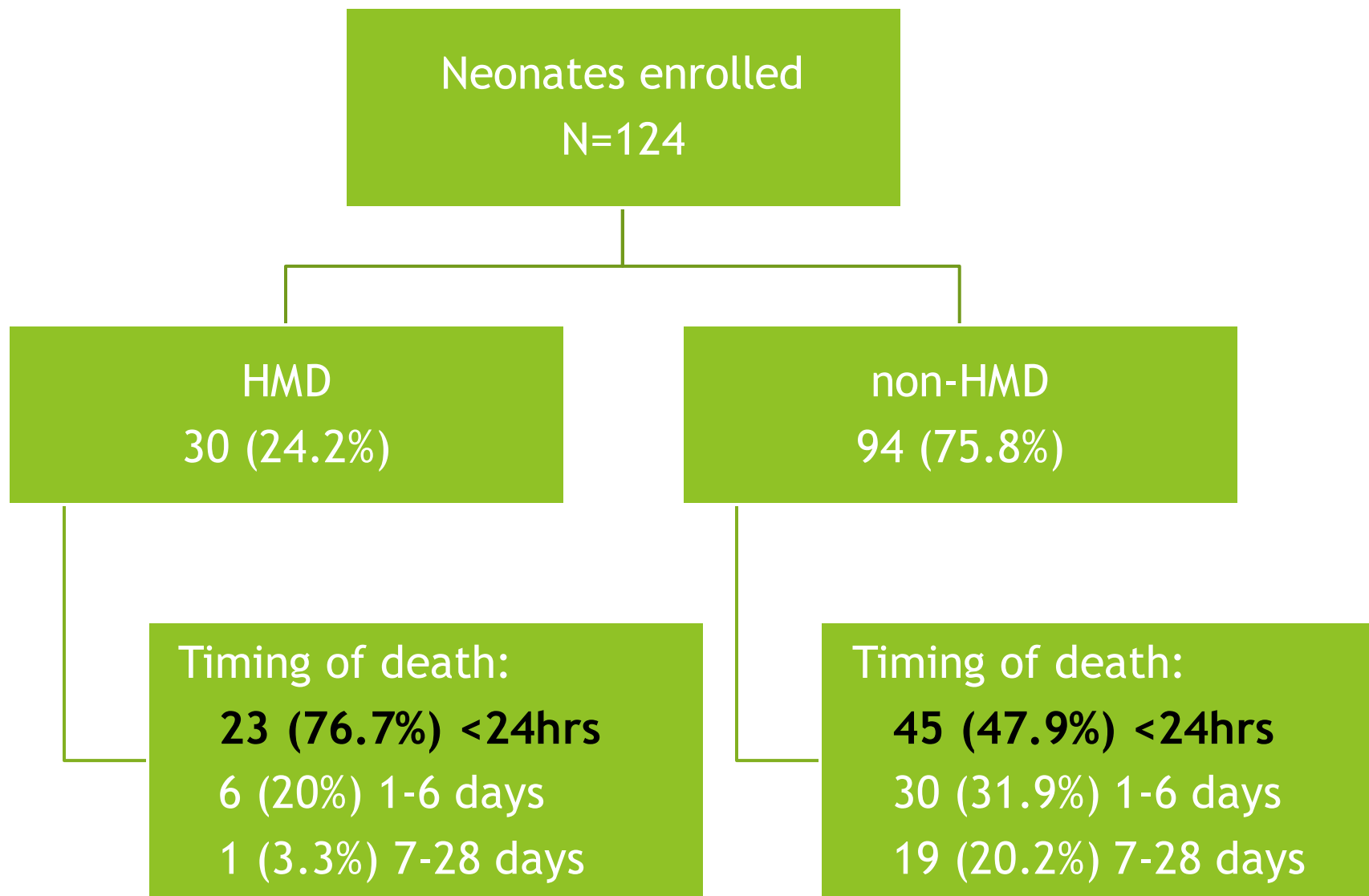
# Introduction

- Hyaline membrane disease (HMD) is an acute lung disease caused by inadequate surfactant
- HMD prevalence in sub-Saharan Africa is largely unknown, and diagnosis and therapeutic options are limited
  - One study in Ethiopia estimated 26% HMD prevalence
- In Kenya, HMD is not well characterized, and its contribution to child morbidity and mortality is undefined
- Our analysis describes the prevalence, diagnosis, management, and maternal risk factors for hyaline membrane disease among neonates enrolled in a child mortality study (CHAMPS) in western Kenya

# Methods

- CHAMPS: Multi-country surveillance study that systematically identifies immediate, underlying and co-morbid causes of under-five mortality
- 2017-2021: CHAMPS study team notified within 24 hours of under-5 (<5) deaths in facility and community
- Family consent sought; clinical records abstracted; verbal autopsy
- Blood, CSF and tissue samples collected using minimally-invasive tissue-sampling (MITS)
- Microbiological testing conducted using KEMRI laboratory in Kenya
- Histopathologic testing conducted by CDC-Atlanta
- Causes of death (COD) determined by a panel of Kenyan experts using data from post-mortem conducted through minimally invasive tissue specimen testing, clinical records and verbal autopsy

# HMD prevalence and timing of death in neonates



Maternal and infant characteristics of HMD cases

		n (%)
Birth Weight (grams)	<1000	8 (26.7%)
	1000-1499	14 (46.7%)
	1500-2499	4 (13.3%)
	>2500	4(13.3%)
Gestational Age (weeks)	<28	5 (16.7%)
	28-32	15 (50.0%)
	33-36	4 (13.3%)
	>36	4 (13.3%)
	Unknown	2 (2.7%)
Apgar Score	<b>5 &amp; below</b>	<b>12 (40.0%)</b>
	>5	13 (43.3%)
	Unknown	5 (16.6%)
Type of pregnancies	Single	20 (66.7%)
	Multiple	10 (33.3%)
Maternal HIV	Negative	23 (76.7%)
	Positive	4 (13.3%)
	Unknown	3 (10.0%)
Maternal Blood Pressure	Normal	26 (86.7%)
	High	4 (13.3%)

76% had LBW Preterm birth

# Gaps in HMD diagnosis and clinical management

## **Diagnosis:**

- Antemortem diagnosis of HMD was made in only 17 (56.7%) out of 30 cases.
- Antemortem diagnosis was based only on clinical findings
- No case received chest X-ray, electrocardiogram, blood culture or blood gases analysis

## **Clinical Management:**

- All cases received oxygen via nasal prongs (0.5L/min)
- 21 (70.0%) cases received 10% dextrose
- 17 (56.7%) cases received antibiotics
- No case received surfactant replacement therapy, continuous positive airway pressure, mechanical breathing, and or endotracheal tube placement

# Limitation

- The small sample size – limits generalizability
- All the cases are deceased neonates  
Its likely to potentially underestimate the HMD in the population


# Conclusion

- HMD caused 1/4 of all neonatal deaths in our study population, but was only diagnosed antemortem in 1/2 of the cases
- There are critical gaps in diagnosis and clinical management of HMD
- A high index of clinical suspicion coupled with training on optimal management could reduce HMD-associated neonatal deaths.



# Acknowledgements

- We would like to thank all the mothers and fathers who agreed to let CHAMPS investigate the complex causes of death in their deceased children in order to better understand and reduce child mortality in Kenya
- CHAMPS study team
- CDC-Atlanta
- CHAMPS Program Office, Emory University



**Thank you!**