Maternal Mortality on-line progress calculator

Introduction

The Sustainable Development Goal (SDG) target 3.1 calls for the global maternal mortality ratio (MMR) to be reduced to less than 70 maternal deaths per 100 000 live births by 2030.[i] As part of the Ending Preventable Maternal Mortality Strategy (EPMM)[ii], this target is expanded to require that no country has a MMR above 140 (twice the global average) by 2030.

The global target of 70 was developed with the thinking that each country shares responsibility for helping to meet the global target. It does not mean that each country is aiming for 70 by 2030, but rather that if countries make similar, substantial reductions in MMR the world can achieve a global MMR of 70 by 2030. Country-specific targets are computed based on the shared rate of reduction that is consistent with achieving the global target, as described below and implemented in the progress calculator.

Global target

To compute country targets, one must first calculate the reduction required globally to meet the SDG target, and then apply that to a given country's situation. Mathematically, this can be done using the annual "average rate of reduction" (ARR), which is defined by the following equation:

ARR = ln(MMR_t1/MMR_t0) / (t1-t0) * 100

In this equation, "t1" is the target year and "t0" is the baseline year ("t" stands for "time").
If we are interested in computing the ARR that will be necessary to achieve the target of 70 by 2030, using 2015 as the baseline year, the calculation would be as follows. Note, the current UN- Maternal Mortality Estimation Inter-Agency Group estimate for the global MMR in 2015 = 219.[iii]

MMR_t1 = 70 (the target MMR value) MMR_t0

= 219 (the baseline MMR value)

t1 = 2030 (the target year)

t0 = 2015 (the baseline year)

ARR = ln(70/219) / (2030-2015) *100 = - 6.1

Note, we can also calculate the total per cent reduction required between 2015 and 2030 to meet the target as (1-(70/219)*100 = 61% reduction.

Country targets

After the global ARR required to meet the 2030 is computed, we can use algebra to re-organize the ARR equation so that it allows us to compute targets for individual countries. This involves solving for the variable MMR_t1 to obtain the following equation:

MMR_t1 = MMR_t0 * exp(ARR/100 * (t1-t0))

Therefore, if we are interested in the target MMR value in 2030 for a country with a 2015 MMR of 90 we would compute the target MMR as follows:

MMR_t1 = 90 * exp(-6.1/100 * (2030-2015)) = 36

So, this country has a MMR target of 36 maternal deaths per 100 000 live births in 2030.

We can use the same formula to compute an intermediate year target. For example, if we were interested in an intermediate target for the year 2020, we would calculate:

MMR_t1 = 90 * exp(-6.1/100 * (2020-2015)) = 66

This means that if the country's MMR is below 66 in 2020, it will be on track to meet the country's SDG 2030 target of 36, if at least the same level of reduction continues.

For countries with high MMRs

Note that the above example is for a country which has a 2030 target below 140. For countries with very high values of MMR, their 2030 target is MMR <140. In cases where one completes the above calculation and finds that the 2030 target is above 140, that value should be ignored and replaced with a value of 140. If there is a need for intermediate targets, the above equations can be used to compute the required ARR and then the implied intermediate targets.

As an example, consider a country with a MMR = 600 in 2015. If we apply the global average ARR, this would imply a 2030 target of:

MMR_t1 = 600 * exp(-6.1/100 * (2030-2015)) = 240

This value is greater than 140, therefore the 2030 target should be set to 140. Once that is done, if we are interested in an intermediate target, say for year 2020, one can compute the required ARR to reach 140 by 2030, and then apply it back to the 2020 time frame as follows:

ARR for 140 in 2030 is:

ARR = ln(140/600) / (2030-2015) *100 = -9.7

And using this new ARR, the intermediate 2020 MMR target is:

MMR_t1 = 600 * exp(-9.7/100 * (2020-2015)) = 369

Note that these two equations can be used for any combination of MMR targets and years that a user may be interested in, not just those that are implied by the SDG target of a global MMR <70.

In case of questions, please contact maternalestimates@who.int

References

[i] https://sustainabledevelopment.un.org/sdg3.
[ii] Strategies towards ending preventable maternal mortality (EPMM). Geneva: World Health Organization; 2015.
[iii] World Health Organization (WHO), United Nations Children's Fund (UNICEF), United Nations Population Fund (UNFPA), World Bank Group, United Nations Population Division. Trends in maternal mortality: 2000 to 2017: estimates by WHO, UNICEF, UNFPA, World Bank Group and the United Nations Population Division. Geneva: World Health Organization; 2019.