Epidemiological Transitions in Maternal and Child Health in Peru: 1990-2013

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Objective

- To analyze epidemiological transitions in **maternal and child health** in Peru
  - 1990 to 2013
  - Progress towards Millenium Development Goals 4 and 5 established by the **United Nations**.
Background
Peru

- Peru is a member state of PAHO/WHO Americas Region
- Total population
  - 30,147,935
  - 77% living in urban areas
- GNI per capita based on PPP
  - $10,090
  - upper middle income economy

http://data.worldbank.org/about/country-and-lending-groups
Millennium Development Goals - MDGs
Established in 2000: targets for 2015 compared to 1990

**Global development Issues**

- **Poverty**
  - MDG # 1: Eradicate extreme poverty and hunger

- **Education**
  - MDG # 2: Achieve universal primary education
  - MDG # 3: Promote gender equality and empower women

- **Health**
  - MDG # 4: Reduce child mortality
  - MDG # 5: Improve maternal health
  - MDG # 6: Combat HIV/AIDS, malaria, and other diseases

- **Sustainable Development**
  - MDG # 7: Ensure environmental sustainability
  - MDG # 8: Develop a global partnership for development
Millennium Development Goal 4
- Reducing child (under 5 years) mortality by two-thirds between 1990 and 2015.

Millennium Development Goal 5
- Reducing maternal mortality ratio (maternal deaths per 100,000 live births) by three quarters between 1990 and 2015
- Achieve universal access to reproductive health.
Methods
Global burden of disease study
Data source: GBD 2013

- Estimate premature death & disability
  - 291 diseases & injuries
  - 1160 sequelae
    - direct consequences of disease & injury
      - 67 risk factors
      - 20 age groups
      - male & female

- GBD 2013
  - published in 2014
  - country-specific cause of death data
    - 188 countries

- International consortium
  - > 700 researchers
  - > 100 countries

Global burden of disease study. [http://www.healthdata.org/GBD](http://www.healthdata.org/GBD)
MDG 4 - Child Health
Reduce mortality (under 5 years old) by $\frac{2}{3}$

- **Child mortality**
  - **early neonatal**
    - 1st 7 days after birth
  - **late neonatal**
    - 8 days - 28 days (remainder of 1st month)
  - **post neonatal**
    - 1 month - 1 year (remainder of 1st year)
  - **1-4 years**
    - 1 year - under-5-years
MDG 5 - Maternal Health
Reduce maternal mortality ratio by $\frac{3}{4}$

- **Maternal mortality**
  - **Cause**
    - abortive outcome
    - hemorrhage
    - obstructed labor
    - sepsis
    - other direct
    - indirect
    - HIV
  - **Age (years)**
    - 10-14
    - 15-19
    - 20-24
    - 25-29
    - 30-34
    - 35-39
    - 40-44
    - 45+
  - **Time**
    - antepartum
      - before labor
    - intrapartum
      - during delivery + 24 hours
    - postpartum
      - 24 hours - 42 days
Results
Child Health - Peru/Global

MDG 4: Reduce child (under 5 years) mortality by \(\frac{2}{3}\) Peru’s annualized rate of decline in child mortality (1990-2013): \(5.3\%\)

Figure 1. Annualized rate of decline in child death rate, 1990-2013

Table 1. Child deaths per 1k live births in Peru, 1990-2013 and 2015 target

<table>
<thead>
<tr>
<th>Year</th>
<th>Child deaths per 1000 live births</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td>75</td>
</tr>
<tr>
<td>2013</td>
<td>22</td>
</tr>
<tr>
<td><strong>2015 target</strong></td>
<td><strong>25</strong></td>
</tr>
</tbody>
</table>
Child Health - Peru/Global

MDG 4: Reduce child (under 5 years) mortality by \( \frac{2}{3} \)

Peru / Developing / Developed / Global

Table 2. Child deaths per 1k live births globally and for Peru, 1990-2013

<table>
<thead>
<tr>
<th></th>
<th>1990</th>
<th>2013</th>
<th>Decrease (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Global</td>
<td>85</td>
<td>44</td>
<td>48%</td>
</tr>
<tr>
<td>Developed</td>
<td>14</td>
<td>5.8</td>
<td>59%</td>
</tr>
<tr>
<td>Developing</td>
<td>95</td>
<td>49</td>
<td>48%</td>
</tr>
<tr>
<td>Peru</td>
<td>75</td>
<td>22</td>
<td>71%</td>
</tr>
</tbody>
</table>

Figure 3. Annualized rate of decline in maternal death rate, 1990-2013
Table 3. Child mortality per 1k live births by age group in Peru, 1990-2013

<table>
<thead>
<tr>
<th>Child mortality age group</th>
<th>1990</th>
<th>2013</th>
<th>Change (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>early neonatal</td>
<td>16</td>
<td>8</td>
<td>50%</td>
</tr>
<tr>
<td>late neonatal</td>
<td>9</td>
<td>3</td>
<td>68%</td>
</tr>
<tr>
<td>post neonatal</td>
<td>29</td>
<td>7</td>
<td>78%</td>
</tr>
<tr>
<td>1-4 years</td>
<td>21</td>
<td>5</td>
<td>77%</td>
</tr>
<tr>
<td>Under 5 years</td>
<td>75</td>
<td>22</td>
<td>71%</td>
</tr>
</tbody>
</table>
Maternal Health - Peru/Global

MDG 5: Reduce maternal mortality ratio by \(\frac{3}{4}\)

Peru’s annualized rate of decline in maternal mortality (1990-2013): 3.2%

Table 4. Maternal deaths per 100k live births in Peru, 1990-2013 and 2015 target

<table>
<thead>
<tr>
<th>Year</th>
<th>Maternal deaths per 100K live births</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td>130</td>
</tr>
<tr>
<td>2013</td>
<td>64</td>
</tr>
<tr>
<td><strong>2015 target</strong></td>
<td><strong>33</strong></td>
</tr>
</tbody>
</table>

Figure 4. Annualized rate of decline in maternal death rate, 1990-2013

(GBD 2013)
MDG 5: Reduce maternal mortality ratio by 3/4
Peru / Developing / Developed / Global

Figure 8. Maternal deaths per 100k live births, 1990-2013

Table 5. Maternal deaths per 100k live births globally and for Peru, 1990-2013

<table>
<thead>
<tr>
<th></th>
<th>1990</th>
<th>2013</th>
<th>Decrease (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Global</td>
<td>280</td>
<td>210</td>
<td>25%</td>
</tr>
<tr>
<td>Developed</td>
<td>25</td>
<td>12</td>
<td>52%</td>
</tr>
<tr>
<td>Developing</td>
<td>320</td>
<td>230</td>
<td>28%</td>
</tr>
<tr>
<td>Peru</td>
<td>132</td>
<td>64</td>
<td>51%</td>
</tr>
</tbody>
</table>
Maternal Health - Peru
MDG 5: Reduce maternal mortality ratio by 3/4

Cause of death

Table 6. Change in maternal mortality ratio by cause of death in Peru, 1990-2013

<table>
<thead>
<tr>
<th>Maternal Mortality by Cause</th>
<th>1990</th>
<th>2013</th>
<th>Change (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abortive outcome</td>
<td>12</td>
<td>7</td>
<td>47%</td>
</tr>
<tr>
<td>Hemorrhage</td>
<td>35</td>
<td>10</td>
<td>73%</td>
</tr>
<tr>
<td>Hypertension</td>
<td>12</td>
<td>9</td>
<td>30%</td>
</tr>
<tr>
<td>Obstructed labor</td>
<td>8</td>
<td>3</td>
<td>60%</td>
</tr>
<tr>
<td>Sepsis</td>
<td>20</td>
<td>10</td>
<td>52%</td>
</tr>
<tr>
<td>Other direct</td>
<td>15</td>
<td>8</td>
<td>51%</td>
</tr>
<tr>
<td>Indirect</td>
<td>10</td>
<td>5</td>
<td>55%</td>
</tr>
<tr>
<td>HIV</td>
<td>0</td>
<td>0</td>
<td>0%</td>
</tr>
</tbody>
</table>

Figure 5. Maternal mortality ratio by cause of death, 1990-2013

(GBD 2013)
**Maternal Health - Peru**

**MDG 5: Reduce maternal mortality ratio by \(\frac{3}{4}\)**

**Age of death**

Table 7. Change in maternal mortality ratio by age of death in Peru, 1990-2013

<table>
<thead>
<tr>
<th>Maternal Mortality by Age</th>
<th>1990</th>
<th>2013</th>
<th>Change (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10-14</td>
<td>0.8</td>
<td>0.2</td>
<td>75%</td>
</tr>
<tr>
<td>15-19</td>
<td>12</td>
<td>6</td>
<td>53%</td>
</tr>
<tr>
<td>20-24</td>
<td>25</td>
<td>11</td>
<td>56%</td>
</tr>
<tr>
<td>25-29</td>
<td>25</td>
<td>8</td>
<td>68%</td>
</tr>
<tr>
<td>30-34</td>
<td>26</td>
<td>12</td>
<td>54%</td>
</tr>
<tr>
<td>35-39</td>
<td>24</td>
<td>13</td>
<td>46%</td>
</tr>
<tr>
<td>40-44</td>
<td>14</td>
<td>9</td>
<td>38%</td>
</tr>
<tr>
<td>45+</td>
<td>4.7</td>
<td>6.1</td>
<td>-30%</td>
</tr>
</tbody>
</table>

Figure 6. Maternal mortality ratio by age of death, 1990-2013

(GBD 2013)
Maternal Health - Peru

MDG 5: Reduce maternal mortality ratio by 3/4

Time of death

Table 4. Change in maternal mortality ratio by time of death in Peru, 1990-2013

<table>
<thead>
<tr>
<th>Maternal Mortality by Time</th>
<th>1990</th>
<th>2013</th>
<th>Change (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antepartum</td>
<td>18</td>
<td>9</td>
<td>50%</td>
</tr>
<tr>
<td>Intrapartum</td>
<td>32</td>
<td>16</td>
<td>60%</td>
</tr>
<tr>
<td>Postpartum</td>
<td>62</td>
<td>24</td>
<td>61%</td>
</tr>
</tbody>
</table>

Figure 7. Maternal mortality ratio by time of death, 1990-2013

(GBD 2013)
Discussion
## Global: MDGs 4 & 5 Progress

### June 2014

### Millennium Development Goals: 2014 Progress Chart

<table>
<thead>
<tr>
<th>Goals and Targets</th>
<th>Africa</th>
<th>Asia</th>
<th>Oceania</th>
<th>Latin America and the Caribbean</th>
<th>Caucasus and Central Asia</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Northern</td>
<td>Sub-Saharan</td>
<td>Eastern</td>
<td>South-Eastern</td>
<td>Western</td>
</tr>
<tr>
<td>Reduce mortality of under-five-year-olds by two thirds</td>
<td>low mortality</td>
<td>high mortality</td>
<td>low mortality</td>
<td>low mortality</td>
<td>moderate mortality</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>low mortality</td>
<td></td>
<td>low mortality</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>low mortality</td>
<td></td>
<td>moderate mortality</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>low mortality</td>
<td></td>
<td>low mortality</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>low mortality</td>
<td></td>
<td>low mortality</td>
</tr>
</tbody>
</table>

### GOAL 4 | Reduce child mortality

- Reduce mortality of under-five-year-olds by two thirds
  - Africa: Low mortality, high mortality
  - Asia: Low mortality, moderate mortality
  - Oceania: Moderate mortality, low mortality
  - Latin America and the Caribbean: Low mortality, low mortality
  - Caucasus and Central Asia: Low mortality, low mortality

### GOAL 5 | Improve maternal health

- Reduce maternal mortality by three quarters
  - Africa: Low mortality, very high mortality
  - Asia: Low mortality, moderate mortality
  - Oceania: Moderate mortality, low mortality
  - Latin America and the Caribbean: Low mortality, low mortality
  - Caucasus and Central Asia: Low mortality, low mortality

- Access to reproductive health
  - Africa: Moderate access, low access
  - Asia: High access, moderate access
  - Oceania: Moderate access, low access
  - Latin America and the Caribbean: Low access, high access
  - Caucasus and Central Asia: Moderate access, high access

- Maternal & child health progress
  - Rising income per person
  - Maternal education
  - Secular shifts
  - Increased development assistance
    - Maternal and child health
    - Millennium declaration (2000)

(Kassebaum et al, 2014)
(Wang et al, 2014)
Maternal & Child Health: Peru (1990-2013)
Status of MDGs 4 & 5

- **MDG 4 - Child health**
  - Reduce child (under 5 years) mortality by $\frac{2}{3}$
    - Achieved

- **MDG 5 - Maternal health**
  - Reduce maternal mortality ratio by $\frac{3}{4}$
    - Making progress

Rank - 19 of 188

Rank - 61 of 188

(GBD 2013)
Maternal & Child Health: Peru (1990-2013)  
Explanations for MCH improvement

- **Decentralization** of provision of public health services  
- **Expansion** of public health services  
- **Universal health coverage**  
- **Comprehensive** Family and Community Care Model (2011)  
- **Incentives** encouraging physicians to work in poor/remote areas (2009)  
- **Prioritized access** for pregnant women to health facilities and pre and post natal care  
- Increase in percentage of **institutional deliveries**  
- Construction of **maternal homes in rural areas**
Limitations

  ○ MMR: 89 (WHO) versus 64 (GBD 2013)

● Lack of data on hypertensive disorders of pregnancy for cause of maternal death
  ○ most common cause of maternal death in many countries in Latin America

● HIV is considered an indirect cause of maternal death in most other sources than GBD 2013 study

● Abortive outcome ~ unsafe abortion
Public Health Implications

- **Continue the focus on essential public health services**
  - **Assessment**
    - Continued surveillance activities to determine the extent to which MDGs are reached
  - **Policy Development**
    - Continuing examination of existing MCH policies as well as development of new policies to increase progress towards MDGs 4 and 5.
  - **Assurance**
    - Enforcing laws and linking people to resources
Public Health Implications
Integration of Essential Public Health Services

1. **Monitor health status to identify and solve problems related to MCH**
2. Diagnosing and investigating MCH health problems;
3. Inform, educate, and empowering women regarding MCH;
4. Mobilize community partnerships and action to identify and solve MCH health problems.
5. **Develop policies and plans that support MCH efforts**
6. Enforce laws and regulations that protect MCH;
7. Link people to needed MCH health services and assure the provision of health care when otherwise unavailable;
8. Assure competent public and personal health care workforce;
9. Evaluate effectiveness, accessibility, and quality of personal and population-based health services
10. **Research for new insights and innovative solutions to MCH problems**
Moving forward...

Health priorities?

- Health Priorities
  - Research & Education
  - Policy & Technology
  - Practice & Behavior
Acknowledgements

- Meagan Adolfson

- CUGH 2015
  - Organizers
  - Participants
Thank you

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