PAHO Pan American Health Organization World Health Organization Americas

Scenarios for Achieving the SDG 3 Targets in the Region of the Americas

Indicator 3.1.1. **Maternal mortality ratio**

SUSTAINABLE DEVELOPMENT GOAL 3
Ensure healthy lives and promote well-being for all at all ages

Target 3.1:

By 2030, reduce the global maternal mortality ratio to less than 70 per 100,000 live births.

A scenario is an environment that makes it possible for an event —or sequence of events— to occur based on certain baseline conditions. Drafting alternative scenarios may help identify the options most likely to result in successful achievement of the targets, so that actions can be adjusted toward that end.

This document lays out a set of scenarios for reaching target 3.1 (reducing the maternal mortality ratio — including reducing its inequality gaps), based on two essential baseline conditions:

1. The reference criterion for establishing average change
2. The equity criterion for establishing distributional change

Specifically, scenarios for achieving target 3.1 are defined according to the **reference point** and the **equity criterion**. The **reference point** may be the global norm, regional norm, or regional empirical data (i.e., according to whether there is a preestablished global or regional target, or whether it is established based on observed data). The **equity criterion** may be horizontal (average change is the same for all countries) or vertical (average change is greater for countries with higher maternal mortality, i.e., proportional progressive improvement is applied).

Baseline conditions are established for 2015 and the scenario is defined by the projected magnitude of three standard metrics for 2030: *1*) average maternal mortality ratio; *2*) absolute inequality gap; and *3*) relative inequality gap (between countries' extreme strata compared to the baseline rate).

Such scenarios can be summarized as follows:

		Reference point		
		Global norm	Regional norm	Regional empirical data
Equity criterion	Horizontal	Scenario A1	Scenario B1	Scenario C1
	Vertical	Scenario A2	Scenario B2	Scenario C2

The different scenarios presented here are only illustrative of the process and do not constitute all possible scenarios. The data used to construct these scenarios are from the most recent estimates of maternal mortality published by the UN Maternal Mortality Estimation Inter-agency Group (UNMMEIG).[a]

[a] World Health Organization. Trends in Maternal Mortality 2000 to 2017: estimates by WHO, UNICEF, UNFPA, the World Bank Group, and the United Nations Population Division. Geneva: WHO; 2019. Available from: https://apps.who.int/iris/handle/10665/327595.

A. Scenarios based on the global normative reference criterion

The target is a global maternal mortality ratio (MMR) of 70 maternal deaths per 100,000 live births by 2030. Using the globally normed reference criterion, it is possible to calculate the average annual percent change (AAPC) in MMR from 2015 to 2030, considering that the global rate in 2015 (baseline year) was 219 maternal deaths per 100,000 live births:

$$\text{AAPC} = \frac{\ln(70) - \ln(219)}{(2030 - 2015)} \times 100 = -7.6\%$$

This means that, in order to meet the global normative target, MMR should be reduced at an average annual rate of 7.6% globally. If this rate of global reduction is applied to the initial value of MMR in the Americas (60 maternal deaths per 100,000 live births in 2015), the regional MMR target can be established for 2030:

$$\text{MMR}_{(2030)} = 60 \times \exp\left[\left(\frac{-7.6}{100}\right) \times (2030 - 2015)\right] = 19$$

The regional MMR target for 2030 would be 19 maternal deaths per 100,000 live births. This means that if the rate observed in the Americas in 2015 was reduced at a mean speed equal to 7.6% annually, by 2030 it should reach the rate of 19 maternal deaths per 100,000 live births.

Scenario A1. Presumes that the countries will reduce their MMR at the same speed, in this case, with an AAPC equal to -7.6%. If this is true, the MMR for each country can be calculated for 2030 taking the 2015 MMR as the initial value. Using these values of the country MMRs, the regional average and the absolute and relative geographic gaps are calculated in 2015 and 2030 (Table 1).

Table 1. **Regional average and inequality gaps in the maternal mortality ratio in 2015 and by 2030**

Metrics	2015	2030	CP (%)
Regional average MMR	60	19	-68.0
Absolute gap in MMR	314	99	–68.0
Relative gap in MMR	19	19	0.0

Notes: Scenario based on global normative criteria and horizontal equity.
MMR: maternal mortality ratio; PC: percent change.

Scenario A2. Presumes that countries will reduce their MMR at different speeds. Different AAPC will be assigned following the criterion of proportional progressive improvement. It is believed that the higher the rate in the country, the faster the reduction will be (the higher the AAPC); while the lower the initial MMR, the lower the AAPC will be. The geographical strata are determined based on three criteria: *1*) the global MMR target for 2030 in SDG 3, that is, 70 maternal deaths per 100,000 live births; *2*) the regional MMR target for 2030 established in the Sustainable Health Agenda for the Americas 2018-2030 (SHAA 2030), that is, 30 maternal deaths per 100,000 live births, and *3*) a maximum allowed threshold equivalent to double the global target for this indicator (140 maternal deaths per 100,000 live births). In this way, the four strata group the countries according to their MMR values as of 2015: above the maximum threshold (group 1), below the threshold but above the global target (group 2), below the global target but above regional one (group 3), and

below the regional target (group 4). The proportional progressive improvement of the AAPC assigned to each of these four strata is presented in Table 2.

Table 2. **Geographical strata of the countries according to initial maternal mortality ratio in 2015 and proportional progressive improvement of the average annual average percent change based on the global normative target**

Geographical strata	Classification criterion (cut-off points)	AAPC*
Stratum 1	Countries with an MMR ≥140	–9.2
Stratum 2	Countries with an MMR ≥70 and <140	–8.0
Stratum 3	Countries with an MMR ≥30 and <70	–7.0
Stratum 4	Countries with an MMR <30	–6.0

Notes: *The average of these four values is the same as the AAPC obtained for the global target (–7.6%).
MMR: maternal mortality ratio; AAPC: average annual percent change.

The AAPC of each country can be used to estimate its MMR for 2030, using its 2015 MMR as the initial value. From these values of the country MMRs, the regional average and the absolute and relative geographic gaps are calculated in 2015 and 2030 (Table 3).

Table 3. **Regional average and inequality gaps in maternal mortality ratio in 2015 and by 2030**

Summary metric	2015	2030	PC (%)
Regional average MMR	60	19	–68.0
MMR absolute gap	314	75	–76.0
MMR relative gap	19	12	37.0

Notes: Scenario based on the global normative criteria and vertical equity.
MMR: maternal mortality ratio; PC: percent change.

B. Scenarios based on the regional normative reference criterion

The regional MMR target is 30 maternal deaths per 100,000 live births by 2030, established in the SHAA 2030. Based on this regional normative reference criterion, the AAPC of MMR can be calculated for 2015-2030, considering that the regional MMR in 2015 (baseline year) was 60 maternal deaths per 100,000 live births:

$$\text{AAPC} = \frac{\ln(30) - \ln(60)}{(2030 - 2015)} \times 100 = -4.6\%$$

Scenario B1. Presumes that the countries will reduce their MMR at the same speed, in this case, with an AAPC of –4.6%. If so, we can calculate the MMR of each country by 2030 using its 2015 MMR as the baseline value. From these values of the country MMRs, the regional average and the absolute and relative geographic gaps are computed in 2015 and 2030 (Table 4).

Table 4. Regional average and inequality gaps in the maternal mortality ratio in 2015 and by 2030

Summary metric	2015	2030	PC (%)
Regional average MMR	60	30	–50.0
MMR absolute gap	314	155	–50.6
MMR relative gap	19	19	0.0

Notes: Scenario based on regional normative criteria and horizontal equity.
MMR: maternal mortality ratio; PC: percentage change.

Scenario B2. Presumes that countries will reduce their MMR at different speeds. AAPC will be assigned different intensity following a criterion for proportional progressive improvement, analogous to the one established in scenario A2. The proportional progressive improvement of the AAPC values assigned to each of these four strata is presented in Table 5.

Table 5. Geographical strata of countries according to 2015 initial maternal mortality ratio and proportional progressive improvement of the average annual percent change based on the regional normative target

Geographical strata	Classification criterion (cut-off points)	AAPC*
Stratum 1	Countries with MMR ≥140	–5.5
Stratum 2	Countries with MMR ≥70 and <140	–5.0
Stratum 3	Countries with MMR ≥30 and <70	–4.5
Stratum 4	Countries with MMR <30	–3.5

Notes: *The average of these four values is the same as the AAPC obtained for the regional target (–4.6%).
MMR: maternal mortality ratio; AAPC: average annual percent change.

The AAPC values for each country can be used to estimate its MMR by 2030, considering its 2015 MMR as the baseline value. From these values of the country MMRs, the regional average and the absolute and relative geographic gaps are calculated in 2015 and 2030 (Table 6).

Table 6. Regional average and inequality gaps in the maternal mortality ratio in 2015 and by 2030

Summary metric	2015	2030	CP (%)
Regional average MMR	60	30	–50.0
MMR absolute gap	314	133	–58.0
MMR relative gap	19	14	–26.0

Notes: Scenario based on regional normative criteria and vertical equity.
MMR: maternal mortality ratio; PC: percent change.

C. Scenarios based on regional empirical reference criterion

Instead of considering a normative criterion that pre-establishes a global or regional target, an empirical criterion may be applied—based on the most recent data—to set an appropriate regional target. Using the regional MMR estimates for the years 2010 (64 maternal deaths per 100,000 live births) and 2015 (60

maternal deaths per 100,000 live births), the AAPC is calculated for the period, which reflects the current regional situation more reliably:

$$\text{AAPC} = \frac{\ln(60) - \ln(64)}{(2015 - 2010)} \times 100 = -1.3\%$$

This indicates that during the five years prior to the baseline year (2015), regional MMR was falling at an average annual rate of 1.3%. This AAPC value (–1.3%) and the initial MMR value (60 maternal deaths per 100,000 live births), allow the regional MMR target for 2030 to be set as:

$$\text{MMR}_{(2030)} = 60 \times \exp\left[\left(\frac{-1.3}{100}\right) \times (2030 - 2015)\right] = 49$$

The regional MMR target for 2030 would thus be 49 maternal deaths per 100,000 live births. This means that if the MMR in the Americas in 2015 (60 maternal deaths per 100,000 live births) continued to fall at the same rate as the previous five years —that is at a mean velocity of 1.3% annually—by 2030 it should reach a rate of 49 maternal deaths per 100,000 live births.

Scenario C1. Presumes that the countries will reduce their MMR at the same speed, in this case, with an AAPC of –1.3%. If so, the MMR for each country by 2030 can be calculated by using its 2015 MMR as the baseline. From these values of the country MMRs, the regional average and the absolute and relative geographic gaps are calculated in 2015 and 2030 (Table 7).

Table 7. **Regional average and inequality gaps in the maternal mortality ratio in 2015 and by 2030**

Summary metric	2015	2030	PC (%)
Regional average MMR	60	49	–18.0
MMR absolute gap	314	254	–19.0
MMR relative gap	19	19	0.0

Notes: Scenario based on regional empirical criteria and horizontal equity.
MMR: maternal mortality ratio; PC: percent change.

Scenario C2. Presumes that countries will reduce their MMR at different speeds. They will be assigned AAPC of different intensity according to the proportional progressive improvement criterion, analogous to the one established in scenario A2. The proportional progressive improvement of the AAPC values assigned to each of these four strata is presented in Table 8.

Table 8. Geographical strata of the countries according to the 2015 baseline maternal mortality ratio and proportional progressive improvement of the average annual percent change based on the regional empirical target

Geographical strata	Classification criterion (cut-off points)	AAPC*
Stratum 1	Countries with MMR ≥140	–2.3
Stratum 2	Countries with MMR ≥70 and <140	–1.8
Stratum 3	Countries with MMR ≥30 and <70	–0.8
Stratum 4	Countries with MMR <30	–0.3

Notes: *The average of these four values is the same as the AAPC obtained for the regional target (–1.3%).
MMR: maternal mortality ratio; AAPC: average annual percent change.

The AAPC of each country can be used to estimate its MMR by 2030, considering its 2015 MMR as the baseline value. From these values of the country MMRs, the regional average and the absolute and relative geographic gaps are calculated in 2015 and 2030 (Table 9).

Table 9. Regional average and inequality gaps in maternal mortality ratio in 2015 and by 2030

Summary metric	2015	2030	PC (%)
Regional average MMR	60	49	–18.0
MMR absolute gap	314	215	–58.0
MMR relative gap	19	14	–26.0

Notes: Scenario based on regional empirical criteria and vertical equity.
MMR: maternal mortality ratio; PC: percent change.

Conclusions

Figures 1.b and 1.c show that in all the scenarios presented, the absolute geographical and relative gaps would be lower by 2030 if the vertical equity criterion is considered (proportional progressive improvement of the MMR AAPC, scenarios A2, B2 and C2) rather than the horizontal equity criterion (same AAPC for all countries, scenarios A1, B1, and C1).

Using the horizontal equity criterion (same AAPC for all countries, scenarios A1, B1, and C1) does not change the relative inequality gap for the period, regardless of the reference criterion (see Figure 1.c).

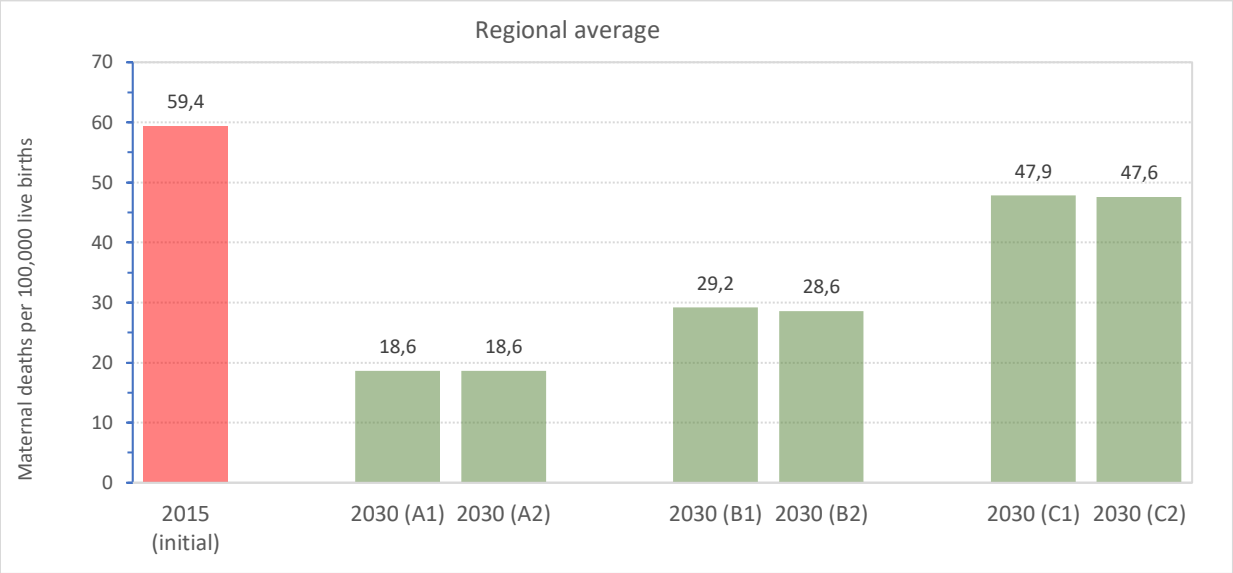
One of the best scenarios is A2, but this is based on a presumed very high (and therefore unrealistic) regional MMR AAPC (see Figures 1.a, 1.b, and 1.c).

The most appropriate of all the scenarios considered may be C2. This assumption is based on the regional MMR values calculated by the Maternal Mortality Estimation Inter-agency Group in 2019, that more accurately reflect the situation in the Region (see Figures 1.a, 1.b, and 1.c).

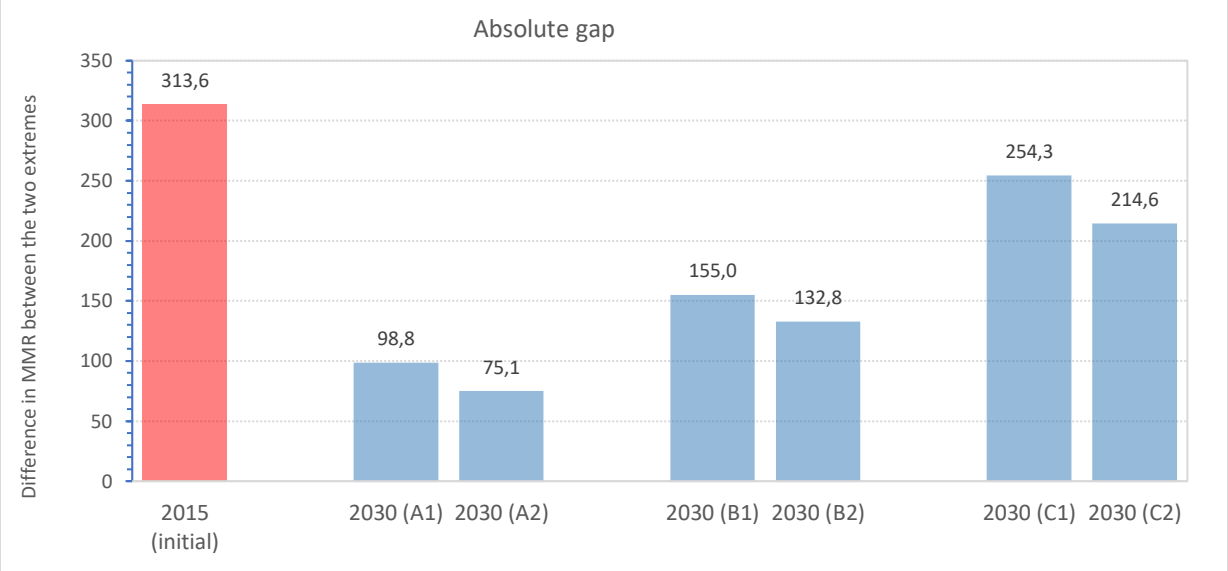
The average annual percent reduction of the regional MMR based on the 2030 global MMR target in SDG 3 and the regional MMR target for 2030 in the SHAA does not reflect the average annual percent reduction of the regional MMR during the five years prior to the baseline year (2015), which is 1.3%.

Figure 1. Description of maternal mortality ratio at the baseline value and scenarios A1, A2, B1, B2, C1 and C2

a. Estimated regional maternal mortality ratio



b. Estimate of geographical absolute inequality in the maternal mortality ratio



c. Estimate of relative geographical inequality in the maternal mortality ratio