

RSV Mortality in Lusaka

Overview and Preliminary Findings from the Zambia Pertussis/RSV Infant Mortality Estimation Study (ZPRIME)

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ReSViNET Conference

November 11, 2019



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Teaching
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BILL & MELINDA
GATES foundation

Disclosures

The authors declare no financial conflicts of interest. Funding for the ZPRIME research is provided by the Bill and Melinda Gates Foundation, grant number OPP1163027.

Acknowledgements

- We would like to recognize the families in Zambia who have suffered great loss and were willing to participate in our cohort study.
- Nursing, Lab and Admin staff at the University Teaching Hospital, the Level 1 Hospitals
- ResVinet

Background and rationale

Research Question

What proportion of deaths among infants <6 months of age can be attributed to infection with respiratory syncytial virus (RSV)?

Background

- **Burden of fatal RSV disease in LMICs is currently unknown**
 - Earlier meta analysis suggest ~180,000 deaths/year
 - However these estimates rest largely on experience among hospitalized infants
 - Case management (oxygen, suction) at hospitals may prevent many/most RSV deaths
- **Burden of community RSV mortality is unclear**
- *To what degree are community RSV deaths undercounting the total?*

Why study RSV in Lusaka?

- Data from Zambia would be generalizable to other LMICs in Africa
- Zambia Suffers a disproportionately high burden of respiratory mortality
- In PERCH, Zambia's CFR was highest of all 9 countries studied (33%)
- In PERCH, RSV emerged as one of most important causes of pediatric pneumonia
- Unlike many pathogens in PERCH study,
 - RSV found almost exclusively among case children (with pneumonia)
 - RSV rarely identified among healthy controls
 - We can conclude that RSV is a primary pathogen and not an opportunist

Methods

Medical care for the poor in Lusaka

- University Teaching Hospital is one of the two government supported tertiary care facility in Lusaka
 - It is linked to a network of primary health centers (PHCs) located throughout the city
- Non-governmental or private facilities also exist, but these are all pay for service, and are therefore rarely used by the city's poor

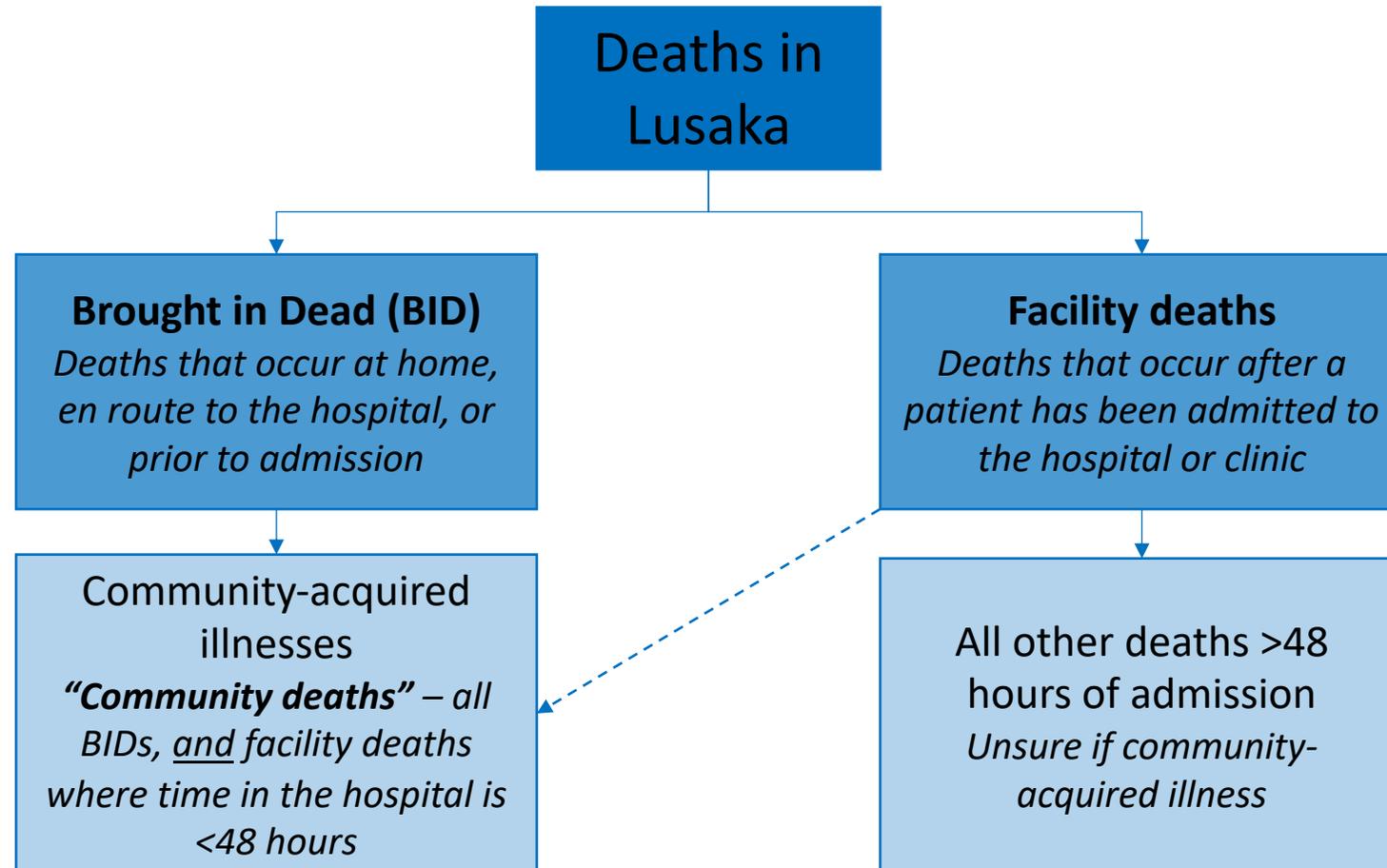
Study Design

- **Community wide prevalence study of deceased infants in Lusaka Zambia**
 - PCR used to identify RSV
 - Subtyping to RSV A and B (future presentations)
 - Also assessing Burden of fatal disease due to pertussis (future presentations)
- **Three year duration of surveillance**
 - RSV events tend to be very seasonal
 - Pertussis which occurs in multi year cycles (3-5 years)
- **Nested Case/Comparator study**
 - **Cases** = COD community acquired ALRI
 - **Comparators** = NOT community acquired ALRI

Eligibility Criteria

- Aged 4 days through 6 months
- Enrolled/sampled within 48 hours of death
- Consent of parent or other caregiver

Definitions



City wide data capture

Long-form data

Collected only at University Teaching Hospital

5 experienced health professionals (nurses and clinical officers)

Sources: medical file, under 5 card, death certificate, verbal autopsy (BIDs)

Data contribute to all PSA and SSA1-3

Short-form data

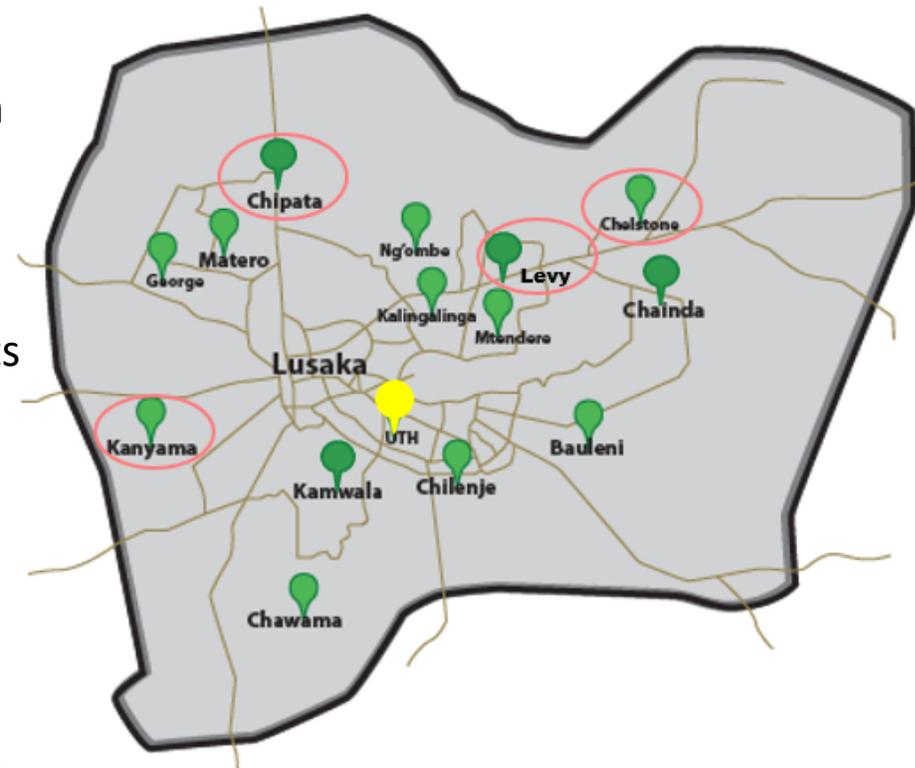
Collected at Level 1 hospitals with an on site mortuary

Local hospital staff screens, obtains consent, and collects NP sample

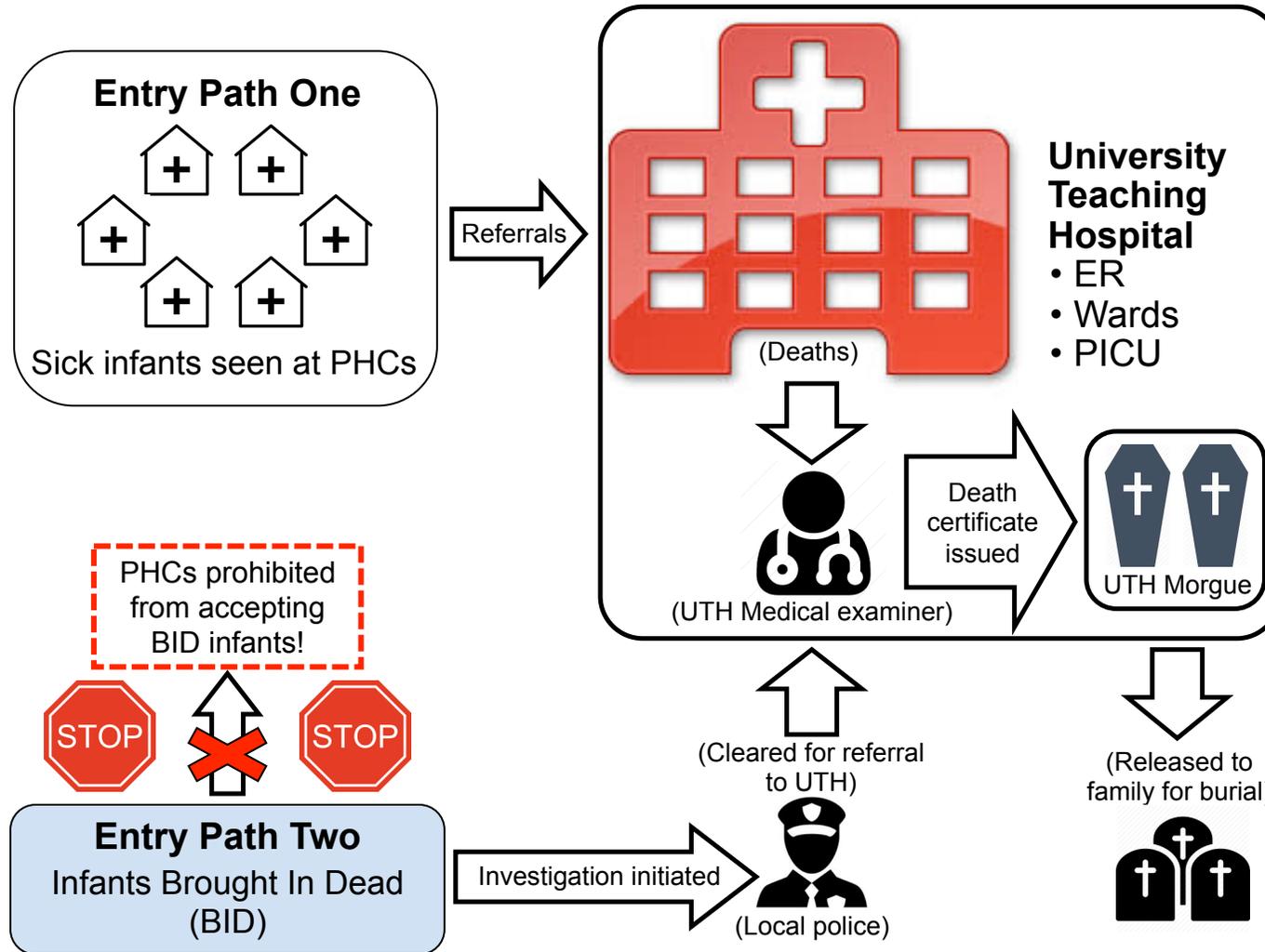
Limited data available: eligibility data, age, sex, NP swab

Data contribute to PSA only, not SSA1-3

PHCs with mortuary circled in red
Deaths at all others are referred to UTH



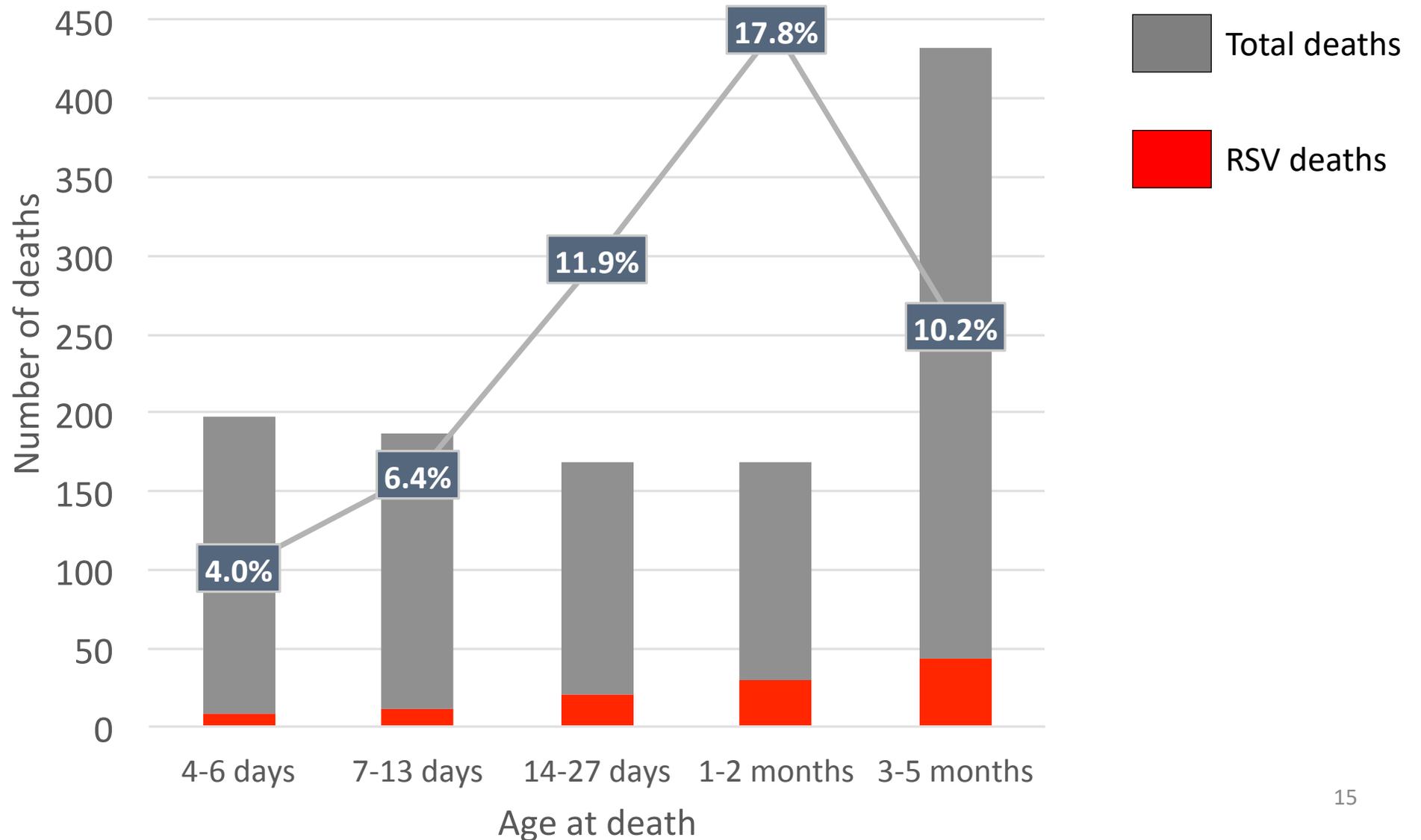
Enrollment strategy



With shift in policy in 2017, enrolment expanded to four level-1 facilities in Lusaka that have an on site infant mortuary. Process is identical to that shown here

Results

RSV associated deaths increase rapidly within the first weeks and months of life but occur even within the first week of life



Most RSV deaths occur in younger infants < 3m

Community and Facility Deaths

<u>Age group</u>	<u># Enrolled</u>	<u># Tested</u>	<u># RSV(+)</u>	
4d-<3 months	1159	1081	97	72% (97/135)
3-<6 months	356	341	38	28% (38/135)
All ages	1515	1422	135	

RSV deaths are predominantly occurring in community setting (Data from Aug 2017-July 2019)

All Years

Community Deaths

Facility Deaths

<u>Age group</u>	<u>#</u>			<u>Age group</u>	<u>#</u>		
	<u>Enrolled</u>	<u># Tested</u>	<u># RSV(+)</u>		<u>Enrolled</u>	<u># Tested</u>	<u># RSV(+)</u>
4d-<3 months	680	636	68	4d-<3 months	479	445	29
3-<6 months	283	268	24	3-<6 months	73	73	14
All ages	963	904	92	All ages	552	518	43

Most RSV deaths are community deaths:

- Community = 92/135 deaths (68%)
- Facility = 43/135 (32%)

Conclusions

- RSV is a major contributor to infant mortality in LMICs
- RSV deaths are concentrated in community settings (68%)
- By contrast, only a third of deaths occur in facility settings
- This suggests several things:
 - With good case management, RSV mortality is avoidable even in resource limited settings
 - Prior estimates of fatal RSV disease based mainly on hospitalized infants significantly undercount true RSV mortality
 - If our results are typical, true BOD may be 3 times higher

Thank you for your attention