Nutrition modeling in LiST

February 2019
Birth outcomes

WHA target: 30% reduction in low birth weight
Low birth weight in LiST

- Most surveys (and most targets) use LBW as their metric
  - Typically difficult to collect data on SGA v. preterm

- LiST separates LBW into small-for-gestational-age (SGA) and preterm
  - Each has very different implications for mortality
  - Region-specific ratio between SGA and preterm allows to LiST to calculate prevalence of each based on prevalence of LBW

Low birth weight in LiST

Interventions
- ITN/IRS
- Balanced energy supplementation
- IPTp
- FamPlan module
- Multiple micronutrient supplementation (iron and multiple micronutrients) in pregnancy
- Calcium supplementation

Risk factors
- SGA
- Birth intervals
- Maternal age
- Birth order
- Preterm

Causes of death
- Child (1-59m) mortality - pneumonia
- Child (1-59m) mortality - other causes
- Child (1-59m) mortality - meningitis
- Child (1-59m) mortality - measles
- Child (1-59m) mortality - diarrhea
- Neonatal mortality - asphyxia
- Neonatal mortality - sepsis
- Neonatal mortality - pneumonia
- Neonatal mortality - prematurity
- Child (1-59m) mortality - all causes
- Neonatal mortality - all causes
Birth outcomes can be considered as an intermediary outcome.

Relative risk for low birth weight is impacted by:
- Maternal age
- Birth intervals
- Maternal health status

Birth outcomes as a risk factor

Birth outcomes also directly impact mortality
Breastfeeding

WHA target: increase the rate of exclusive breastfeeding in the first 6 months up to at least 50%
Breastfeeding in LiST

Interventions
- Breastfeeding promotion
- KMC (Kangaroo mother care)

Risk factors
- Early initiation of breastfeeding
- Exclusive and continued breastfeeding
- Diarrhea incidence
- Stunting

Causes of death
- Neonatal mortality - sepsis
- Neonatal mortality - pneumonia
- Neonatal mortality - diarrhea
- Child (1-59m) mortality - pertussis
- Child (1-59m) mortality - pneumonia
- Child (1-59m) mortality - meningitis
- Child (1-59m) mortality - measles
- Child (1-59m) mortality - diarrhea
- Child (1-59m) mortality - other causes
- Neonatal mortality - all causes
- Child (1-59m) mortality - all causes
Breastfeeding in LiST

**Promotion**
- Is an intervention
- Is less commonly measured
- Impacts mortality through changes in breastfeeding behavior
- Effectiveness studies exist relating breastfeeding promotion to age-appropriate breastfeeding

**Behavior**
- Is not an intervention
- Measured in surveys
- Directly impacts cause-specific mortality
  - NN diarrhea, pneumonia, sepsis
  - U5 diarrhea, pneumonia, meningitis, measles and pertussis

LiST: The Lives Saved Tool
Breastfeeding in LiST - promotion

- Only have the option of entering single value for breastfeeding promotion

- Can be delivered through:
  - Health system promotion
  - Home/community promotion

- LiST then calculates coverage of (for each age group):
  - Exclusive breastfeeding
  - Predominant breastfeeding
  - Partial breastfeeding
  - Not breastfeeding

- Odds ratios are available in: Effectiveness of interventions -> Breastfeeding
Breastfeeding in LiST - prevalence

- LiST calculates impact on cause-specific mortality directly (for neonatal and post-neonatal)
  - Diarrhea
  - Pneumonia
  - Meningitis
  - Measles
  - Pertussis

- LiST also calculates the impact of breastfeeding on diarrhea incidence, and then cause-specific mortality based on relative risk
Impact of BF behavior on incidence

Scale up BF behavior → LiST calculates impact on diarrhea incidence based on these RRs
Wasting
Wasting in LiST

Interventions

- Treatment for SAM
- Treatment for MAM
- Complementary feeding - supplementary feeding and education

Risk factors

- Wasting

Causes of death

- Child (1-59m) mortality - pneumonia
- Child (1-59m) mortality - other causes
- Child (1-59m) mortality - meningitis
- Child (1-59m) mortality - measles
- Child (1-59m) mortality - diarrhea
- Child (1-59m) mortality - all causes
Wasting in LiST

- LiST calculates impact on cause-specific mortality directly (for each age groups)
  - Diarrhea
  - Pneumonia
  - Meningitis
  - Measles
  - Pertussis

- LiST also calculates the impact wasting on cause-specific mortality based on relative risk
Effectiveness of nutrition interventions on wasting

- LiST calculates impact on cause-specific mortality directly (for each age groups)
  - Therapeutic feeding – severe acute malnutrition recovery rate
  - Moderate acute malnutrition recovery rate
  - Impact of complementary feeding on wasting differs depending on category:
    - Food secure with promotion
    - Food secure without promotion
    - Insecure with promotion and supplementation
    - Insecure with neither promotion nor supplementation
Diarrhea incidence
Impact of interventions on diarrhea incidence
Impact of interventions on diarrhea incidence

### Effectiveness of interventions on incidence

<table>
<thead>
<tr>
<th></th>
<th>&lt; 1 month</th>
<th>1-5 months</th>
<th>6-11 months</th>
<th>12-23 months</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Preventive</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Improved water source</td>
<td>0.17</td>
<td>1.00</td>
<td>0.17</td>
<td>1.00</td>
</tr>
<tr>
<td>Water connection in the home</td>
<td>0.63</td>
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<td>0.63</td>
<td>1.00</td>
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<tr>
<td>Improved sanitation - Utilization of latrines or toilets</td>
<td>0.36</td>
<td>1.00</td>
<td>0.36</td>
<td>1.00</td>
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<tr>
<td>Hand washing with soap</td>
<td>0.48</td>
<td>1.00</td>
<td>0.48</td>
<td>1.00</td>
</tr>
<tr>
<td>Hygienic disposal of children’s stools</td>
<td>0.20</td>
<td>1.00</td>
<td>0.20</td>
<td>1.00</td>
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<tr>
<td>Zinc supplementation</td>
<td>0.00</td>
<td>0.18</td>
<td>0.00</td>
<td>0.18</td>
</tr>
<tr>
<td>Vitamin A supplementation</td>
<td>0.00</td>
<td>0.42</td>
<td>0.00</td>
<td>0.42</td>
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<tr>
<td><strong>Vaccines</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rotavirus vaccine</td>
<td>0.00</td>
<td>1.00</td>
<td>0.00</td>
<td>0.27</td>
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<tr>
<td>Diarrheal vaccine pathogen B</td>
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<td>0.28</td>
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<tr>
<td>Diarrheal vaccine pathogen C</td>
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<td>1.00</td>
<td>0.12</td>
<td>0.00</td>
</tr>
<tr>
<td><strong>Impacts on severe diarrhea incidence</strong></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rotavirus vaccine</td>
<td>0.00</td>
<td>1.00</td>
<td>0.50</td>
<td>1.00</td>
</tr>
</tbody>
</table>

### Risk of diarrhea incidence at different levels of breastfeeding

<table>
<thead>
<tr>
<th></th>
<th>&lt; 1 month</th>
<th>1-5 months</th>
<th>6-11 months</th>
<th>12-23 months</th>
<th>24-59 months</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exclusive breastfeeding</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
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<tr>
<td>Predominant breastfeeding</td>
<td>1.26</td>
<td>1.26</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
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<tr>
<td>Partial breastfeeding</td>
<td>1.66</td>
<td>1.66</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
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<tr>
<td>Not breastfeeding</td>
<td>2.65</td>
<td>2.65</td>
<td>2.07</td>
<td>2.07</td>
<td>1.00</td>
</tr>
</tbody>
</table>
Direct entry of stunting and wasting
Understanding “direct entry”

If stunting and/or wasting coverage values are available, they can be entered directly.

LiST treats them as interventions.
“Stunting” and “Wasting” tabs appear in the software, and coverage data can be entered directly in the software.
Link between nutrition interventions with impact on mortality via stunting or wasting is ‘broken’

Two options to enter stunting or wasting data:

- **Single indicator for stunting (or wasting)**
  - LiST automatically calculates the stunting/wasting severity distribution, per age cohort

- **Detailed indicators for stunting (or wasting)**
  - Users provide coverage data for the stunting/wasting severity distribution, per age cohort

Note: in the case of stunting, zinc can still be edited because it has pathways to mortality other than via stunting
Changes in mortality are attributed to changes in stunting or wasting prevalence (i.e. lives saved by decreasing stunting or wasting prevalence)
Direct entry:

- User does not have option to enter data on stunting or wasting distribution
- Changes in stunting and wasting distribution are calculated based on changes in coverage of interventions linked to stunting and wasting, respectively
Direct entry:  

Lives saved will be listed by intervention instead of in a stunting or wasting category.

Can see changes in stunting or wasting distribution (due to changes in intervention coverage).
Conclusions
Additional features

- Birth outcomes
- Percentage of children stunted
- Number of stunted children
- Percentage of children wasted
- Global stunting rate
- Global wasting rate
- Number of stunting cases averted
- Number of stunting cases averted by intervention
- Breastfeeding prevalence
- Percent of children (<6mo) exclusively breastfed
- Prevalence of early initiation of breastfeeding
- Percent of women with anemia
- Number of women with anemia
- Number of anemia cases prevented
Additional features

Tools

Missed opportunities

Cases of stunting averted, Benin, 2018
Default data

Intervention type
- All
- Periconceptual
- Pregnancy
- Childbirth

Country
Benin

Result to display
Cases of stunting averted

Sort data by
Value

Cases of stunting averted
Challenges

- Lack of data on many key nutrition interventions
- Not all interventions are being implemented at public health scale (e.g. calcium supplementation)
- Incomplete understanding of link between promotion and practice
- Difficulty of interpreting wasting numbers
What’s not in the model

- Deworming
- Nutrition-sensitive interventions (agriculture, home gardens, etc.)
- Salt iodization

→ Mostly due to lack of data for effect size