Cluster Sampling: Examples from the field
Definition of terms

- Who do you want to generalize to/understand?
  - Theoretical Population
- What population can you get access to?
  - Study Population
- How can you get access to them?
  - Sampling Frame
- Who is in your study?
  - Sample
Sampling methods

Random Sampling
- Simple Random Sample
- Stratified Sample
- Cluster Random Sample
- Multi-Stage Sample

Non-Random Sampling
- Convenience Sample
- Purposive Sample
  - Maximum Variation Sample
  - Criterion Sample
  - Snowball Sample
Sampling methods

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Sampling methods

Random Sampling

Simple Random Sample

Stratified Sample

Cluster Random Sample

Multi-Stage Sample

Ex: Randomly select 50 people from a population of 200
Sampling methods

Random Sampling
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**Ex:** Randomly select 5 boys and 5 girls from the population
Sampling methods

Random Sampling
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- Multi-Stage Sample

Ex: Randomly select 3 schools from the population, then sample all students in each school
Sampling methods

**Random Sampling**
- Simple Random Sample
- Stratified Sample
- Cluster Random Sample
- Multi-Stage Sample

**Ex:** Randomly select 3 schools from the population, then sample 6 students in each school (Two-stage sampling)
Sampling techniques: How to draw a random sample

- Lottery/drawing lots
- Random number generator
- Random selection from a list
Random selection: Lottery

• Drawing a name from a hat/bowl/etc.

• **Example:** Names of all eligible districts are put into a bowl, and 2 names are randomly chosen. All schools in these districts will receive new libraries with collection of books for young children.
Random selection: Random number generator

- Use of Excel or some other technology to randomly allocate numbers to a list of eligible participants

Example: All schools in the target district are put on a list, each given a random number. The schools with the 5 highest numbers are chosen for the study sample.

What happens if some of the schools in the district become ineligible for the study before work begins?
Random selection: Drawing from a list

• Create a list of all eligible participants and select every Nth name

• Example: Ask all girls in a classroom to stand up, write their names on a list, select each 5th girl for participation in the study. Repeat the process for boys in the classroom.

Who can you generalize your results to?
Case study: Improving ECE quality in Ethiopia

Early Literacy and Math (ELM)
- Improving classroom quality through more play-based learning and child-centered teaching methods
- Provides bank of 50 literacy and 50 math games to add to daily curriculum
- Creating learning materials from local sources

Case study: Improving ECE quality in Ethiopia

- Study population (36 schools)
  - ELM Intervention (18 schools)
  - Control (Status-quo ECE) (18 schools)
  - No ECE (2 communities)

Wrote all school names on a list and chose every other for the intervention group
Case study: Improving ECE quality in Ethiopia

Study population (36 schools)

- ELM Intervention (18 schools)
  - 180 children

- Control (Status-quo ECE) (18 schools)
  - 180 children

- No ECE (2 communities)

Stratified by age & randomly chose 5 5-year-olds and 5 6-year-olds using teacher class list
Case study: Improving ECE quality in Ethiopia

Figure 1. Language Domain: average baseline and gain by group (% of 86 correct)

*gain significantly greater than comparison group at p<.05
**gain significantly greater than ECCD group at p<.05
Case study: ECE for all in Bhutan
Case study: ECE for all in Bhutan

Children in urban areas display stronger cognitive development than children in rural areas

<table>
<thead>
<tr>
<th>Category</th>
<th>Rural %</th>
<th>Urban %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motor</td>
<td>21%</td>
<td>36%</td>
</tr>
<tr>
<td>Math</td>
<td>24%</td>
<td>33%</td>
</tr>
<tr>
<td>Literacy</td>
<td>13%</td>
<td>23%</td>
</tr>
<tr>
<td>Social-emotional</td>
<td>19%</td>
<td>28%</td>
</tr>
<tr>
<td>IDELA</td>
<td>23%</td>
<td>35%</td>
</tr>
</tbody>
</table>
Case study: ECE for all in Bhutan

Care for Child Development (C4CD)
- Implemented at health centers throughout Bhutan
- Health, hygiene and stimulation practices for children and families

Early Literacy and Math (ELM)
- Used by ECCD programs throughout Bhutan
- Teaching parents how to engage in pre-literacy and math skills with their children at home

C4CD Plus
- C4CD + ELM for holistic development of 3-5 year old children
- 9 sessions (7 ELM + 2 Health & Hygiene) delivered by HA/VHWs in communities without ECCD centers
Case study: ECE for all in Bhutan

• Cluster Random Sample
  • 4 districts chosen (Haa, Lhuentse, Zhemgang, Tsirang)
    • Selected based on lack of ECCD center programming and presence of health workers
  • Sub-districts randomly selected for intervention/control groups
  • Health unit service areas within each sub-district randomly selected for inclusion in the study
• All children ages 3, 4 and 5 living in selected Chiwogs were eligible to participate in study
Case study: ECE for all in Bhutan

C4CD Plus associated with stronger cognitive development

Effect size

Motor | Literacy*** | Numeracy** | Social-emotional | IDELA**

*p < .05  **p < .01  ***p < .001
Checking for Bias

During sample selection
- List of possible study sites does not include all sites in study population or includes extra sites that are ineligible (Selection bias)
- Methods for selecting study sample are not truly random, for example some sites are chosen for convenience or political reasons

During data collection
- If assessors know which groups are intervention/control they could potentially bias results of study (Assessor bias)

After initial data collection
- Dropout of study participants over time makes the effect of treatment appear larger than it is (Attrition bias)