Setting a Target for Maternal Mortality

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Outline of talk

- What is the MMR—definition and data issues
- Assessing plausible targets for MM reduction
- Historical trends in MMR
- Absolute target for MMR
- Proportional reduction target for MMR
- Conclusions and questions
• U5MR is an age specific rate whereas the MMR is a cause specific ratio.

• The Under 5 Mortality Rate is the number of children under 5 who died per 1,000 live births. The other under-five mortality rates are also on that scale.

• The MMR is a ratio of maternal deaths per 100,000 live births –note the extra factor of 100 in the denominator.
A maternal death is a rare event

- MMR is expressed as the number of maternal deaths per 100,000 live births.

  Consider an MMR of 325 versus an MMR of 271: If we express per 1,000 live births, the result is 3.25 versus 2.71. These MMRs are quite similar—both would round to 3 deaths per 1,000 live births.

- Thus, the MMR is a measure that gives a false sense of precision.
  - Typically cannot disaggregate the MMR for subnational values
  - Even national level estimates of the MMR have a wide range of uncertainty

*Statistics & Monitoring Section/DPS/UNICEF 2013*
MMR Numerator: maternal deaths

The death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management but not from accidental or incidental causes.

Need to know:
• Pregnancy status of the woman
• Timing of death
• Medical cause of death

WHO International Statistical Classification of Diseases and Related Health Problems, Tenth Revision, 1992 (ICD-10)
Maternal mortality is difficult to measure
– Need to have information on pregnancy status, timing and cause
– Rare event

Available data suffer from serious limitations
– Sparse
– Suffer from under-reporting and misclassification of deaths
– May have definitional differences

The settings with highest maternal mortality tend to be also the settings with the greatest data quality problems
Assessing plausible targets for MM reduction

• Absolute level of MMR by a specific year
  – MMR of 50
  – Target year: 2035

• Proportional reduction or annual rate of reduction (ARR) by a specific year
  – 75% decline by 2035 (ARR=5.5%)
  – 85% decline by 2035 (ARR=7.3%)
Target should be ambitious but plausible; should accelerate progress

Four key components to the specification of a target:

- **Indicator**: MMR (MDG 5: MMR)

- **End year**: Focus here on 2035, but actual value is TBD (MDG 5: 1990-2015)

- **Trajectory**: Annual Rate of Reduction (ARR) does not have to be constant, but the average value should be feasible (MDG 5: ARR of 5.5%)

- **End value**: Determined by the choice of end year and ARR, with rounding (MDG 5: 25% of the start value, or a decline of 75%)
Ending preventable maternal deaths worldwide by 2035-reaching MMR = 50

543,000 deaths annually

4.1% Annual Rate of MMR Reduction 2000-2010

287,000 deaths annually

5.6% Annual Rate of MMR Reduction 2010-2035 Accelerated Trend

2015 MDG MMR=100

4.1% Annual Rate of MMR Reduction 2010-2035 Current trend

OECD Upper Limit MMR

Maternal mortality declined globally between 2000 and 2010, but with considerable regional variation.

Countries require different rates of reduction to end preventable maternal deaths by 2035 – reaching MMR = 50

Asia: Afghanistan, Bhutan, Cambodia, Indonesia, Iran, Iraq, Kyrgyzstan, Lao, Morocco, Myanmar, Nepal, Pakistan, Papua New Guinea, Philippines, Solomon Islands, Tajikistan, Turkmenistan, Uzbekistan, VietNam, Yemen
Select a plausible end value of the MMRatio, AFTER the end year has been selected.

• **MMR:** The estimated global MMRatio for 2010 was 210.

• **ARR:**
  – The estimated global ARR for 2000-2010 was 4.1%.
  – Acceleration would mean a target ARR>4.1%, although not necessarily >5.5% (the MDG5 value). **Plausible range could be 5% to 7%.**
  – In 2000-2010, only **22 countries** had an ARR more than **5.5% - required ARR to meet MDG 5 (75% reduction from 1990 to 2015);** Only **20 countries** had an ARR more than **6%** from 2000-2010; among them, only **5 countries** had an ARR more than **8%**

• Use Table to guide choice of ARR and target value of the MMRatio, for a specified time year.

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## Future global MMRatio implied by MMRatio=210 in 2010 and ARR between 5% and 7%

<table>
<thead>
<tr>
<th>Values of ARR</th>
<th>End Years</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>ARR</td>
<td>2015</td>
<td>2020</td>
<td>2025</td>
<td>2030</td>
<td>2035</td>
<td></td>
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<tr>
<td>5.00</td>
<td>164</td>
<td>127</td>
<td>99</td>
<td>77</td>
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<tr>
<td>5.25</td>
<td>162</td>
<td>124</td>
<td>96</td>
<td>73</td>
<td>57</td>
<td></td>
</tr>
<tr>
<td>5.50</td>
<td><strong>160</strong></td>
<td><strong>121</strong></td>
<td>92</td>
<td>70</td>
<td>53</td>
<td></td>
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<tr>
<td>5.75</td>
<td>158</td>
<td>118</td>
<td>89</td>
<td>66</td>
<td>50</td>
<td></td>
</tr>
<tr>
<td>6.00</td>
<td>156</td>
<td>115</td>
<td>85</td>
<td>63</td>
<td>47</td>
<td></td>
</tr>
<tr>
<td>6.25</td>
<td>154</td>
<td>112</td>
<td>82</td>
<td>60</td>
<td>44</td>
<td></td>
</tr>
<tr>
<td>6.50</td>
<td>152</td>
<td>110</td>
<td>79</td>
<td>57</td>
<td>41</td>
<td></td>
</tr>
<tr>
<td>6.75</td>
<td>150</td>
<td>107</td>
<td>76</td>
<td>54</td>
<td>39</td>
<td></td>
</tr>
<tr>
<td>7.00</td>
<td>148</td>
<td>104</td>
<td>73</td>
<td>52</td>
<td>36</td>
<td></td>
</tr>
</tbody>
</table>

|      | 13 |      |      |      |      |      |
Global target MMRatio for each possible end year:

2020: 120 (This end year seems too soon)

2025: 80? 90?

2030: 60

2035: 50

These end values appear plausible and are rounded numbers.
Maternal Mortality Ratio Average ARR (%), 2000-2010

ARR for Afghanistan, Bangladesh, Nepal and Pakistan, to reach MMR = 50, 2035

- **Afghanistan**: Current ARR 2000-2010: -7.5%, ARR to Reach MMR=50: -8.5%
- **Bangladesh**: Current ARR 2000-2010: -5.0%, ARR to Reach MMR=50: -6.1%
- **Nepal**: Current ARR 2000-2010: -7.2%, ARR to Reach MMR=50: -4.8%
- **Pakistan**: Current ARR 2000-2010: -3.7%, ARR to Reach MMR=50: -6.4%

ARR for India to reach MMR 50, 2035

Maternal Mortality Ratio (per 100,000 live births)

India

Current ARR 2000-2010: -6.5
ARR to Reach MMR=50: -5.4

ARR for Sri Lanka and Thailand to reach MMR 50, 2035

Sri Lanka
Thailand

Current ARR 2000-2010
Sri Lanka -4.9%
Thailand -3.1%

ARR to Reach MMR=50
Sri Lanka 1.4%
Thailand 0.2%

ARR for China to reach MMR 50, 2035

China

Current ARR 2000-2010: -4.9%
ARR to Reach MMR=50: 1.2%

Future level of MMRatio implied by MMRatio=400 in 2010 and specified ARR between 5% and 7%

<table>
<thead>
<tr>
<th>Values of ARR</th>
<th>End Years</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2015</td>
</tr>
<tr>
<td>5.00</td>
<td>310</td>
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<tr>
<td>5.25</td>
<td>305</td>
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<tr>
<td><strong>5.50</strong></td>
<td><strong>301</strong></td>
</tr>
<tr>
<td>5.75</td>
<td>297</td>
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<td>6.00</td>
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<td>6.50</td>
<td>286</td>
</tr>
<tr>
<td>6.75</td>
<td>282</td>
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<tr>
<td>7.00</td>
<td>278</td>
</tr>
</tbody>
</table>
A GLOBAL MMR target of 50 by 2035 is plausible, but no single target value for all countries would be desirable.

-- Countries>400MMR (2010): A target of 50 by 2035 cannot be applied to the highest fertility countries; the required rate of reduction would be out of reach.

-- Many Asian countries (e.g., Nepal, Bangladesh, Pakistan and Indonesia), could follow the trajectory for the global MMR of 50 by 2035

-- Trajectories for Thailand, Sri Lanka, India, and China show that a target of 50 by 2035 would not make sense as they are already close to that level. The goal for such countries could be within-country equity for MMR across subnational populations.
Proportional decline targets
Number of countries with specific ranges of MMR by 2035 under different proportional decline scenarios

<table>
<thead>
<tr>
<th>Range</th>
<th>75% Reduction</th>
<th>85% Reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>MMR ≤ 30</td>
<td>120</td>
<td>128</td>
</tr>
<tr>
<td>30 &lt; MMR ≤ 50</td>
<td>8</td>
<td>19</td>
</tr>
<tr>
<td>50 &lt; MMR ≤ 100</td>
<td>27</td>
<td>25</td>
</tr>
<tr>
<td>100 &lt; MMR</td>
<td>26</td>
<td>9</td>
</tr>
</tbody>
</table>

Legend:
- Blue: MMR ≤ 30
- Green: 30 < MMR ≤ 50
- Yellow: 50 < MMR ≤ 100
- Red: 100 < MMR
MMR in 2035 – 75% reduction by 2035

MMR≤30
30<MMR≤50
50<MMR≤100
100<MMR
Data not available
Afghanistan: MMR in 2035 with 75% and 85% reductions from 2010

Bangladesh, Nepal: MMR in 2035 with 75% and 85% reductions from 2010

Pakistan, India: MMR in 2035 with 75% and 85% reductions from 2010

China, Sri Lanka: MMRs in 2035 with 75% and 85% reductions from 2010

Thailand: MMR in 2035 with 75% and 85% reductions from 2010

A country with MMR=400 in 2010 will need to maintain high ARR to meet MMR=100 by 2035.
• **Target indicator**: should it be MMR?
  A target with one absolute level (e.g. 50/100,000 by 2035) makes it more difficult to achieve for countries with high MMRs, particularly Sub-Saharan African countries. Should the target indicator thus be a GLOBAL indicator?

• **The end year**: 2030, 2035—will depend on the development agenda
End Year, Global target MMRatio and percentage decline (from 2010)

• End year = 2025:
  Global MMR target= 80 or 90; percent decline=60%

• End year = 2030:
  Global target= 60; percent decline=70%

• End year = 2035:
  Global target= 50; percent decline=80%
Key points and questions

• ARR -- trajectory:
  – Each country could be located or placed on a trajectory of decline implied by a global target
  – Each country’s rate of progress could be measured by passing 5 year milestones consistent with its position on the trajectory
  – Countries at very high MMR levels could aim for higher MMR than global MMR (eg., MMR=100)
  – Countries at low levels could focus on remaining high MMR sub-populations/within country equity.