Two Major Choices When Experimental Design is not Feasible

• Cross-Sectional vs. Longitudinal Data

• Repeated cross-sectional data measures outcomes at the population level at multiple time points

• Example: Did contraceptive prevalence change between baseline and endline for representative samples?

This tells us the **what**…. But not the **why**
Challenges with Cross-Sectional Data

The **why** is not easy to answer with just cross-sectional data:

- **Nonrandom program placement**
  - E.g. Outreach only in poor areas

- **Recall of exposure correlated with unobserved characteristics of respondents**
  - E.g. More motivated women may be more likely to recall exposure and may be more likely to act on message
The Power of Longitudinal Data

Longitudinal data overcomes both problems: Each woman serves as her own control
  - Approximates pre-test/post-test experimental design

With longitudinal data, impact evaluation is straightforward:
  - Can measure behavioral change for each respondent as a function of program exposure change with controls for other factors that may have changed
Household Survey Study Design in Nigeria

**Baseline data (2010/2011):**

Representative cross-sections from each city

Focus: *Four initial intervention cities* (Abuja, Ibadan, Ilorin, Kaduna), and *two delayed intervention cities* (Benin City, Zaria)

**Endline data (2014):**

**Longitudinal:** Tracked and interviewed all eligible baseline respondents in six original cities
## Women Tracking Results from Endline

<table>
<thead>
<tr>
<th>City</th>
<th>Percent of eligible women found during tracking</th>
<th>Percent of eligible women found and interviewed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abuja</td>
<td>67.0</td>
<td>63.0</td>
</tr>
<tr>
<td>Benin City</td>
<td>57.7</td>
<td>52.8</td>
</tr>
<tr>
<td>Ibadan</td>
<td>63.0</td>
<td>58.6</td>
</tr>
<tr>
<td>Ilorin</td>
<td>75.1</td>
<td>69.7</td>
</tr>
<tr>
<td>Kaduna</td>
<td>74.6</td>
<td>70.0</td>
</tr>
<tr>
<td>Zaria</td>
<td>83.2</td>
<td>79.5</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>70.7</strong></td>
<td><strong>66.2</strong></td>
</tr>
</tbody>
</table>
MLE Approach for Facilities in Nigeria

Census of PUBLIC FACILITIES

Census of facilities where NURHI IMPLEMENTED ACTIVITIES

Census/Sample of PHARMACIES and PMS

Census of PRIVATE FACILITIES mentioned by women at baseline

Total Facility Sample
NURHI facilities: N= 132
Non-NURHI facilities: N= 253
Pharmacies: N= 433
PMS: N= 540

Note: Only facilities that provide at least one reproductive health service were included.
Facility Survey Study Design in Nigeria

**Baseline (2011):**
- Facility Audit
- Provider interviews
- Client exit interviews
- Pharmacy/PMS audit

**Endline (2014):**
- Facility Audit
- Provider interviews
- Client exit interviews
- Pharmacy/PMS audit
Types of Analyses

Longitudinal examination of trends over time for women

Impact analysis

Facility-level analysis

Relative cost-effectiveness
Types of Analyses

Longitudinal examination of trends

Impact analysis using longitudinal data to examine the effect of exposure to demand and supply activities on modern FP use

Facility-level analysis

Relative cost-effectiveness analysis
Types of Analyses

Longitudinal examination of trends

Impact analysis

*Facility-level analysis* to examine changes observed in NURHI and non-NURHI facilities over time

Relative cost-effectiveness analysis
Types of Analyses

Longitudinal examination of trends

Impact analysis

Facility-level analysis

Relative cost-effectiveness analysis to compare significant program variables from impact analysis
Patterns of Family Planning Use
The Outcome: Percent Current Modern Method Use at Baseline (2010/2011) and Endline (2014) Among All Women

Abuja: Baseline 30%, Endline 38%
Ibadan: Baseline 29%, Endline 39%
Ilorin: Baseline 21%, Endline 33%
Kaduna: Baseline 17%, Endline 29%
Benin City: Baseline 25%, Endline 29%
Zaria: Baseline 5%, Endline 20%
Modern Contraceptive Method Use by Age among Women Aged 20-49: Delayed Intervention Cities

Benin City

Zaria

Baseline 2010/2011   Endline 2014
% Modern Contraceptive Method Use Among All Women by Wealth Quintile at Baseline and Endline

- Abuja:
  - Poorest: 22% (Baseline), 40% (Endline)
  - Richest: 32% (Baseline), 46% (Endline)

- Ibadan:
  - Poorest: 25% (Baseline), 36% (Endline)
  - Richest: 28% (Baseline), 37% (Endline)

- Ilorin:
  - Poorest: 17% (Baseline), 28% (Endline)
  - Richest: 20% (Baseline), 36% (Endline)

- Kaduna:
  - Poorest: 12% (Baseline), 22% (Endline)
  - Richest: 16% (Baseline), 25% (Endline)
Method Change Between Baseline and Endline among Women Aged 15-49, Six Urban Areas, Nigeria

- **Discontinued Modern Method**: 10.3%
- **Continued Nonuse/Traditional Use**: 57.9%
- **Continued Modern Method Use**: 11.0%
- **Adopted Modern Method**: 20.8%
Impact Evaluation Methods and Results
Multivariable Methods

• *Repeated* measures for *same* individual allows *investigation of change* in both dependent and independent variables for each individual

• *Fixed effect* multivariable models
  
  Does change in program exposure over time cause change in modern contraceptive?
Exposure to NURHI Demand and Supply and Activities at Endline

<table>
<thead>
<tr>
<th>Activity</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>FP messages on TV</td>
<td>60%</td>
</tr>
<tr>
<td>NURHI radio programs</td>
<td>75%</td>
</tr>
<tr>
<td>NURHI community outreach/events</td>
<td>33%</td>
</tr>
<tr>
<td>NURHI provider badge</td>
<td>26%</td>
</tr>
<tr>
<td>NURHI print media</td>
<td>38%</td>
</tr>
<tr>
<td>NURHI health facility (within 1km)</td>
<td>46%</td>
</tr>
<tr>
<td>IEC program at health facility (within 1km)</td>
<td>71%</td>
</tr>
<tr>
<td>FP outreach program at health facility (within 1km)</td>
<td>53%</td>
</tr>
<tr>
<td>Stock-out(s) in last 30 days (within 1km)</td>
<td>33%</td>
</tr>
</tbody>
</table>
## Endline Impact Evaluation Models

<table>
<thead>
<tr>
<th>Variable</th>
<th>Marginal effects of 100% program exposure on modern FP use</th>
</tr>
</thead>
<tbody>
<tr>
<td>FP messages on TV</td>
<td>1.98*</td>
</tr>
<tr>
<td>NURHI radio programs</td>
<td>4.28***</td>
</tr>
<tr>
<td>NURHI community outreach/events</td>
<td>3.48***</td>
</tr>
<tr>
<td>NURHI provider badge</td>
<td>3.24*</td>
</tr>
<tr>
<td>NURHI print media</td>
<td>-0.31</td>
</tr>
<tr>
<td>NURHI health facility (within 1km)</td>
<td>1.31*</td>
</tr>
<tr>
<td>IEC program at health facility (within 1km)</td>
<td>0.79</td>
</tr>
<tr>
<td>FP outreach program at health facility (within 1km)</td>
<td>2.66**</td>
</tr>
<tr>
<td>Stock-out(s) in last 30 days (within 1km)</td>
<td>0.06</td>
</tr>
</tbody>
</table>

***p ≤ 0.001; **p ≤ 0.01; *p ≤ 0.05; +p ≤ 0.10
Nigeria Impact Findings (percent increase in CPR with 100% exposure)

- FP messages on TV: 1.98*
- NURHI radio programs: 4.28***
- NURHI community outreach/events: 3.48***
- NURHI provider badge: 3.24*
- NURHI health facility (within 1km): 1.31*
- IEC program at health facility (within 1km): 0.79
- FP outreach program at health facility (within 1km): 2.66**

*p<0.05, **p<0.01, ***p<0.001.
Facility-Level Analyses
## Number of FP Methods Provided at Baseline and Endline in Kaduna

<table>
<thead>
<tr>
<th>Number of Facilities</th>
<th>Baseline NURHI (%)</th>
<th>Baseline non-NURHI (%)</th>
<th>Endline NURHI (%)</th>
<th>Endline non-NURHI (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No methods</td>
<td>0.0</td>
<td>6.9</td>
<td>0.0</td>
<td>11.5</td>
</tr>
<tr>
<td>1-3 methods</td>
<td>25.0</td>
<td>43.1</td>
<td>0.0</td>
<td>14.8</td>
</tr>
<tr>
<td>4-6 methods</td>
<td>50.0</td>
<td>34.7</td>
<td>22.7</td>
<td>37.7</td>
</tr>
<tr>
<td>7+ methods</td>
<td>25.0</td>
<td>15.3</td>
<td>77.3</td>
<td>36.1</td>
</tr>
<tr>
<td>Number of facilities</td>
<td>20</td>
<td>72</td>
<td>22</td>
<td>61</td>
</tr>
</tbody>
</table>
NURHI Program Activities at Facilities at Endline – Ibadan

Provider Exposure to NURHI Program Activities at MLE Endline 2014, Ibadan

- 21% Member of FPPN*
- 32% Received NURHI FP in-service training
- 50% Received NURHI ISS** visit
NURHI Program Activities at Facilities at Endline – Abuja

Integration of FP Services Among Reproductive Health Clients by Service Type, Abuja

- Received FP info during child health visit: 66%
- Received FP info during antenatal care: 60%

MLE Endline 2014  MLE Baseline 2010/2011
NURHI Program Activities at Facilities at Endline – Ilorin

Facility Exposure to NURHI Program Activities at MLE Endline 2014, Ilorin

- Have FP health outreach program: 64% NURHI facility, 35% non-NURHI facility
- Have 4+ contraceptive methods available: 100% NURHI facility, 86% non-NURHI facility
- Stock out of IUDs, implants or injectables in the past 30 days*: 0% NURHI facility, 10% non-NURHI facility

*Note: The asterisk indicates that the data for non-NURHI facilities is the stockout rate in the past 30 days.
Cost-Effectiveness Analyses

- MLE also undertook a cost-effectiveness analysis
- Collected costs by key activities
- Results of impact models, exposure levels and cost used to determine cost-effectiveness of significant activities
  - Step 1: determine impact (i.e., effects shown times exposure)
  - Step 2: determine relative cost and relative impact
  - Step 3: relate the two
Cost-Effectiveness - Nigeria

Table 1: Cost and relative cost effectiveness for NURHI program measures in six cities

<table>
<thead>
<tr>
<th>Intervention</th>
<th>Cost (USD)</th>
<th>Effectiveness</th>
<th>Relative Cost Effectiveness</th>
</tr>
</thead>
<tbody>
<tr>
<td>TV</td>
<td>$3,674,851</td>
<td>.012239*</td>
<td>0.4719</td>
</tr>
<tr>
<td>Radio</td>
<td>$2,833,443</td>
<td>.0356262***</td>
<td>1.7816</td>
</tr>
<tr>
<td>Community event</td>
<td>$1,785,197</td>
<td>.0125986**</td>
<td>1.0000</td>
</tr>
<tr>
<td>Supply Side</td>
<td>$8,617,819</td>
<td>.0110434*</td>
<td>0.1816</td>
</tr>
</tbody>
</table>

Note: All results are unweighted; +p<0.10, *p<0.05, **p<0.01, ***p<0.001
Summary of Results

• **IE analysis:** Significant results for demand and supply variables
  – Demand-side: Television, radio, community event, NURHI badge
  – Supply-side: Exposure to NURHI facilities and access to FP outreach within 1KM

• **Facility-level:** Large improvements in NURHI facilities in terms of supply and training

• **Cost-Effectiveness:** Radio program is most cost-effective activity followed by community events
Conclusion

• Results indicate the importance of comprehensive programs to influence FP uptake in these urban areas

• Findings can be used to inform scale-up and sustainability for FP programs in urban Nigeria and elsewhere in Nigeria
Thank you!

www.urbanreproductivehealth.org
## NURHI Program Exposure Variables

<table>
<thead>
<tr>
<th>Category</th>
<th>Exposure measure</th>
<th>Exposure components</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Demand</strong></td>
<td>FP messages on TV</td>
<td>• Heard FP messages on TV in the last three months(^1)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Ever heard of or listened to NURHI radio dramas</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Ever heard radio drama played at a meeting</td>
</tr>
<tr>
<td></td>
<td>NURHI radio</td>
<td>• Ever heard a NURHI slogan on a radio drama(^2)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Ever heard a NURHI radio spot/jingle(^3)</td>
</tr>
<tr>
<td></td>
<td>NURHI community outreach</td>
<td>• Heard FP info at any life event(^4)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Heard FP at a group or club meeting</td>
</tr>
<tr>
<td></td>
<td>NURHI provider badge</td>
<td>• Seen a provider wearing a badge/button “Ask me about FP” in the last year</td>
</tr>
<tr>
<td></td>
<td>NURHI print media</td>
<td>• Saw “Be Beautiful” card in the past year</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Saw “Be Successful” card in the past year</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Saw any NURHI slogan on a billboard in the past year</td>
</tr>
<tr>
<td><strong>Supply</strong></td>
<td>NURHI health facility</td>
<td>• Number of NURHI facilities within 1km of the woman</td>
</tr>
<tr>
<td></td>
<td>IEC program at health facility</td>
<td>• Presence/absence of observed IEC materials at least one health facility within 1km of the woman</td>
</tr>
<tr>
<td></td>
<td>FP outreach program at health facility</td>
<td>• Presence/absence of a health facility with an FP outreach program within 1km of the woman</td>
</tr>
<tr>
<td></td>
<td>Stock-out(s) of modern FP method in last 30 days</td>
<td>• Presence/absence of a stock-out of any modern FP method in the last 30 days at any facility within 1km of the woman</td>
</tr>
</tbody>
</table>