Access to Electricity and Obstetric Care
Laura Stachel, MD MPH
Greater uptake of skilled care by mothers
Improved health worker morale & confidence
Improved capacity to provide obstetric care
Reduced delays – prompt c/sections
Accurate fetal heart rate monitoring
Timely referrals

BEFORE Solar Suitcase

• Fear of night duty
• Difficulty with diagnosis and treatment
• Difficulty monitoring fetal well-being
• Emergency communication hindered
• Delayed and cancelled procedures including cesarean sections
• Safety concerns

AFTER Installation

• Greater uptake of skilled care by mothers
• Improved health worker morale & confidence
• Improved capacity to provide obstetric care
• Reduced delays – prompt c/sections
• Accurate fetal heart rate monitoring
• Timely referrals
### Solar Suitcase Programs with Multiple Interventions

<table>
<thead>
<tr>
<th>Country</th>
<th>Maternal Mortality</th>
<th>Perinatal Mortality</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Uganda</strong> (Amref)</td>
<td>↓ 53%</td>
<td>↓ 73%</td>
</tr>
<tr>
<td><strong>Tanzania</strong> (Pathfinder)</td>
<td>↓ 40%</td>
<td>↓ 46%</td>
</tr>
<tr>
<td><strong>Nigeria</strong> (Pathfinder)</td>
<td>↓ 55%</td>
<td>↓ 40%</td>
</tr>
</tbody>
</table>

- **Uganda (Amref)**: 100 facilities, Saving Lives at Birth 2013 - 2016
- **Tanzania (Pathfinder)**: 78 Facilities, Mobilizing Maternal Health Project 2014 – 2017
- **Nigeria (Pathfinder)**: 60 Facilities, Cross River State Program Saving Mothers Giving Life 2017-2018
RCT in Uganda

• Third party research lead by Innovations for Poverty Action and Harvard School of Public Health
• Funded by UBS Optimus Foundation
• Stepped wedge cluster-randomized control trial in 30 maternity care facilities in rural Uganda that lack access to reliable lighting
  • Facilities randomized into one of two groups of 15 facilities
  • Timing of implementation staggered → All facilities eventually receive the Solar Suitcase
  • All are observed before and after intervention
# Design and Data Collection Methods

<table>
<thead>
<tr>
<th>Primary Outcomes</th>
<th>(1) Reliability and quality of light during intrapartum care</th>
<th>(2) Quality of obstetric and newborn care</th>
<th>(3) Health worker satisfaction</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Installed light sensors</td>
<td>• Direct clinical observations by trained enumerators</td>
<td>• Health worker survey</td>
</tr>
<tr>
<td></td>
<td>• Light and electricity observation</td>
<td>• Facility survey</td>
<td></td>
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<tr>
<td>Secondary Outcome</td>
<td>(4) Facility volumes (# deliveries, deaths, ANC visits, etc.)</td>
<td></td>
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<td></td>
<td>• Quarterly visits to facilities to collect HMIS data</td>
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</tbody>
</table>
Enroll facilities meeting eligibility criteria

Randomization at facility level

Group 1

Baseline: 4-6 weeks
Assessments: Delivery observations, Health Worker Survey, Facility Survey, Light and electricity observations

Solar Suitcase Installation and exposure period: 6 weeks

Midline: 4-6 weeks
Assessments: Delivery observations, Health Worker Survey, Facility Survey, Light and electricity observations

Endline: 4-6 weeks
Assessments: Delivery observations, Health Worker Survey, Facility Survey, Light and electricity observations

Facility registry data: every 3 months for one year
Implementation Challenges

• Government selected districts: Hard to find facilities meeting all eligibility criteria → Delayed start of project
• Observations did not always verify study eligibility
• Confounding variables
• RCT as part of the Light Every Birth Initiative
Limitations

• Randomized Design
• Direct Clinical Observations and time stamping for delays rather than self-report
• Detailed observation tool
• Objective and Subjective Light Assessments

Strengths

• Limited Number of Facilities
• Rural Ugandan health facilities only
• Not examining surgical care and complicated labors
Baseline Data

- 30 facilities; 73% HC IIIs, 17% HC IIs, 10% HClIVs
- 37% grid connection; 23% solar; 40% no electricity
- 419 observations of labor and delivery
- 43% exclusively night observations, 21% daytime, and 36% combine night and day
- 59% of health workers rated availability of light as poor/very poor
- Baseline quality of care: An average of 45% of essential items were performed
- Without good lighting, episiotomy repair delayed