Health inequality monitoring: with a special focus on low- and middle-income countries

Lecture 3: Data sources

World Health Organization
Data collection infrastructure

• Ideally, data should come from an information-producing system that:
  – has strong legitimacy
  – has high-level political support
  – is transparent
  – includes policy, technical, academic and civil society constituencies
Data source types

All data for health inequality monitoring

- Surveillance systems
- Population-based sources
- Censuses
- Vital registration systems
- Household surveys
- Resource records (e.g. number of hospitals)
- Service records (e.g. number of immunizations provided)
- Individual records (e.g. hospital charts)
Population-based sources: censuses

• National population and household censuses are implemented every 10 years in most countries
• Data cover the entire population (or nearly so), providing accurate denominator counts for population subgroups
• Censuses may be a good source of information about equity stratifiers, but usually contain only limited information on health
• Possible improvements:
  – include individual or small-area identifiers
  – include mortality and cause of death questions
Population-based sources: vital registration systems

• For example, national birth or death registries
• These systems are the best and most-reliable source for fertility, mortality, life expectancy and cause-of-death statistics
• Vital registration systems can often be linked to information on sex, geographical region, occupation, education
• Incomplete in many low- and middle-income countries
• Possible improvements:
  – Expand coverage
  – Include cause of death, birth weight and gestational age
  – Include at least one socioeconomic indicator
Global status of vital registration systems

• In 2009...
  – only 25% of the world population lived in countries where at least 90% of births and deaths are registered
  – only 34 countries (representing 15% of the global population) had high-quality cause-of-death data
  – 74 countries lacked data altogether about births and deaths
  – In the WHO African Region 42 out of 46 countries had no death registration data

Population-based sources: household surveys

- Currently the most common and overall most reliable data source for health inequality monitoring in low- and middle-income countries
- Data are representative for a specific population (often national)
- Have rich data on a specific health topic as well as living standards and other complementary variables
- Often repeated over time, allowing for measurement of time trends
- Conducted in multiple countries, allowing for benchmarking
- Sampling and non-sampling errors can be important
- Survey may not be representative of small subpopulations of interest
- Possible improvements:
  - Repeat surveys on a regular basis
  - Enhance comparability over time and between countries by harmonizing survey questions
  - Increase sample sizes
## Examples of multinational household survey programmes

<table>
<thead>
<tr>
<th>Survey name</th>
<th>Organization</th>
<th>Website</th>
</tr>
</thead>
</table>
Data availability in low- and middle-income countries

- Household surveys are the main data source in many low- and middle-income countries.
- Health inequality monitoring in low- and middle-income countries is limited to the health indicators for which data are available.
  - Often outcome or impact indicators.
- Certain health topics may be challenging to monitor, particularly those related to inputs and processes and outputs, which are usually collected from institution-based sources.
Institution-based data sources

• Data are readily and quickly available
• Can be used at lower administrative levels (e.g. district level)
• Data may be fragmented or of poor quality
• Often data cannot be linked to other sources
• Data may not be representative of the whole population
• Possible improvements:
  – Include individual or small-area identifiers
  – Standardize electronic records across institutions
Surveillance systems

- Can provide detailed data on a single condition or from selected sites
- Data may be useful for correction of over- or under-reporting
- Not always representative of population
- Some systems may collect little information relevant to equity stratifiers
- Possible improvements:
  - Include individual or small-area identifiers
  - Integrate surveillance functionality into larger health information systems with full coverage
Types of surveillance systems

• **Outbreak disease surveillance**
  – aims to track cases of epidemic-prone diseases as well as their risk factors
  – often relies on frequent reporting by health facilities, such as laboratories

• **Sentinel surveillance**
  – uses a sample of clinics for intensified monitoring
  – is used by disease programmes such as HIV and malaria

• **Risk factor surveillance**
  – describes data collection and analysis in noncommunicable disease monitoring
  – often focuses on data obtained through surveys

• **Demographic surveillance**
  – found in many low- and middle-income countries
  – sites have a longitudinal birth and death registration system for a local population to collect information about cause of death and other health-related data
Data source mapping

• Involves cataloguing and describing all data sources available for a given country, province, district or other administrative unit to determine which sources can be used for health inequality monitoring.

• Can also identify important gaps that indicate where a country lacks data about health indicators or equity stratifiers.

• Consists of four steps.
# Data source mapping: step 1

## List of data sources by type (partial table)

<table>
<thead>
<tr>
<th>Data source type</th>
<th>Data source</th>
<th>Year(s) of data collection</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Census</td>
<td>National census</td>
<td>1990, 2000, 2010</td>
<td></td>
</tr>
<tr>
<td>Administrative</td>
<td>Immunization records</td>
<td>2000–2006</td>
<td>Annual collection</td>
</tr>
</tbody>
</table>

Note: DHS = Demographic and Health Survey
Data source mapping: step 2

List of data sources and equity stratifiers (partial table)

<table>
<thead>
<tr>
<th>No.</th>
<th>Data source and year</th>
<th>Equity stratifier</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Sex</td>
<td>Wealth</td>
</tr>
<tr>
<td>1</td>
<td>Immunization records 2000–2006</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>2</td>
<td>DHS 2009</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>3</td>
<td>DHS 2004</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>...</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Data source mapping: step 3

### List of health topics and corresponding data sources (partial table)

<table>
<thead>
<tr>
<th>Health topic</th>
<th>Data source number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Child health</td>
<td>1 2 3 ...</td>
</tr>
<tr>
<td>Maternal health</td>
<td>2 3 ...</td>
</tr>
<tr>
<td>...</td>
<td></td>
</tr>
</tbody>
</table>
## Data source mapping: step 4

### Data source map (partial table)

<table>
<thead>
<tr>
<th>Health topic</th>
<th>Equity stratifier</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sex</td>
</tr>
<tr>
<td></td>
<td>Wealth</td>
</tr>
<tr>
<td></td>
<td>Place of residence</td>
</tr>
<tr>
<td></td>
<td>Province or region</td>
</tr>
<tr>
<td>Child health</td>
<td>2, 3 ...</td>
</tr>
<tr>
<td>Maternal health</td>
<td>Not applicable</td>
</tr>
<tr>
<td></td>
<td>2 ...</td>
</tr>
<tr>
<td></td>
<td>2, 3 ...</td>
</tr>
<tr>
<td></td>
<td>1, 2, 3 ...</td>
</tr>
<tr>
<td></td>
<td>2, 3 ...</td>
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<tr>
<td></td>
<td>2, 3 ...</td>
</tr>
<tr>
<td>...</td>
<td></td>
</tr>
</tbody>
</table>
Overcoming data unavailability

• If a country wishes to monitor a priority health topic or indicator for which there are currently no data available, immediate analysis is not possible
  – Advocating for the collection of additional data may enable analysis and monitoring in the future

• Strengthening, modifying or expanding existing data sources may be feasible options to generate new information
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Full text available online:

http://apps.who.int/iris/bitstream/10665/85345/1/9789241548632_eng.pdf