Using LiST to help in attribution of Impact of iCCM, a multi-Country Analysis

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Overview of Presentation

- Background on LiST (*Li*ves *S*aved *T*ool)
- Overview of iCCM data sets
- Methods for analyses
- Results' focusing on some key studies
- Conclusions, limitations and next steps

How LiST is used?

- The primary purpose of LiST is to estimate the impact of scaling up interventions on maternal, fetal, neonatal and child (1-59m) mortality

- LiST also estimates the impact of interventions on risk factors such as rates of stunting, wasting, prematurity, birth size and behaviors such as breast feeding and sanitation practices.

Where did the model come from?

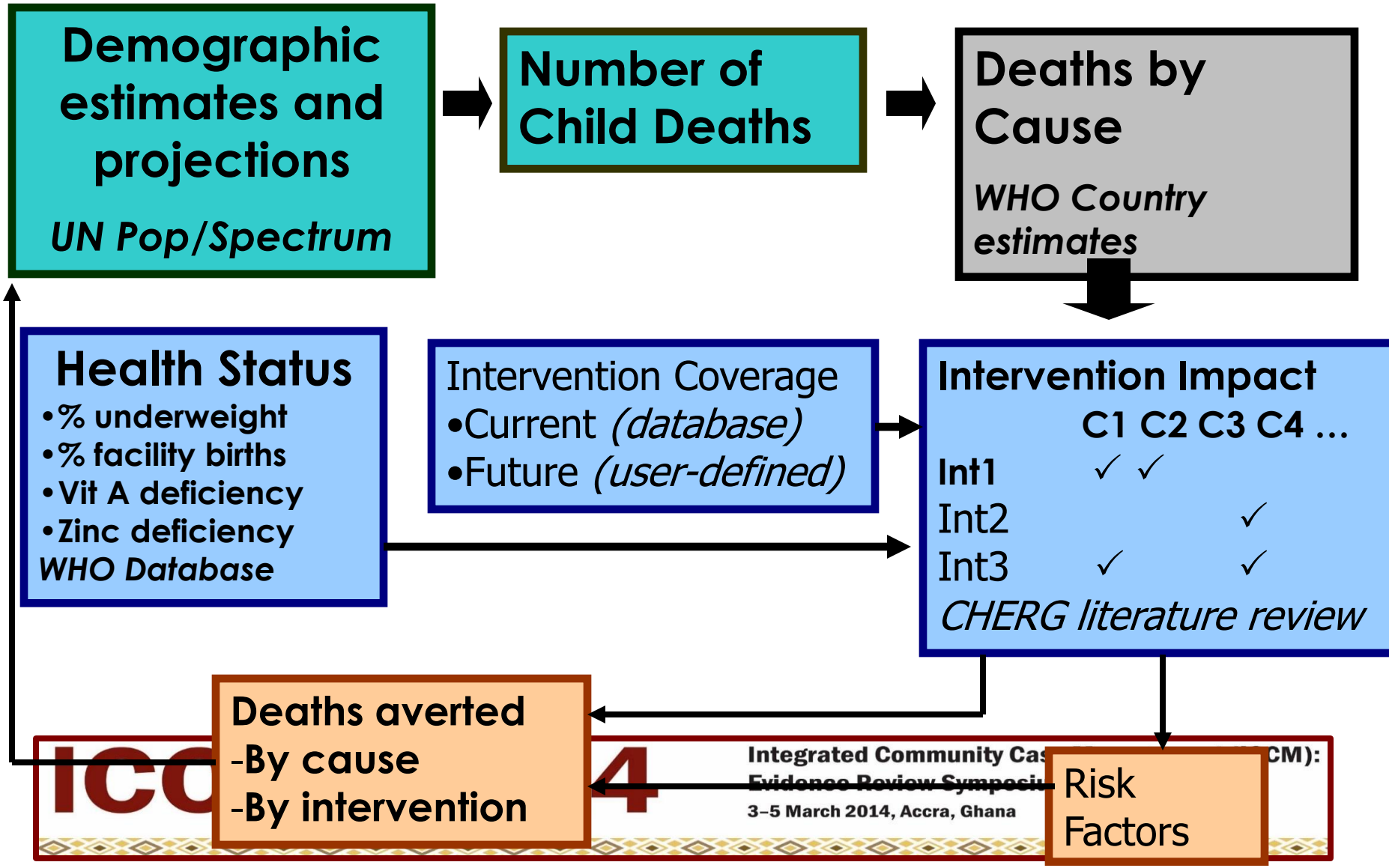
- Based on the work in 2003 Child Survival series and WHO/UNICEF Child Health Epidemiology Reference group (CHERG)

- Initially interventions that could delivered at community level (Lancet 2003 Child Survival series) and since then has been expanded to include new interventions, risk factors and outcomes.

General Approach of *LiST*

- Deterministic – same inputs same outputs
- Mathematical – assumes it has correctly defined the causal pathways
- Population, not individuals
- Age structures with pseudo cohorts (age bands)
- Linear, e.g., incidence of disease as constant except as altered by risk factors or intervention
- Mortality reduction is the consequence of increased coverage of interventions, reduction in risk factors such as stunting and wasting, or change in behaviors, such as breastfeeding and sanitation practices.
- Model is set up so that the impact of multiple interventions on mortality can be estimated

Approach to Estimates and Projections



Developing a projection

- Basic approach in LiST is to establish a baseline of a country or region. This includes
  - Demography, births, deaths, fertility
  - Cause of death structure for (MNCH)
  - Current levels of risk factors and exposure variables (e.g., stunting, falciparum, deficiencies)
  - Current level of coverage of interventions

And then

- Scale up interventions (each of which is linked by effectiveness values to cause-specific mortality and/or risk factors)
- Re-compute the demography (and cause of death structure) based on changes in intervention coverage, risk factors and behaviors
- Outputs include all of the inputs from baseline (age and cause-specific death, changes in risk factors) and allow on to attribute which interventions led to changes in mortality

Methods - Data Requirements for LiST Analyses

- To develop a LiST baseline model for a iCCM study site we needed
  - Population information, including fertility
  - Coverage of interventions, risk factors and behaviors at baseline
  - Measured mortality at baseline (both neonatal and under-five mortality)
  - Focused on studies that had both intervention and control areas in their study;
- Then with measures of interventions, risk factors and behaviors at endline we can recompute mortality and risk factors and do attribution of impact of interventions delivered by iCCM

Possible Outputs from LiST Analyses

- Mortality reduction
  - New mortality rates, both neonatal and under-five are computed based on changes in coverage
- Attribution
  - Relative importance of study interventions (ORS, Zinc for treatment of diarrhea, antibiotics for pneumonia and ACT for malaria) in estimated reduction in deaths to children under the age of five
- Role of CCM in coverage change
- Comparison on Intervention and control areas

Analyses

- Of the over 20 studies, we chose to focus on studies that had intervention and comparison areas
- Also we focused on studies where there were a broad range of interventions with coverage measurement as well as measures of breastfeeding.
- This resulted in LiST analyses for present studies in five countries (Ethiopia, Cameroon, Sierra Leone, Uganda, Zambia) with 12 sites.

Results – Places where no evidence of impact of iCCM

- Ethiopia
  - Measured 8 interventions and breastfeeding plus 3 iCCM interventions
  - Overall, LiST analyses showed that there was a very small reduction in mortality in both intervention (1%) and control areas (1%). Overall there was little evidence that iCCM increased coverage of 3 key interventions and the small mortality reductions that were found in the LiST analyses came from increases in coverage of interventions that are not part of the iCCM program.

- LiST analyses for the iCCM program in Cameroon had similar finding with little if any evidence that iCCM increased coverage or resulted in lower under-five mortality' Again in the control areas coverage of other interventions led to a slight decrease in mortality (2%) while in the intervention districts LiST estimated an increase in mortality due to lower coverage of interventions.

- One study in Uganda also found no evidence of coverage increases due to iCCM or a reduction in child mortality

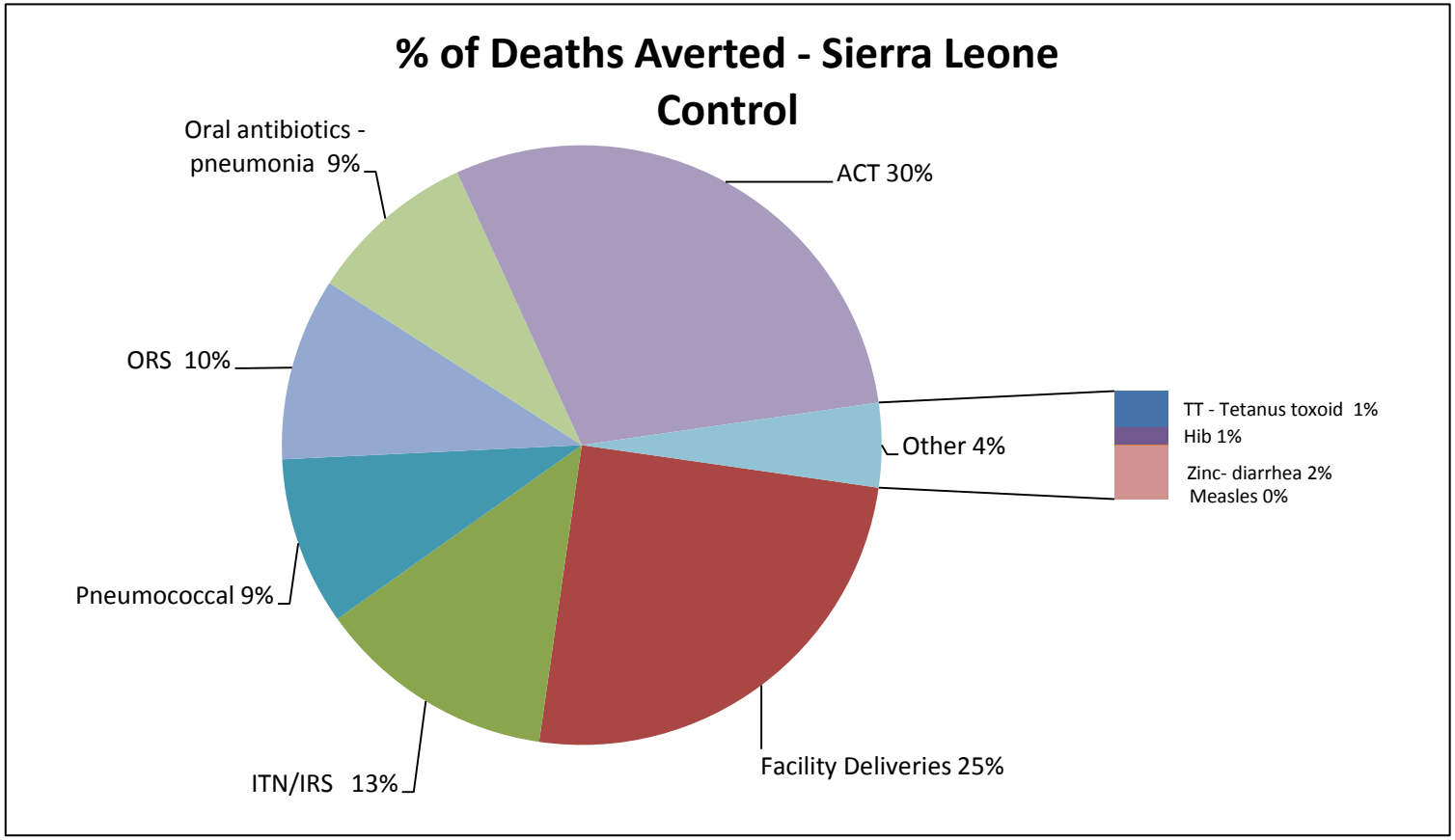
Results – Studies where iCCM was effective

- A second study in Uganda found increases in coverage of two iCCM interventions and based on the LiST analyses this resulted in a 3% reduction in mortality in the intervention areas. In the control areas coverage changes were poorer and there was no estimated reduction in mortality in the non-iCCM areas
- A study in Sierra Leone did find very strong effects of iCCM. Here changes in coverage led to an estimated 16% reduction in U5M in two years, in a large part driven by iCCM interventions but also by vaccines and ITNs as well as increases in birth in facilities

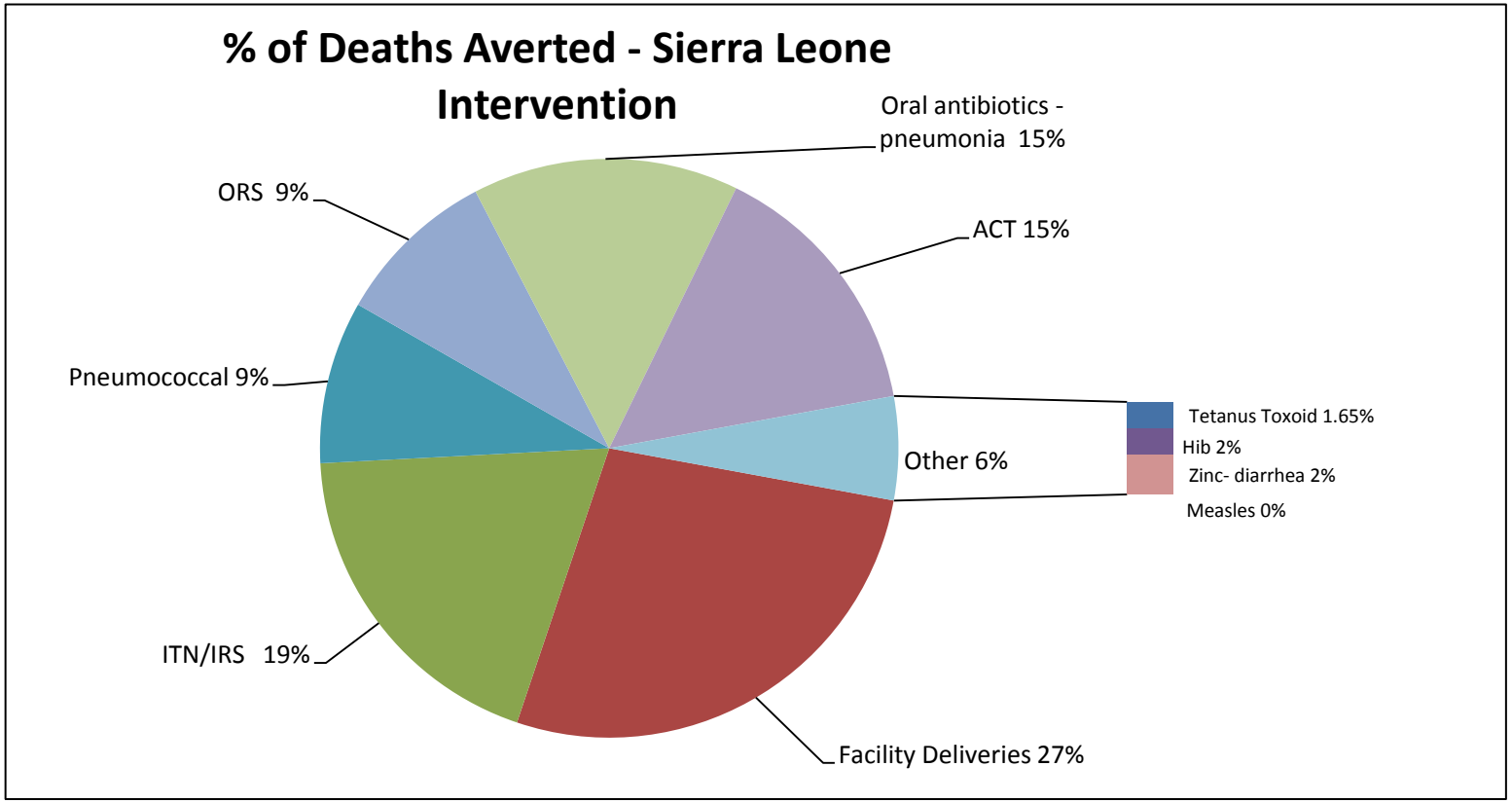
Sierra Leone

- Coverage
  - Both intervention and control areas showed scale up of treatment interventions, but also increases in other interventions, notably ITN ownership as well as introduction and scale up of vaccines
  - In Intervention area LiST estimated a 16% reduction in U5M (75 to 63) while in Control area there was a 22% reduction in U5M (47 to 35)
  - In Intervention area, scale up by service provider
    - ORS coverage increase due to both ICCM and facility,
    - for antibiotics, almost all scale up due to iCCM and
    - for ACT almost all scale up due to facility delivery

Attribution of mortality reduction



Attribution of mortality reduction



Conclusions?

- iCCM *can* result in increases in coverage of key child survival interventions and this can result in reductions in under-five mortality, but
- iCCM is no panacea as in many study sites, coverage of interventions did not increase and mortality did not fall
- One possibility is that in the sites where iCCM seemed to have the biggest impact it seemed to occur in a framework of increased health services that are not directly provided by iCCM programs.

Overall Limitations for LiST Analyses

- For many studies, inability to directly link measured mortality reduction with coverage change
    - Most studies did not collect both baseline and endline measurements of coverage of interventions beyond those provided by iCCM
    - Few studies measured anthropometry and breastfeeding rates at baseline and endline
- Many studies had problems in getting reliable measures of mortality, especially neonatal and early child deaths
- In some studies, large changes/drops in coverage raise the issue of reliability of measurement
- Short time period for most studies and many programs may not have fully implemented their iCCM programs in the study period

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