

Appendix to Advances and challenges in the path toward reaching the SDG in Mexico: inequalities and their decomposition by states, 1990–2017

1. Heatmaps: HRSDGI levels by Mexican states, 1990 and 2017	2
2. Trends of health-related SDG indicators in Mexico	3
3. Results of the concentration index by indicator.....	4
4. Decomposition analysis by indicator.....	8

1. Heatmaps: HRSDGI levels by Mexican states, 1990 and 2017

Indicators unscaled

1990	Health	Mortality	Quality of Life	Healthcare	Education	Environment	Income	Gender	Age	Urbanization	Population	Healthcare	Education	Environment	Income	Gender	Age	Urbanization	Population	Healthcare	Education	Environment	Income	Gender	Age	Urbanization	Population	Healthcare	Education	Environment	Income	Gender	Age	Urbanization	Population								
Mexico	0	23%	21%	4%	67	77%	41	15	0	25	2	1063	326	345	4	15%	27	63%	47	55	52	25	1	27%	22%	3	2	0	1	5%	1%	1%	32%	21%	23%	747	24	22	0	7%	3%	7%	76%

2017	Health	Mortality	Quality of Life	Healthcare	Education	Environment	Income	Gender	Age	Urbanization	Population	Healthcare	Education	Environment	Income	Gender	Age	Urbanization	Population	Healthcare	Education	Environment	Income	Gender	Age	Urbanization	Population	Healthcare	Education	Environment	Income	Gender	Age	Urbanization	Population	Healthcare	Education	Environment	Income	Gender	Age	Urbanization	Population		
Mexico	0	13%	23%	2%	44	88%	16	7	0	17	0	881	166	277	6	13%	16	76%	36	70	36	3	1	10%	84%	8	5	0	2	4%	0%	0%	3%	7%	11%	16%	10%	552	21	32	0	7%	2%	7%	87%

Worst performance
Middle performance
Best performance

Scaled indicators

Table with 200 columns and 40 rows. Columns include state names (e.g., Mexico, Aguascalientes, Baja California) and various scaled indicators (e.g., SDG Index, Stigma, Morbidity, Mortality, Birth rate, etc.). Rows represent data for the years 1990 and 2017.

Worst performance
Middle performance
Best performance

2. Trends of health-related SDG indicators in Mexico

From the 40 analysed indicators, the trend for 22 is in the desired direction, that is, to improve conditions among the population (maternal mortality ratio [MMR], births attended by skilled personnel, under-5 mortality, neonatal mortality, malaria incidence, neglected tropical diseases [NTD] prevalence, road injuries mortality, met need for family planning, adolescent birth rate, coverage of essential health services, air pollution mortality, unsafe water, sanitation or lack of hygiene [WaSH] mortality, unintentional poisoning mortality, health worker density, unsafe water, unsafe sanitation, access to handwashing facility, prevalence of household air pollution, occupational risks, well-certified deaths, stunting, wasting). Of the remaining 21, there were no changes or very limited changes in recent years for 16, so almost a stable pattern (tuberculosis incidence, hepatitis incidence, non-communicable diseases mortality, self-harm mortality, alcohol consumption, prevalence of daily smoking, vaccine coverage, intimate partner violence, non-intimate partner violence, levels of PM_{2.5}, conflict mortality, physical violence, sexual violence, childhood sexual abuse, forces of nature mortality, child overweight) while for the last two, the trend is in the opposite direction (HIV incidence and interpersonal violence mortality).

3. Results of the concentration index by indicator

Of a total of 25 indicators concerning SDG, 18 presented evidence of inequalities. Fertility rate for women aged 10 to 19 consistently had a CI with negative values from 1990 up to 2017. Although CI values are relatively low (-0.048 $p = 0.011$ in 1990 to -0.043 $p = 0.008$ in 2017), what seems relevant is that inequality remains in the period, with a reduction between 1990 and 2017 of only about 10%.

For the death rate attributable to air pollution, incidence of HIV, neonatal mortality rate, death rate for unintentional poisoning, death rate due to road injuries, death rate due to self-harm, and TB incidence, there was no evidence of inequality across states in Mexico.

Prevalence of alcohol consumption was concentrated among states with higher development, with almost no changes between 1990 and 2017: the CI for the former year was 0.048 ($p=0.006$) and for the latter 0.047 ($p=0.006$), suggesting a stable pattern.

The percentage of women of reproductive age with met need for family planning was larger in more developed states, with negligible changes over the analysed period: the CI was 0.105 ($p < 0.001$) in 1990 and 0.091 ($p < 0.001$) in 2017.

Regarding the incidence of HIV, there was evidence of inequality only in 1990, with a CI of 0.112 ($p = 0.003$).

In terms of the indicators of health personnel, for the overall index as well as for each of the three types of personnel (nurses, physicians, and pharmacists), the CI values are positive (ie, personnel more concentrated in more-developed states) and statistically different from zero. The CI for the overall index, density of health workers, went from 0.144 ($p < 0.001$) in 1990 to 0.111 ($p < 0.001$) in 2017.

The rate of hepatitis incidence was slightly but increasingly concentrated in less-developed states during the period 1990–2017, with a CI of -0.015 ($p = 0.445$) in 1990 and a CI of -0.045 ($p = 0.003$) in 2017, representing a 200% increase in the CI value over the 27 years.

The inequality in the distribution of the rate of malaria was identified during the period with high values of the CI: it was -0.494 ($p = 0.004$) in 1990 and increased to -0.652 ($p = 0.055$) in 2017.

The CI values for the maternal mortality ratio (MMR) decreased 50%, from a CI of 0.122 ($p = 0.001$) in 1990 to a CI in 2017 of -0.064 ($p = 0.002$) in 2017 that was concomitant with an overall reduction of the MMR in the country.

The CI death rate due to non-communicable diseases for the population aged 30 to 70 has positive values for the period, but decreased from 0.075 ($p < 0.001$) in 1990 to 0.029 ($p = 0.007$) in 2017, that is, a 61% reduction.

As expected, prevalence of neglected tropical diseases is more concentrated among less-developed states. The CI for this indicator decreased 10% over the period, as it presented a value of -0.144 ($p < 0.001$) in 1990 and then in 2017 a CI of -0.130 ($p < 0.001$).

The proportion of births that are attended by skilled health personnel was higher in more-developed states, so the CI has positive values during the 1990–2017 period. The CI in 2017 was 0.263 ($p = 0.027$), which represented a 9% decrease from the CI in 1990 of 0.288 ($p = 0.002$).

Prevalence of current smoking was also higher in more-developed states, but with a decreasing CI during the analysed period. The CI for this indicator was 0.142 ($p < 0.001$) in 1990 and was 0.110 ($p < 0.001$) by 2017, a 23% reduction.

Coverage of essential health services was slightly concentrated among more-developed states during this period, with a decreasing pattern. The CI for this indicator went from 0.050 ($p < 0.001$) in 1990 to 0.042 ($p < 0.001$) in 2017, a 16% decrease.

The CI values for the under-5 mortality rate are negative in the analysed years – that is, more frequent among states with lower SDI values, with a decrease of 29% in the period: the CI in 1990 was -0.105 ($p < 0.001$) and -0.075 ($p < 0.001$) in 2017.

Interestingly, vaccine coverage is more concentrated among less-developed states with an increasing pattern: the CI for this indicator was -0.065 ($p = 0.006$) in 1990 and more than doubled by 2017, with a CI of -0.148 ($p = 0.037$).

The CI values for death rate attributable to unsafe water, sanitation, and hygiene (WaSH) are negative for the period, with a reduction of 35% from 1990 to 2017; that is, the CI in 1990 was -0.327 ($p < 0.001$) and -0.211 ($p < 0.001$) in 2017.

With regard to the two health-related indicators of SDG 5, gender equality, neither for the prevalence of women experiencing violence by an intimate partner in the last 12 months nor the prevalence experiencing violence by a non-intimate partner in the last 12 months there was evidence of inequality.

For SDG 6, clean water and sanitation, there are three health-related indicators, and for all of those, there was evidence of inequality affecting population living in less-developed states. Prevalence of population without access to a handwashing facility was concentrated in less-developed states, with a clear trend of reducing inequality. The CI for this indicator was -0.251 ($p < 0.001$) in 1990 and decreased to -0.061 ($p < 0.001$) in 2017, a 76% reduction in 27 years.

In an opposite trend, the inequality in prevalence of populations using unsafe or unimproved sanitation increased in the period in 24%. The CI for this indicator went from -0.213 ($p = 0.005$) in 1990 to -0.267 ($p < 0.001$) in 2017.

Finally, inequality in the prevalence of populations using unsafe or unimproved sources of water decreased in the period, although it was still relevant by 2017.

The CI for this indicator was -0.397 ($p=0.005$) in 1990 and dropped by 39% to -0.244 ($p<0.001$) in 2017.

For SDG 7, affordable and clean energy, there is one health-related indicator, prevalence of household air pollution, and there was evidence of increasing inequality for it, affecting less-developed states: the CI was -0.427 ($p<0.001$) in 1990 and increased to -0.463 ($p<0.001$) in 2017, that is, 8% higher.

All-cause disability-adjusted life year rates attributable to occupational risks is the health-related indicator for SDG 8, decent work and economic growth. The estimated CIs for the period indicate evidence of inequality that decreased over the period, with a CI of -0.027 ($p<0.001$) in 1990 and a CI of -0.014 ($p=0.012$) in 2017. There is one health-related indicator for SDG 11, sustainable cities and communities, the mean levels of fine particulate matter smaller than 2.5 microns in diameter. The analysis indicates that this value is higher among more-developed states, with an increasing pattern. For this indicator, the CI was 0.027 ($p=0.064$) in 1990 and 0.047 ($p=0.002$) in 2017.

For SDG 16, peace, justice, and strong institutions, there are five health-related indicators, and for three of them (death rate due to conflict and terrorism, death rate due to interpersonal violence, and prevalence of physical violence), there is no evidence of inequalities.

On the other hand, for the indicator on child sexual abuse (prevalence of men and women aged 18-29 years that experienced sexual violence by the age 18), the CI values indicate a slight concentration among less-developed states, with the CI being -0.046 ($p=0.001$) in 1990 and -0.031 ($p=0.007$) in 2017.

The prevalence of sexual violence was, in turn, slightly concentrated in more-developed states during the period, with a decreasing trend in the CI values: the CI was 0.030 ($p<0.001$) in 1990 and 0.005 ($p=0.018$) in 2017.

For SDG 17, partnerships for the goals, there is one health-related indicator, the percentage of well-certified deaths. The CI for this indicator was 0.158 ($p<0.001$) in 1990 and dropped to 0.048 ($p=0.003$) in 2017.

The health-related indicator for SDG 1, no poverty, death rate due to exposure to forces of nature, presented no evidence of inequalities during the period; that is, the CI were not statistically different from zero.

Finally, three health-related indicators were included for SDG 2, zero hunger, and for all three there was evidence of inequality. Regarding overweight among children aged 2 to 4, there was an important reduction in the CI absolute value, from 0.148 ($p < 0.001$) in 1990 to 0.084 ($p < 0.001$) in 2017, equivalent to 46% decline. In this case, the positive value indicates that child overweight is more frequent in more-developed states, but the trend is to equalise across the SDI. With regard to stunting and wasting, for both indicators (prevalence in children under 5), the CI values indicate inequalities, with higher prevalence among less-developed states. While for wasting there is a decreasing trend in inequality, for stunting the inequality increased from 1990 to 2017. The CI for prevalence of stunting was -0.118 ($p=0.008$) in 1990 and increased to -0.137 ($p=0.001$) in 2017. For wasting prevalence, the CI went from -0.070 ($p=0.002$) in 1990 to -0.035 ($p=0.084$) in 2017, that is, almost negligible change.

4. Decomposition analysis by indicator

For inequality on the adolescent fertility rate, while GDP per capita seems to reduce it (opposite sign, absolute contribution of 0.030), the larger contributor to it is poverty, with an absolute contribution of -0.036. For alcohol use, the larger contributor is illiteracy, with an absolute contribution of 0.018; this indicator is also the larger contributor to the inequality in family planning: 0.013. For the inequality in the density of health care personnel, illiteracy is also the larger contributor, with an absolute contribution of 0.058, while poverty is the second contributor with 0.049.

For inequality on the incidence of hepatitis B, poverty is the larger contributor with an absolute contribution of -0.093, while for malaria incidence it is the public health expenditure percentage of GDP with an absolute contribution of -1.091.

For inequality in maternal mortality ratio, the largest and sign coincident contribution is from poverty, with a value of -0.098, while for mortality due to chronic conditions it is illiteracy, with 0.022. For inequality in the prevalence of

neglected tropical diseases, again illiteracy is the larger contributor with a value of -0.085.

For inequality in the prevalence of smoking, again illiteracy is the larger contributor, with a value of 0.090, while for inequality in the indicator for UHC, poverty is the larger contributor, with an absolute contribution of 0.019.

The largest contributor to inequality in under-5 mortality was poverty, with absolute contribution of -0.073, almost as large as the CI for the health indicator.

In turn, the largest value of absolute contribution to inequality in vaccine coverage is the per capita public health expenditure, with a value of -0.018.

For the inequality in WaSH mortality, public health expenditure as percentage of the state GDP is the explanatory variable, with the larger sign-coincident value of absolute contribution with -0.171. Inequalities in the prevalence of unsafe or unimproved handwashing facilities, sanitation, and water are explained principally by illiteracy, with values of absolute contribution of -0.038, -0.243, and -0.164, respectively. Illiteracy is also the variable that explains most of the inequality in the prevalence of household pollution, with an absolute contribution of -0.337.

Poverty turns out to be the variable with the larger explanation for inequality in the mean levels of PM_{2.5}, with an absolute contribution of 0.082.

Regarding inequality in child sex abuse, per capita public health expenditure is the variable that explains more of it, with an absolute contribution of -0.044, and this is also the variable that explains more of the inequality in sexual violence, with an absolute contribution of 0.007.

The inequality in well-registered deaths is explained mostly by illiteracy, with an absolute contribution of 0.013.

Illiteracy is also the variable with the larger value of absolute contribution to inequality in child overweight, 0.033. Regarding inequalities in the indicators of child malnourishment by deficiencies, per capita public health expenditure is the larger contributor to stunting and poverty to wasting, with absolute contributions of -0.102 and -0.056, respectively.