HOW TO REDUCE MATERNAL MORTALITY IN MEXICO?

EVIDENCE-BASED
PUBLIC POLICIES

MATERNAL HEALTH **NATIONAL RANKING**

MELISA INSTITUTE

Developing public health policies is fundamental to promoting maternal health worldwide. The United Nations (UN) proposed eight Millennium Development Goals to guide the public policies of its member countries, including Mexico. The fifth goal aimed to reduce maternal mortality by 75% by 2015. However, once this deadline passed, global maternal mortality had dropped by just under 50%.

Some examples of the most important and universally accepted measures that have reduced maternal mortality worldwide are access to prenatal care, emergency obstetric care, skilled attendance at birth, access to clean water and increasing women's education.

This report presents, as a summary for the public, the scientific evidence obtained from a thorough investigation of the determinants of maternal mortality conducted in each Mexican state. The full study was published in British Medical Journal Open (BMJ Open) and coordinated by the MELISA Institute in cooperation with an international team of specialists from various institutions, such as UNAM, Duke University, the University of Utah, and the University of North Carolina-Chapel Hill.

In the following pages, the reader will find 32 index cards with the maternal mortality rankings of the 32 Mexican states, the most important determinants of maternal health identified in each state, and specific recommendations to design public policies based on scientific evidence. In fact, each Mexican state has its own challenges that require a policy addressing maternal health determinants, which differ from one state to another. Before reviewing the card of a particular state, it is recommended to read the brief glossary describing the 7 determinants of maternal health found by the investigation.

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Open Access Research

BMJ Open Abortion legislation, maternal healthcare, fertility, female literacy, sanitation, violence against women and maternal deaths: a natural experiment in 32 Mexican states

This report on maternal mortality including the 32 states that comprise Mexico was prepared based on a research published in the British Medical Journal Open.

Abortion legislation, maternal healthcare, fertility, female literacy, sanitation, violence against women and maternal deaths: a natural experiment in 32 Mexican states.

BMJ Open. 2015; 5(2): e006013.

SEVEN DETERMINANTS OF MATERNAL MORTALITY IN MEXICO

WOMEN'S EDUCATION. The studies invariably confirm that the lower the education of women of reproductive age is, the greater the risk of death during pregnancy, delivery, and postpartum. In the study of the 32 Mexican states, low female literacy explained between 11.9% and 50.9% of maternal mortality. Female literacy rates in the 32 states range from 77.5% to 96.5%. In addition to its direct impact on reducing maternal mortality, higher education of women positively affects other factors, such as increased access to prenatal care, skilled attendance at birth, and emergency obstetric care if complications arise during pregnancy.

RECOMMENDATION: Current evidence suggests that a 5% increase in literacy rates, in states below the national average, would prevent the deaths of 5 to 10 women in each state. It is essential for these states to develop public policies and allocate resources to eradicate illiteracy, achieve universal schooling of girls, and increase the years of total schooling of women.

EMERGENCY OBSTETRIC CARE. This refers to the immediate care of an obstetric complication, such as haemorrhage, obstruction of labor, or complicated abortion. For example, for every 5% increase in access to hospitals for urgent complications of this type, 4 or 5 maternal deaths could be prevented in each state, especially in those with higher maternal mortality.

RECOMMENDATION: Recent evidence suggests that more than half of the states require specific public policies to increase the number of maternity hospitals with more advanced emergency obstetric care (1 per 500,000 inhabitants), including the availability of blood transfusion, intensive care with mechanical ventilation, and access to surgical care. Transport in rural areas with difficult access should be improved.

PRENATAL CARE AND SKILLED ATTENDANCE AT BIRTH. These factors refer to the numbers of women attending prenatal care early in their pregnancy and ultimately receiving skilled attendance at birth. In Mexico, coverage of skilled attendance at birth ranges between 75% and 99% across the different states. This factor illuminates important gaps in access to prenatal care and coverage of institutional delivery in more than half of the states.

RECOMMENDATION The most recent evidence in the study of the 32 Mexican states showed that it would be possible to prevent 2 to 3 maternal deaths per year for every 5% increase in skilled attendance at birth in the states below the country's average. Specific public policies are required to increase the early detection of pregnancy and make sure that every pregnant woman attends at least 4 prenatal visits. In rural areas with difficult access, transport and timely arrival of healthcare providers should be improved.

CLEAN WATER AND SANITATION. Among the environmental risk factors identified in the study of the 32 Mexican states, clean water and sanitation were clear determinants of maternal health. The lower the access to clean water and sanitation is, the greater the number of deaths during pregnancy. First, poor hygiene conditions can lead to puerperal sepsis, one of the leading causes of preventable maternal deaths in the world. Second, exposure to dirty water and lack of sanitation increases the likelihood of repeated long-term infections, thus weakening women of reproductive age.

RECOMMENDATION: Considering the current disparities found across Mexican states with regard to the supply of clean water and sanitation (the lowest being 62.0% and the highest being 99.2%), scientific evidence shows that Mexican states below the national average of clean water supply urgently require public policies and programs to increase access to clean water and sanitation to reduce maternal deaths.

HIGH-RISK PREGNANCY AND LOW BIRTH WEIGHT. High-risk pregnancies, such as those occurring among malnourished women in the poorest regions and those pregnancies increasingly common in women aged over 35 years in wealthier urban regions, but with higher population densities, lower fecundity, and more aged populations, result in the highest rates of premature births and low birth weight. These high-risk pregnancies represent over 50% of maternal deaths in several states. For every 1% increase in low-birth-weight newborns in one state, 1 or 2 preventable maternal deaths occur in that state.

RECOMMENDATION: The evidence suggests that states with low-birth-weight rates higher than the country average would benefit from public policies aimed at the detection and timely referral of high-risk pregnancies to more advanced diagnostic and obstetric care centers. States lacking access to these types of centers should implement them. Malnourished mothers require access to supplementary feeding programs during their pregnancies and puerperia. Malnutrition can and must be eradicated.

VIOLENCE AGAINST WOMEN. Physical violence during pregnancy increases the risk of obstetric complications from beatings, injuries, premature labor, and haemorrhage. Affected women often suffer barriers to accessing adequate prenatal care. In the study of the 32 Mexican states, violence against women in the last year was identified as a factor influencing global maternal mortality and abortion-related mortality. It was estimated that between 2.8% and 7.2% of maternal deaths in the Mexican states may be related to violence. In Mexico, violence against women ranges from 6.3% in Oaxaca to 20.9% in Mexico City.

RECOMMENDATION: Current evidence suggests that screening programs for violence against women during prenatal visits along with later interventions by qualified health professionals can improve maternal health. Public policies are required to fulfill this objective and guarantee the welfare of families.

FECUNDITY AND DELAYED MOTHERHOOD. The increase in education level together with the greater participation of women in the labor force have led to delayed motherhood and a decrease in fecundity. These phenomena have resulted in an increase in pregnancies at older ages, i.e., between 35 and 45 years. In pregnancies at older ages, complications are observed more frequently, especially in primiparous women.

RECOMMENDATION: Current evidence suggests that maternal aging is a global phenomenon in Mexico and is more evident in states with greater urban development. Preconception counseling programs to promote healthy pregnancies before the age of 35 and reinforce prenatal care to detect risk factors in pregnancies at older ages must be developed.

NUEVO LEÓN

Nº Women of childbearing age: 1,323,790 **Nº Births: 93,747 (3.6% of the National total)**[1]

The state of **Nuevo León** is one of the 5 states with the lowest maternal mortality rates in the country over the last 10 years. On average, 21.2 women die per 100 thousand live births per year.

Indirect obstetric deaths resulting from previously existing diseases represent 33.8% over 10 years. Gestational hypertension, eclampsia, and toxemias of pregnancy represent another 29%. Haemorrhage represents 6.8% of maternal deaths over a decade.

Ninety point three percent (90.3%) of maternal deaths are unrelated to abortion. Induced abortion and spontaneous abortion each represent 1% of deaths over 10 years.[2]

MAJOR DETERMINANTS

Nuevo León's maternal health is one of the best in the country in terms of prenatal care and coverage of skilled attendance at birth. Mothers' literacy is over 95%, as is access to clean water and sanitation.

The current mortality pattern is influenced by an aging population, decreased fecundity, and **delayed motherhood**. Pregnancies have increased in women aged 35 - 45 years, who have a higher incidence of serious obstetric complications and concomitant diseases.[3] They also have a higher risk of premature birth **and low-birth-weight newborns**. Sixty-two percent (62%) of current maternal deaths occur in **high-risk pregnancies**.

Access to **emergency obstetric care** and more advanced prenatal care should be strengthened in the coming years. High-risk pregnancies require **specialized medical care**.

The prevalence of **violence against women** is 13.1%, higher than the country's median. Demographic changes, such as a decrease in marriages, an increase in informal unions, and alcohol and drug use, are associated with higher levels of violence against women.[4] **Physical violence** during pregnancy increases the risk of obstetric complications from beatings, injuries, premature labor, and haemorrhage. Affected women often face barriers to accessing regular prenatal care or timely emergency obstetric care. It is necessary to **detect this violence in prenatal visits** to prevent complications, pregnancy losses, premature births, and accidental maternal deaths.

[1] Source: INEGI. Birth statistics by state.
[2] Ectopic pregnancy, molar pregnancy, and other conception abnormalities represent 7.7% of deaths over 10 years.
[3] Koch E, Thorp J, Bravo M, et al. Women's education level, maternal health facilities, abortion legislation and maternal deaths: a natural experiment in Chile from 1957 to 2007. PLoS One. 2012;7(5):e36613.
[4] Pliego, F. Families in Mexico. Organizational Structures. Processes of Change 2000-2010 and consequences for the well-being of children and adults. (1st ed.). Mexico City: Editorial Porrúa; 2014.

DETERMINANTS OF MATERNAL MORTALITY

NUEVO LEÓN

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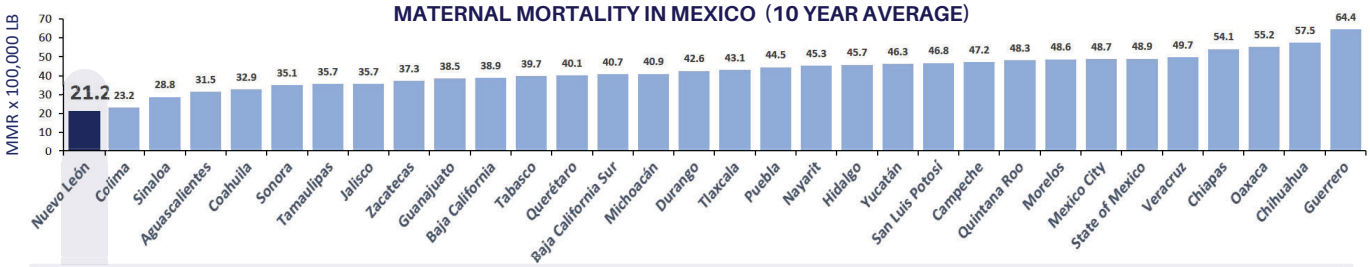
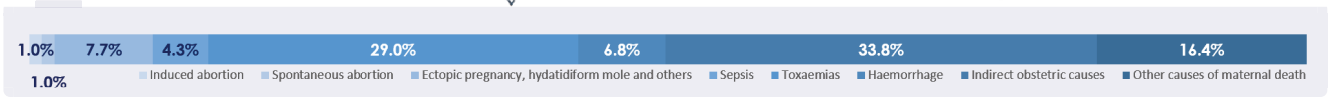
NATIONAL 44.6

LOWER — HIGHER

MATERNAL MORTALITY IN MEXICO (10 YEAR AVERAGE)





DETERMINANTS OF MATERNAL MORTALITY - STATE VS. NATIONAL

SKILLED ATTENDANCE AT BIRTH

96.6% ✓

(NATIONAL 92.7%)

EMERGENCY OBSTETRIC CARE

6.5 / 100 LIVE BIRTHS

(GOAL 10.0/100 LB)

LOW BIRTH WEIGHT

8.6%

(NATIONAL 8.4%)

WOMEN'S EDUCATION

LITERACY

95.8% ✓ (National 92.9%)

CLEAN WATER

96.9% ✓ (National 91.8%)

VIOLENCE AGAINST WOMEN

13.1% (National 10.8%)

FECUNDITY AND DELAYED MOTHERHOOD

2.1 children / woman (National 2.3 children / woman)

EVIDENCE-BASED PUBLIC HEALTH INTERVENTIONS TO IMPROVE MATERNAL HEALTH

- EXPAND SPECIALISED PRENATAL CARE FOR HIGH-RISK PREGNANCIES AND NUTRITIONAL PROGRAMMES FOR MALNOURISHED PREGNANT WOMEN
- INCREASE NUMBER OF AND ACCESS TO EMERGENCY OBSTETRIC UNITS
- DETECT VIOLENCE AGAINST WOMEN DURING PRENATAL VISITS
- PRECONCEPTION COUNSELLING IN ORDER TO PROMOTE HEALTHY CHILDBEARING

NATIONAL RANKING

1

Adapted from Koch et al. BMJ Open 2015;5:e006013. doi: 10.1136/bmjopen-2014-006013

COLIMA

Nº Women of childbearing age: 187,469 **Nº Births: 14,054 (0.5% of the National total)**[1]

The state of **Colima** ranks 2nd in the national ranking of maternal mortality. On average, 23.2 women die per 100 thousand live births per year.

Haemorrhage has been the main cause of maternal mortality, representing 29% of deaths over 10 years. Indirect obstetric deaths resulting from previously existing diseases represent 25.8%. Next, gestational hypertension, eclampsia, and toxemias of pregnancy represent 16.1% of maternal deaths recorded over a decade.

Abortion deaths are uncommon in **Colima**. In fact, there were no deaths from induced or spontaneous abortion over the 10-year period, except for deaths due to ectopic pregnancy.[2]

MAJOR DETERMINANTS

Colima is one of the states with the lowest number of women of reproductive age in the country, with few births, and one of the 5 states with the lowest maternal mortality rates in the country. The state has achieved high coverage of prenatal care and skilled attendance at birth.

The maternal health profile of **Colima** is currently influenced by an aging population, decreased fecundity, and **delayed motherhood**. These factors contribute to an increase in pregnancies in older women, who are at greater risk of complications such as gestational hypertension, eclampsia, gestational diabetes, and toxemias of pregnancy.[3] They may also experience haemorrhage, obstruction of labor, uterine rupture, and complications due to the presence of concomitant diseases that may worsen during pregnancy.

The prevalence of **violence against women** is higher than the country's median, reaching 11%. Demographic changes, such as a decrease in marriages, an increase in informal unions, and alcohol and drug use, are associated with higher levels of violence against women.[4] **Physical violence** during pregnancy increases the risk of obstetric complications from beatings, injuries, premature labor, and haemorrhage. Affected women often face barriers to accessing regular prenatal care and timely emergency obstetric care. It is important to **detect this violence in prenatal visits** to prevent complications, pregnancy losses, premature births, fetal deaths, and accidental maternal deaths.

[1] Source: INEGI. Birth statistics by state.
[2] Ectopic pregnancy, molar pregnancy, and other anomalies of conception represent 6.5% of deaths over 10 years.
[3] Koch E, Thorp J, Bravo M, et al. Women's education level, maternal health facilities, abortion legislation and maternal deaths: a natural experiment in Chile from 1957 to 2007. PLoS One. 2012;7(5):e36613.
[4] Pliego, F. Families in Mexico. Organizational Structures. Processes of Change 2000-2010 and consequences for the well-being of children and adults. (1st ed.). Mexico City: Editorial Porrúa; 2014.

DETERMINANTS OF MATERNAL MORTALITY

COLIMA

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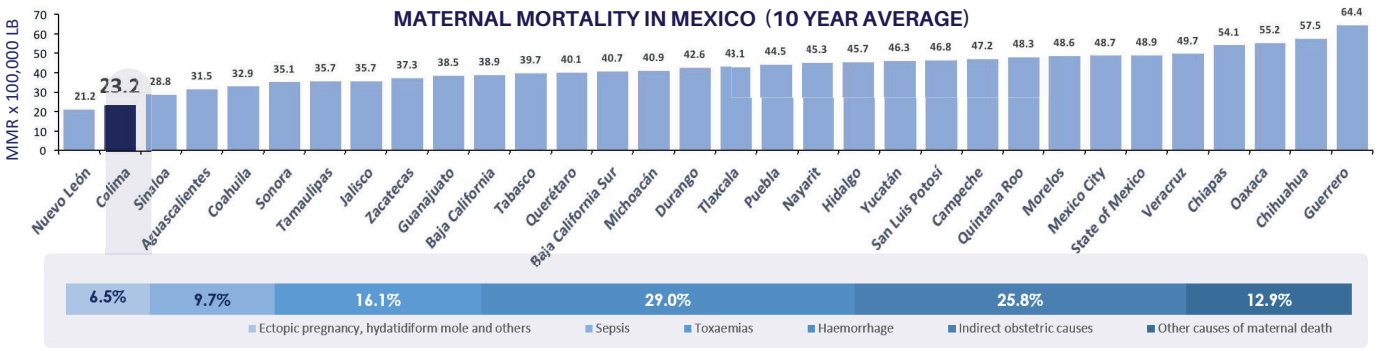
NATIONAL 44.6

LOWER — HIGHER

MATERNAL MORTALITY IN MEXICO (10 YEAR AVERAGE)



DETERMINANTS OF MATERNAL MORTALITY - STATE VS. NATIONAL

SKILLED ATTENDANCE AT BIRTH

96.4% ✓

(NATIONAL 92.7%)

EMERGENCY OBSTETRIC CARE

17.4 ✓

100 LIVE BIRTHS

(GOAL 10.0/100 LB)

LOW BIRTH WEIGHT

5.4% ✓

(NATIONAL 8.4%)

WOMEN'S EDUCATION

LITERACY

94.2% ✓ (National 92.9%)

CLEAN WATER

97.3% ✓ (National 91.8%)

VIOLENCE AGAINST WOMEN

11.0% (National 10.8%)

FECUNDITY AND DELAYED MOTHERHOOD

2.3 children / woman (National 2.3 children / woman)

EVIDENCE-BASED PUBLIC HEALTH INTERVENTIONS TO IMPROVE MATERNAL HEALTH

- DETECT VIOLENCE AGAINST WOMEN DURING PRENATAL VISITS
- PRECONCEPTION COUNSELLING IN ORDER TO PROMOTE HEALTHY CHILDBEARING

NATIONAL RANKING

2

Adapted from Koch et al. BMJ Open 2015;5:e006013. doi: 10.1136/bmjopen-2014-006013

SINALOA

Nº Women of childbearing age: 779,850 **Nº Births: 60,208 (2.3% of the National total)**[1]

Sinaloa is one of the 5 states with the lowest maternal mortality rates over the last 10 years. On average, 28.8 women die per 100 thousand live births per year.

The main causes are gestational hypertension, eclampsia, and toxemias of pregnancy, representing 38.2% of maternal deaths over a decade. Indirect obstetric deaths resulting from previously existing diseases represent 26.7%. Haemorrhage represents 14.7% of deaths.

Ninety-six point nine percent (96.9%) of maternal deaths are unrelated to abortion. Induced abortion represents 0.5% of maternal deaths over 10 years. There were no deaths from spontaneous abortion in this period, except for deaths due to ectopic pregnancy.[2]

MAJOR DETERMINANTS

Being one of the 5 states with the best maternal health profiles in the country, motherhood in **Sinaloa** is currently influenced by an aging population, decreased fecundity, and **delayed motherhood**. These factors contribute to an increase in pregnancies in women aged 40 years and older, who have a higher incidence of complications and concomitant diseases that may worsen during pregnancy.[3] More than 64% of maternal deaths occur in **high-risk pregnancies**. These require early detection and referral to a nearby reference center providing **specialized medical care**.

The percentage of the population with access to **clean water and sanitation** still has room for improvement in the state of **Sinaloa**, which will have an impact on the overall health of mothers and their children in the most vulnerable sectors of the region.

The levels of **violence against women** are higher than the country's median, reaching a prevalence of 15%. Demographic changes, such as a decrease in marriages, an increase in informal unions, and alcohol and drug use, are associated with higher levels of violence against women.[4] **Physical violence** during pregnancy increases the risk of obstetric complications from beatings, injuries, premature labor, and haemorrhage. Affected women often face barriers to accessing regular prenatal care and timely emergency obstetric care. It is necessary to **detect this violence during prenatal visits** to prevent complications, pregnancy losses, premature births, and accidental maternal deaths.

[1] Source: INEGI. Birth statistics by state.
[2] Ectopic pregnancy, molar pregnancy, and other anomalies of conception represent 6.5% of deaths over 10 years.
[3] Koch E, Thorp J, Bravo M, et al. Women's education level, maternal health facilities, abortion legislation and maternal deaths: a natural experiment in Chile from 1957 to 2007. PLoS One. 2012;7(5): e36613
[4] Pliego, F. Families in Mexico. Organizational Structures. Processes of Change 2000-2010 and consequences for the well-being of children and adults. (1st ed.). Mexico City: Editorial Porrúa; 2014.

DETERMINANTS OF MATERNAL MORTALITY

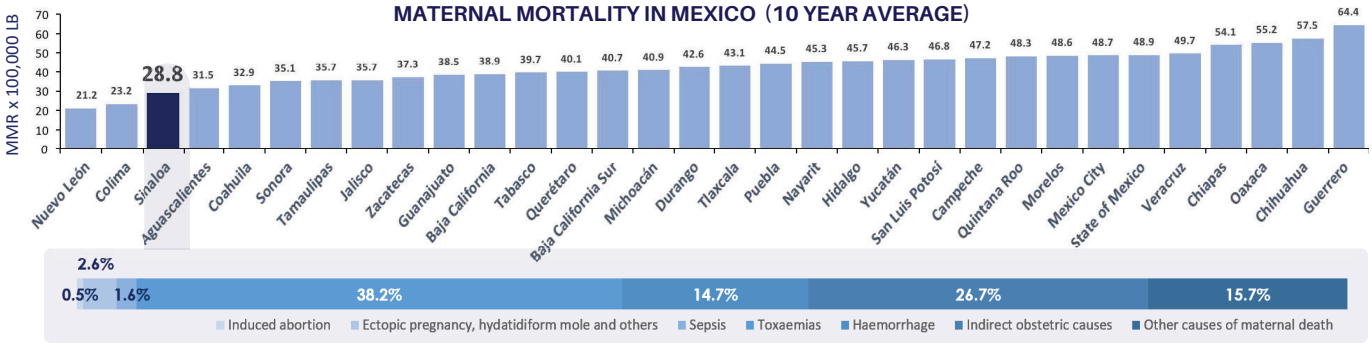
SINALOA

MELISA INSTITUTE

NATIONAL 44.6

LOWER — HIGHER

MATERNAL MORTALITY IN MEXICO (10 YEAR AVERAGE)



DETERMINANTS OF MATERNAL MORTALITY - STATE VS. NATIONAL

SKILLED ATTENDANCE AT BIRTH

93.4% ✓

(NATIONAL 92.7%)

EMERGENCY OBSTETRIC CARE

8.1 / 100 LIVE BIRTHS

(GOAL 10.0/100 LB)

LOW BIRTH WEIGHT

6.1% ✓

(NATIONAL 8.4%)

WOMEN'S EDUCATION

LITERACY

94.7% ✓ (National 92.9%)

CLEAN WATER

90.3% (National 91.8%)

VIOLENCE AGAINST WOMEN

15.0% (National 10.8%)

FECUNDITY AND DELAYED MOTHERHOOD

2.3 children / woman (National 2.3 children / woman)

EVIDENCE-BASED PUBLIC HEALTH INTERVENTIONS TO IMPROVE MATERNAL HEALTH

- INCREASE NUMBER OF AND ACCESS TO EMERGENCY OBSTETRIC UNITS
- PRECONCEPTION COUNSELLING IN ORDER TO PROMOTE HEALTHY CHILDBEARING
- DETECT VIOLENCE AGAINST WOMEN DURING PRENATAL VISITS
- INCREASE THE NUMBER OF HOUSEHOLDS WITH ACCESS TO CLEAN WATER AND SANITATION COVERAGE

NATIONAL RANKING 3

Adapted from Koch et al. BMJ Open 2015;5:e006013. doi: 10.1136/bmjopen-2014-006013

AGUASCALIENTES

Nº Women of childbearing age: 336,384 **Nº Births: 27,427 (1.1% of the National total)**[1]

Aguascalientes is one of the 5 states with the lowest maternal mortality rates over the last 10 years. On average, 31.5 women die per 100 thousand live births per year.

The main causes of death are gestational hypertension, eclampsia, and toxemias of pregnancy, representing 30.7% of deaths. Deaths due to previously existing diseases that may worsen during pregnancy represent 21.6%. Haemorrhage represents 17% of maternal deaths over a decade.

Eighty-nine point eight percent (89.8%) of maternal deaths are unrelated to abortion. Induced abortion represents 6.8% of deaths. There were no deaths from spontaneous abortion in this period.[2]

MAJOR DETERMINANTS

Maternal health in **Aguascalientes** is one of the best in the country in terms of prenatal care and skilled attendance at birth. Mothers' literacy is over 95%; access to clean water and sanitation are almost universal.

Motherhood in the state is influenced by an aging population and **delayed motherhood**. Pregnancies in women aged 40 years or older have a higher incidence of complications, such as gestational hypertension, eclampsia, and gestational diabetes. The same occurs with the presence of concomitant diseases that may worsen during pregnancy.[3]

Fifty-two percent (52%) of current maternal deaths in **Aguascalientes** are due to complex causes associated with **high-risk pregnancies**. These require early detection and referral to a state reference center providing **specialized medical care**.

The levels of **violence against women** are higher than the country's median, reaching a prevalence of 12%. Demographic changes, such as a decrease in marriages, an increase in informal unions, and alcohol and drug use, are associated with higher levels of **violence against women**.[4]

Physical violence during pregnancy increases the risk of obstetric complications from beatings, injuries, premature labor, and haemorrhage. Affected women often face barriers to accessing regular prenatal care and timely emergency obstetric care. It is necessary **to detect this violence during prenatal visits** to prevent complications, pregnancy losses, premature births, and accidental maternal deaths.

[1] Source: INEGI. Birth statistics by state.

[2] Ectopic pregnancy, molar pregnancy, and other anomalies of conception represent 3.4% of deaths over 10 years.

[3] Koch E, Thorp J, Bravo M, et al. Women's education level, maternal health facilities, abortion legislation and maternal deaths: a natural experiment in Chile from 1957 to 2007. PLoS One. 2012;7(5): e36613

[4] Pliego, F. Families in Mexico. Organizational Structures. Processes of Change 2000-2010 and consequences for the well-being of children and adults. (1st ed.). Mexico City: Editorial Porrúa; 2014.

DETERMINANTS OF MATERNAL MORTALITY

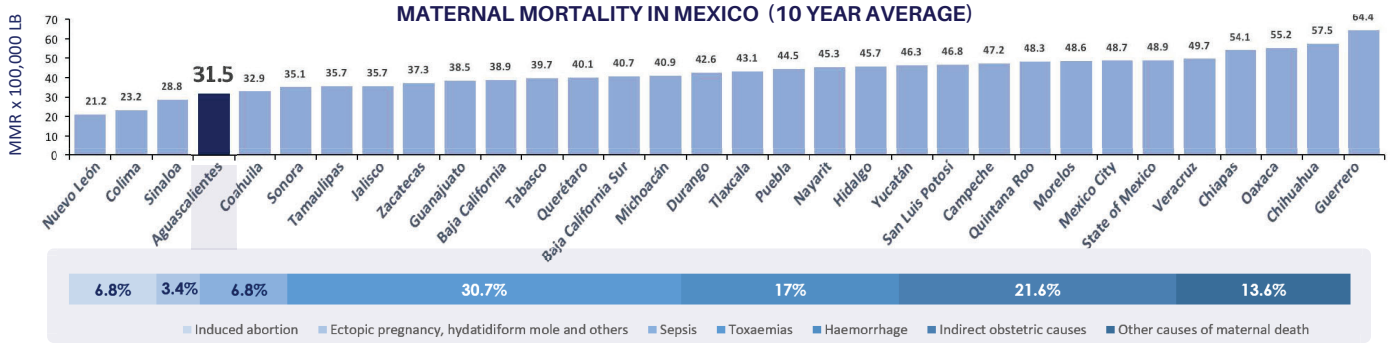
AGUASCALIENTES

MELISA INSTITUTE

NATIONAL 44.6

LOWER — HIGHER

MATERNAL MORTALITY IN MEXICO (10 YEAR AVERAGE)



DETERMINANTS OF MATERNAL MORTALITY - STATE VS. NATIONAL

SKILLED ATTENDANCE AT BIRTH

97.5% ✓

(NATIONAL 92.7%)

EMERGENCY OBSTETRIC CARE

10.8 ✓

100 LIVE BIRTHS

(GOAL 10.0/100 LB)

LOW BIRTH WEIGHT

6.6% ✓

(NATIONAL 8.4%)

WOMEN'S EDUCATION

LITERACY

95.9% ✓ (National 92.9%)

CLEAN WATER

98.0% ✓ (National 91.8%)

VIOLENCE AGAINST WOMEN

12.0% (National 10.8%)

FECUNDITY AND DELAYED MOTHERHOOD

2.6 children / woman (National 2.3 children / woman)

EVIDENCE-BASED PUBLIC HEALTH INTERVENTIONS TO IMPROVE MATERNAL HEALTH

- INCREASE ANTENATAL CARE VISITS AND SKILLED ATTENDANCE AT BIRTH
- DETECT VIOLENCE AGAINST WOMEN DURING PRENATAL VISITS
- PRECONCEPTION COUNSELLING IN ORDER TO PROMOTE HEALTHY CHILDBEARING

NATIONAL RANKING

4

Adapted from Koch et al. BMJ Open 2015;5:e006013. doi: 10.1136/bmjopen-2014-006013

COAHUILA

Nº Women of childbearing age: 769,140 **Nº Births: 58,882 (2.3% of the National total)**[1]

Coahuila is one of the 5 states with the lowest maternal mortality rates over the last 10 years. On average, 32.9 women die per 100 thousand live births per year.

The main causes of death are gestational hypertension, eclampsia, and toxemias of pregnancy, representing 32.7% of deaths. Indirect obstetric deaths resulting from previously existing diseases represent 28.2%. Haemorrhage represents 14.4% of deaths.

Ninety-five point five percent (95.5%) of maternal deaths are unrelated to abortion. Induced abortion represents 2% of deaths over 10 years. There were no deaths from spontaneous abortion in this period.[2]

MAJOR DETERMINANTS

Being one of the 5 states with the best maternal health in the country, motherhood in **Coahuila** is currently influenced by an aging population, decreased fecundity, and **delayed motherhood**. These factors contribute to an increase in pregnancies in women over 35 years of age, who are more likely to have complications and concomitant diseases that may worsen during pregnancy.[3] In fact, more than 60% of maternal deaths occur in **high-risk pregnancies**. These require detection during prenatal visits and referral to a nearby reference center providing **specialized medical care**.

Among health determinants, **Coahuila** still has 89.6% coverage of skilled attendance at birth. All women should have at least four prenatal visits during their pregnancy.

Violence against women is higher than the country's median, with a prevalence of 14.3%. Demographic changes, such as a decrease in marriages, an increase in informal unions, and alcohol and drug use, are associated with higher levels of violence against women.[4] **Physical violence** during pregnancy increases the risk of obstetric complications from beatings, injuries, premature labor, and haemorrhage.

Affected women often face barriers to accessing regular prenatal care and **timely emergency obstetric care**. It is necessary to detect this violence during prenatal visits to prevent complications, pregnancy losses, premature births, and accidental maternal deaths.

[1] Source: INEGI. Birth statistics by state.
[2] Ectopic pregnancy, molar pregnancy, and other anomalies of conception represent 2.5% of deaths over 10 years.
[3] Koch E, Thorp J, Bravo M, et al. Women's education level, maternal health facilities, abortion legislation and maternal deaths: a natural experiment in Chile from 1957 to 2007. PLoS One. 2012;7(5): e36613
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DETERMINANTS OF MATERNAL MORTALITY

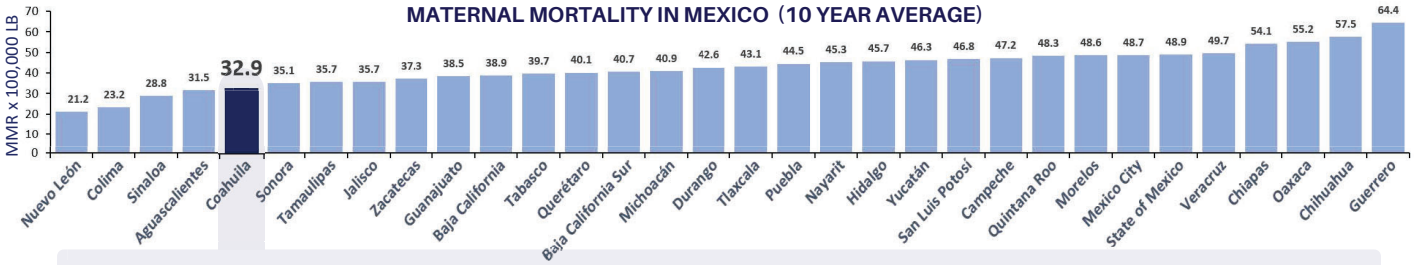
COAHUILA

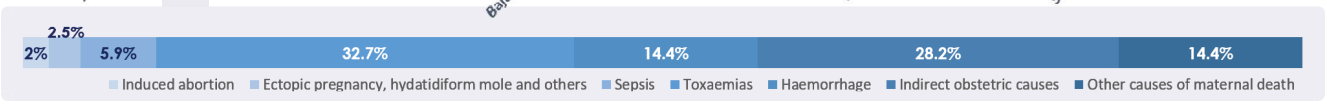
MELISA INSTITUTE

NATIONAL 44.6

LOWER ⟵ ⟶ HIGHER

MATERNAL MORTALITY IN MEXICO (10 YEAR AVERAGE)





DETERMINANTS OF MATERNAL MORTALITY - STATE VS. NATIONAL

SKILLED ATTENDANCE AT BIRTH

89.6%

(NATIONAL 92.7%)

EMERGENCY OBSTETRIC CARE

8.0 / 100 LIVE BIRTHS

(GOAL 10.0/100 LB)

LOW BIRTH WEIGHT

8.0% ✓

(NATIONAL 8.4%)

WOMEN'S EDUCATION

LITERACY

96.5% ✓ (National 92.9%)

CLEAN WATER

96.8% ✓ (National 91.8%)

VIOLENCE AGAINST WOMEN

14.3% (National 10.8%)

FECUNDITY AND DELAYED MOTHERHOOD

2.3 children / woman (National 2.3 children / woman)

EVIDENCE-BASED PUBLIC HEALTH INTERVENTIONS TO IMPROVE MATERNAL HEALTH

- INCREASE ANTENATAL CARE VISITS AND SKILLED ATTENDANCE AT BIRTH
- INCREASE NUMBER OF AND ACCESS TO EMERGENCY OBSTETRIC UNITS
- PRECONCEPTION COUNSELLING IN ORDER TO PROMOTE HEALTHY CHILDBEARING
- DETECT VIOLENCE AGAINST WOMEN DURING PRENATAL VISITS

NATIONAL RANKING

5

Adapted from Koch et al. BMJ Open 2015;5:e006013. doi: 10.1136/bmjopen-2014-006013

SONORA

Nº Women of childbearing age: 737,927 **Nº Births: 54,756 (2.1% of the National total)**[1]

The state of **Sonora** ranks 6th in the national ranking of maternal mortality over the past 10 years. On average, 35.1 women die per 100 thousand live births per year.

The main causes of death are indirect obstetric deaths, representing 26.4%. Next, deaths due to gestational hypertension, eclampsia, and toxemias of pregnancy represent 25.9% of deaths. Haemorrhage represents 16.4% of deaths over 10 years.[2]

Ninety-four point five percent (94.5%) of maternal deaths are unrelated to abortion. Induced abortion represents 4% and spontaneous abortion 0.5% of deaths over 10 years.[3]

MAJOR DETERMINANTS

The current mortality pattern in the state is influenced by an aging population and **delayed motherhood.** With increasing pregnancies at older ages (35-45 years), there is a higher incidence of complications, such as gestational hypertension, eclampsia, gestational diabetes, and toxemias of pregnancy.[4] More than 53% of maternal deaths occur in **high-risk pregnancies.** These require early detection and referral to a nearby reference center providing **specialized medical care**.

The levels of **violence against women** are higher than the country's median, reaching a prevalence of 15.4%. Demographic changes, such as a decrease in marriages, an increase in informal unions, and alcohol and drug use, are associated with higher levels of violence against women.[5]

Physical violence during pregnancy increases the risk of obstetric complications from beatings, injuries, premature birth, and haemorrhage. Affected women often face barriers to accessing regular prenatal care and timely **emergency obstetric care**. It is necessary to detect this violence during prenatal visits to prevent complications, pregnancy losses, premature births, and accidental maternal deaths.

Ten percent (10%) of the population in the state still does not have access to **sanitation**. Sanitation influences maternal health in the most vulnerable populations by preventing repeated infectious diseases, either by direct contact or by contamination of soil, water, and food with different pathogens.

[1] Source: INEGI. Birth statistics by state.
[2] Deaths preventable by timely medical-surgical treatment and blood transfusion availability.
[3] Ectopic pregnancy, molar pregnancy, and other anomalies of conception represent 1% of deaths over 10 years.
[4] Koch E, Thorp J, Bravo M, et al. Women's education level, maternal health facilities, abortion legislation and maternal deaths: a natural experiment in Chile from 1957 to 2007. *PLoS One*. 2012;7(5): e36613.
[5] Pliego, F. Families in Mexico. Organizational Structures. Processes of Change 2000-2010 and consequences for the well-being of children and adults. (1st ed.). Mexico City: Editorial Porrúa; 2014.

DETERMINANTS OF MATERNAL MORTALITY

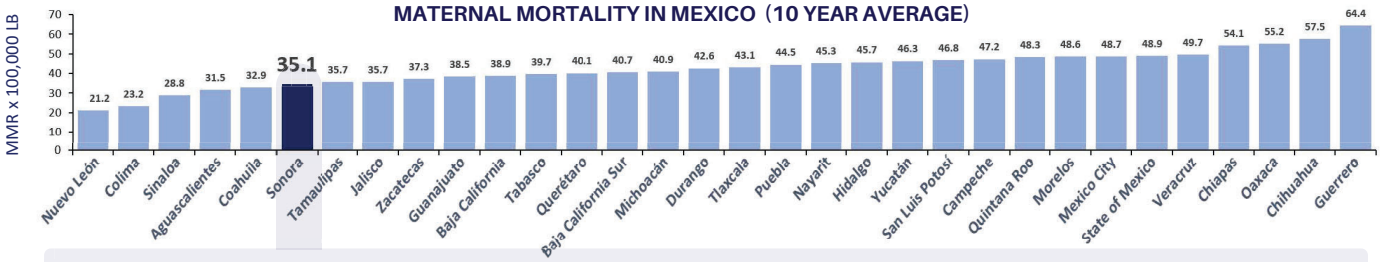
SONORA

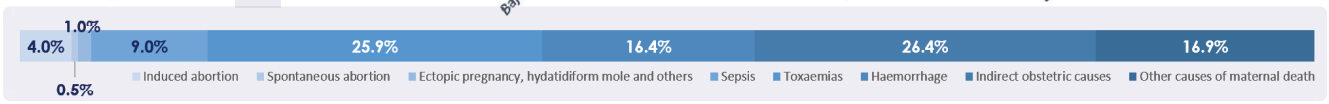
MELISA INSTITUTE

NATIONAL 44.6

LOWER — HIGHER

MATERNAL MORTALITY IN MEXICO (10 YEAR AVERAGE)





DETERMINANTS OF MATERNAL MORTALITY - STATE VS. NATIONAL

SKILLED ATTENDANCE AT BIRTH

94.6% ✓

(NATIONAL 92.7%)

EMERGENCY OBSTETRIC CARE

8.7 / 100 LIVE BIRTHS

(GOAL 10.0/100 LB)

LOW BIRTH WEIGHT

6.2% ✓

(NATIONAL 8.4%)

WOMEN'S EDUCATION

LITERACY

96.3% ✓ (National 92.9%)

SANITATION COVERAGE

90.0% (National 91.0%)

VIOLENCE AGAINST WOMEN

15.4% (National 10.8%)

FECUNDITY AND DELAYED MOTHERHOOD

2.4 children / woman (National 2.3 children / woman)

EVIDENCE-BASED PUBLIC HEALTH INTERVENTIONS TO IMPROVE MATERNAL HEALTH

- INCREASE NUMBER OF AND ACCESS TO EMERGENCY OBSTETRIC UNITS
- INCREASE THE NUMBER OF HOUSEHOLDS WITH SANITATION COVERAGE
- DETECT VIOLENCE AGAINST WOMEN DURING PRENATAL VISITS
- PRECONCEPTION COUNSELLING IN ORDER TO PROMOTE HEALTHY CHILDBEARING

NATIONAL RANKING

6

Adapted from Koch et al. BMJ Open 2015;5:e006013. doi: 10.1136/bmjopen-2014-006013

TAMAULIPAS

Nº Women of childbearing age: 935,444 **Nº Births: 66,892 (2.6% of the National total)**[1]

The state of **Tamaulipas** ranks 7th in the national ranking of maternal mortality over the past 10 years. On average, 35.7 women die per 100 thousand live births per year.

The main causes of death are gestational hypertension, eclampsia, and toxemias, representing 33% of deaths. Indirect obstetric deaths resulting from previously existing diseases represent 24.6%. Haemorrhage represents 14.8% of deaths over a decade.[2]

Ninety-four point three percent (94.3%) of maternal deaths are unrelated to abortion. Induced abortion represents 2.7% of deaths over 10 years. There were no deaths from spontaneous abortion in this period.[3]

MAJOR DETERMINANTS

Similar to other Mexican states, the current mortality pattern of **Tamaulipas** is influenced by an aging population and **delayed motherhood**. With increasing pregnancies at older ages (35-45 years), there is a higher incidence of complications, such as gestational hypertension, eclampsia, gestational diabetes, and toxemias of pregnancy.[4] Such women also have a higher risk of haemorrhage during labor and complications of concomitant diseases that may worsen during pregnancy.

Approximately 12% of the population of Tamaulipas still does not have access to **sanitation.** Clean water and sanitation are key determinants influencing maternal and child health in the most vulnerable populations, preventing repeated infectious diseases, either by direct contact or through contamination of soil, water, and food with feces.

The levels of **violence against women** are higher than the country's median, reaching a prevalence of 14.9%. Demographic changes, such as a decrease in marriages, an increase in informal unions, and alcohol and drug use, are associated with higher levels of violence against women.[5]

Physical violence during pregnancy increases the risk of obstetric complications from beatings, injuries, premature birth, and haemorrhage. Affected women often face barriers to accessing regular prenatal care and timely **emergency obstetric care**. It is necessary to detect this violence during prenatal care to prevent complications, pregnancy losses, premature births, and accidental maternal deaths.

[1] Source: INEGI. Birth statistics by state.
[2] Deaths preventable by timely medical-surgical treatment and blood transfusion availability.
[3] Ectopic pregnancy, molar pregnancy, and other anomalies of conception represent 3% of deaths over 10 years.
[4] Koch E, Thorp J, Bravo M, et al. Women's education level, maternal health facilities, abortion legislation and maternal deaths: a natural experiment in Chile from 1957 to 2007. *PLoS One*. 2012;7(5): e36613.
[5] Pliego, F. Families in Mexico. Organizational Structures. Processes of Change 2000-2010 and consequences for the well-being of children and adults. (1st ed.). Mexico City: Editorial Porrúa; 2014.

DETERMINANTS OF MATERNAL MORTALITY

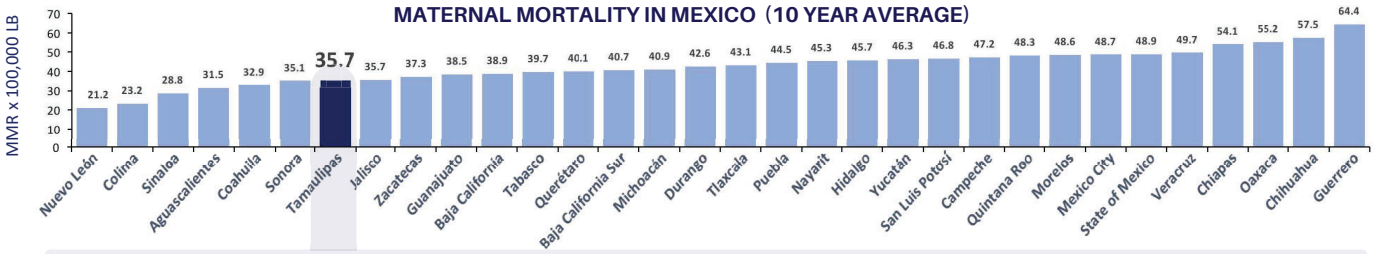
TAMAULIPAS

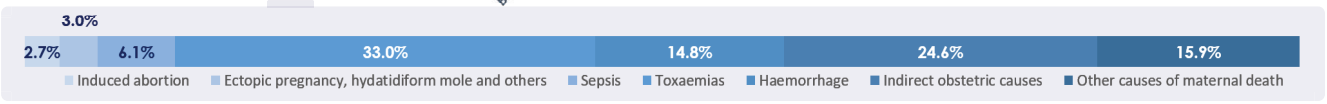
MELISA INSTITUTE

NATIONAL 44.6

LOWER ⟵ ⟶ HIGHER

MATERNAL MORTALITY IN MEXICO (10 YEAR AVERAGE)





DETERMINANTS OF MATERNAL MORTALITY - STATE VS. NATIONAL

SKILLED ATTENDANCE AT BIRTH

99.0% ✓

(NATIONAL 92.7%)

EMERGENCY OBSTETRIC CARE

10.0 ✓ / 100 LIVE BIRTHS

(GOAL 10.0/100 LB)

LOW BIRTH WEIGHT

7.4% ✓

(NATIONAL 8.4%)

WOMEN'S EDUCATION

LITERACY

94.2% ✓ (National 92.9%)

SANITATION COVERAGE

88.1% (National 91.0%)

VIOLENCE AGAINST WOMEN

14.9% (National 10.8%)

FECUNDITY AND DELAYED MOTHERHOOD

2.3 children / woman (National 2.3 children / woman)

EVIDENCE-BASED PUBLIC HEALTH INTERVENTIONS TO IMPROVE MATERNAL HEALTH

- INCREASE THE NUMBER OF HOUSEHOLDS WITH SANITATION COVERAGE
- DETECT VIOLENCE AGAINST WOMEN DURING PRENATAL VISITS
- PRECONCEPTION COUNSELLING IN ORDER TO PROMOTE HEALTHY CHILDBEARING

NATIONAL RANKING

7

Adapted from Koch et al. BMJ Open 2015;5:e006013. doi: 10.1136/bmjopen-2014-006013

JALISCO

Nº Women of childbearing age: 2,068,743 **Nº Births: 163,123 (6.3% of the National total)**[1]

The state of **Jalisco** ranks 8th in the national ranking of maternal mortality over the past 10 years. On average, 35.7 women die per 100 thousand live births per year.

Indirect obstetric deaths resulting from previously existing diseases represent 25.5%. Next, deaths due to gestational hypertension, eclampsia, and toxemias of pregnancy represent 23.3%. Haemorrhage represents 20% of deaths over a decade.

Ninety-two point eight percent (92.8%) of maternal deaths are unrelated to abortion. Induced abortion represents 1.5% and spontaneous abortion 1% of deaths over 10 years.[2]

MAJOR DETERMINANTS

Among the determinants of public health, **Jalisco** has insufficient coverage of **emergency obstetric care**. This likely explains why 20% of maternal deaths over 10 years result from haemorraghe.[3]

The current maternal health profile in the state is influenced by an aging population and **delayed motherhood**. With increasing pregnancies at older ages (35 to 45 years), there is a higher incidence of serious obstetric complications and concomitant diseases.[4] More than 58% of maternal deaths occur in high-risk pregnancies. These require early detection and referral to a reference center providing **specialized medical care**.

Jalisco has a higher prevalence of **low birth weight** than the country's median, which is explained, in part, by an increase in **premature births. Maternal malnutrition** must be eradicated. Pregnancies by in vitro fertilization (IVF) have also increased, which are at increased risk of premature birth.[5]

The prevalence of **intimate-partner violence against women** is 10% in Jalisco. Affected women often face barriers to accessing adequate prenatal care or timely health care. **Physical violence** during pregnancy increases the risk of obstetric complications from beatings, injuries, premature birth, and haemorrhage. It is necessary to **detect this violence during prenatal visits** to intervene and prevent deaths from these complications.

[1] Source: INEGI. Birth statistics by state.
[2] Ectopic pregnancy, molar pregnancy, and other anomalies of conception represent 4.6% of deaths over 10 years.
[3] Deaths preventable by timely medical-surgical treatment and blood transfusion availability.
[4] Koch E, Thorp J, Bravo M, et al. Women's education level, maternal health facilities, abortion legislation and maternal deaths: a natural experiment in Chile from 1957 to 2007. *PLoS One*. 2012;7(5): e36613.
[5] McGovern PG, et al. Increased risk of preterm birth in singleton pregnancies resulting from in vitro fertilization-embryo transfer or gamete intrafallopian transfer: a meta-analysis. *Fertil Steril.* 2004 Dec;82(6):1514-20.

DETERMINANTS OF MATERNAL MORTALITY

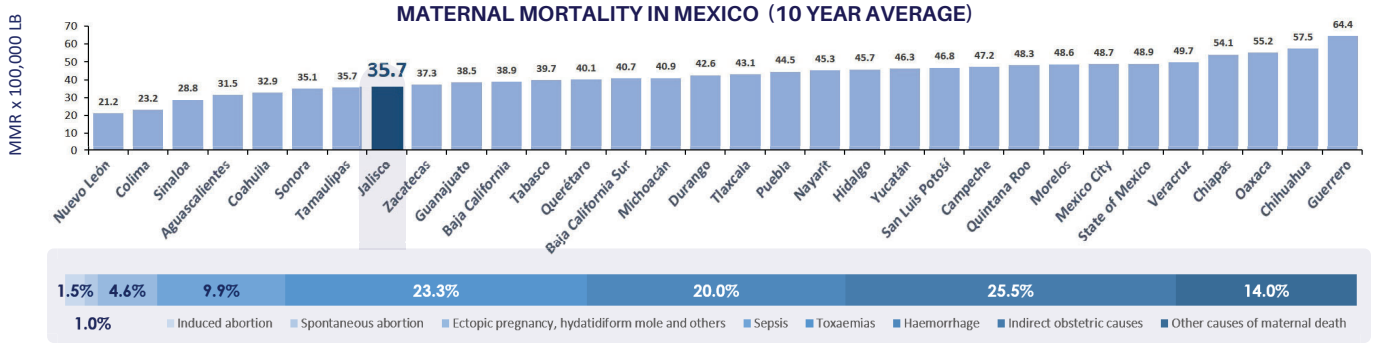
JALISCO

MELISA INSTITUTE

NATIONAL 44.6

LOWER — HIGHER

MATERNAL MORTALITY IN MEXICO (10 YEAR AVERAGE)



DETERMINANTS OF MATERNAL MORTALITY - STATE VS. NATIONAL

SKILLED ATTENDANCE AT BIRTH

93.5% ✓

(NATIONAL 92.7%)

EMERGENCY OBSTETRIC CARE

7.4 / 100 LIVE BIRTHS

(GOAL 10.0/100 LB)

LOW BIRTH WEIGHT

9.0%

(NATIONAL 8.4%)

WOMEN'S EDUCATION

LITERACY

94.8% ✓ (National 92.9%)

CLEAN WATER

94.6% ✓ (National 91.8%)

VIOLENCE AGAINST WOMEN

10.0% ✓ (National 10.8%)

FECUNDITY AND DELAYED MOTHERHOOD

2.4 children / woman

(National 2.3 children / woman)

EVIDENCE-BASED PUBLIC HEALTH INTERVENTIONS TO IMPROVE MATERNAL HEALTH

- INCREASE NUMBER OF AND ACCESS TO EMERGENCY OBSTETRIC UNITS
- EXPAND SPECIALISED PRENATAL CARE FOR HIGH-RISK PREGNANCIES AND NUTRITIONAL PROGRAMMES FOR MALNOURISHED PREGNANT WOMEN
- PRECONCEPTION COUNSELLING IN ORDER TO PROMOTE HEALTHY CHILDBEARING

NATIONAL RANKING

8

Adapted from Koch et al. BMJ Open 2015;5:e006013. doi: 10.1136/bmjopen-2014-006013

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ZACATECAS

Nº Women of childbearing age: 412,309 **Nº Births: 36,629 (1.4% of the National total)**[1]

Zacatecas ranks 9th in the national ranking of maternal mortality over the past 10 years. On average, 37.3 women die per 100 thousand live births per year.

The main causes of death are gestational hypertension, eclampsia, and toxemias of pregnancy, representing 26.6% of deaths. Indirect obstetric deaths resulting from previously existing diseases represent 23%. Haemorrhage represents 18.7% of deaths.

Ninety-four point three percent (94.3%) of maternal deaths are unrelated to abortion. Induced abortion represents 1.4% of deaths over 10 years. There were no deaths from spontaneous abortion in this period.[2]

MAJOR DETERMINANTS

Among the determinants of public health, **Zacatecas** still needs to improve coverage of **emergency obstetric care** and skilled attendance at birth. These factors explain why 18.7% of maternal deaths over 10 years result from haemorrhage.[3] It is estimated that every 5% increase in access to hospitals for urgent complications of this type could prevent 4 or 5 maternal deaths.

The current maternal health profile in the state is beginning to be influenced by an aging population and **delayed motherhood**. With increasing pregnancies at older ages (35 to 45 years), there is a higher incidence of serious obstetric complications and concomitant diseases.[4]

Nearly half of maternal deaths in Zacatecas are caused by **high-risk pregnancies**. To prevent them, these pregnancies need to be detected early and referred to a more advanced center providing **specialized obstetric care**.

Approximately 11% of the population in the state of **Zacatecas** does not have access to **sanitation**, and 8.3% does not have access to **clean water** either. Clean water is a key determinant influencing maternal and child health in the most vulnerable or poorest populations. Consumption of dirty or feces-contaminated water weakens mothers and their children due to repeated infections.

[1] Source: INEGI. Birth statistics by state.
[2] Ectopic pregnancy, molar pregnancy, and other anomalies of conception represent 4.3% of deaths over 10 years.
[3] Deaths preventable by timely medical-surgical treatment and blood transfusion availability.
[4] Koch E, Thorp J, Bravo M, et al. Women's education level, maternal health facilities, abortion legislation and maternal deaths: a natural experiment in Chile from 1957 to 2007. *PLoS One*. 2012;7(5):e36613.

DETERMINANTS OF MATERNAL MORTALITY

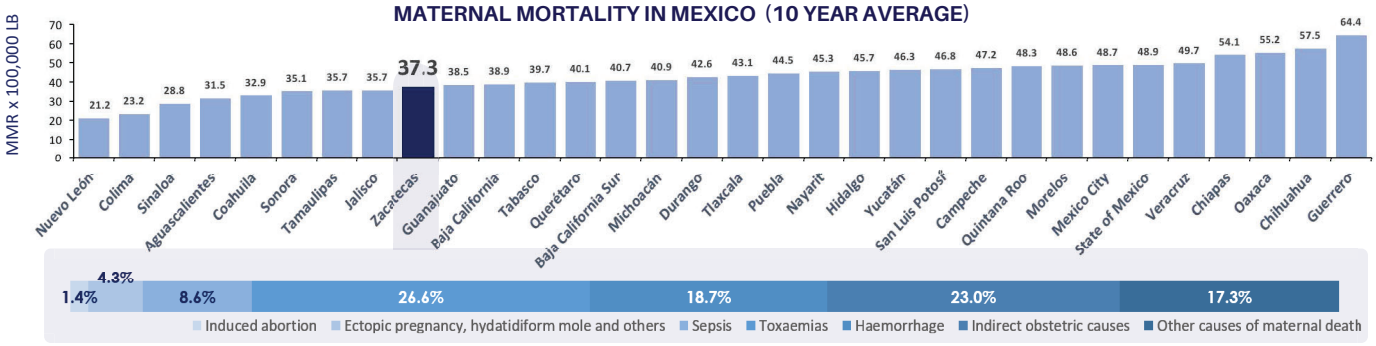
ZACATECAS

MELISA INSTITUTE

NATIONAL 44.6

LOWER — HIGHER

MATERNAL MORTALITY IN MEXICO (10 YEAR AVERAGE)



DETERMINANTS OF MATERNAL MORTALITY - STATE VS. NATIONAL

SKILLED ATTENDANCE AT BIRTH

89.1%

(NATIONAL 92.7%)

EMERGENCY OBSTETRIC CARE

8.3 / 100 LIVE BIRTHS

(GOAL 10.0/100 LB)

LOW BIRTH WEIGHT

8.6%

(NATIONAL 8.4%)

WOMEN'S EDUCATION

LITERACY

93.6% ✓ (National 92.9%)

SANITATION COVERAGE

89.0% (National 91.0%)

VIOLENCE AGAINST WOMEN

8.2% ✓ (National 10.8%)

FECUNDITY AND DELAYED MOTHERHOOD

2.5 children / woman

(National 2.3 children / woman)

EVIDENCE-BASED PUBLIC HEALTH INTERVENTIONS TO IMPROVE MATERNAL HEALTH

- INCREASE ANTENATAL CARE VISITS AND SKILLED ATTENDANCE AT BIRTH
- INCREASE NUMBER OF AND ACCESS TO EMERGENCY OBSTETRIC UNITS
- EXPAND SPECIALISED PRENATAL CARE FOR HIGH-RISK PREGNANCIES AND NUTRITIONAL PROGRAMMES FOR MALNOURISHED PREGNANT WOMEN
- PRECONCEPTION COUNSELLING IN ORDER TO PROMOTE HEALTHY CHILDBEARING
- INCREASE THE NUMBER OF HOUSEHOLDS WITH ACCESS TO CLEAN WATER AND SANITATION COVERAGE

NATIONAL RANKING

9

Adapted from Koch et al. BMJ Open 2015;5:e006013. doi: 10.1136/bmjopen-2014-006013

GUANAJUATO

Nº Women of childbearing age: 1,569,535 **Nº Births: 124,003 (4.8% of the National total)**[1]

The state of **Guanajuato** ranks 10th in the national ranking of maternal mortality over the past 10 years. On average, 38.5 women die per 100 thousand live births per year.

The main causes of death are gestational hypertension, eclampsia, and toxemias of pregnancy, representing 28.4% of deaths. Indirect obstetric deaths resulting from previously existing diseases represent 20.8%. Haemorrhage represents 20.6% of deaths.

Ninety-four point two percent (94.2%) of maternal deaths are unrelated to abortion. Induced abortion represents 1.2% and spontaneous abortion 0.8% of deaths over 10 years.[2]

MAJOR DETERMINANTS

Among the determinants of public health, **Guanajuato** still has insufficient coverage of **emergency obstetric care**. It is estimated that every 5% increase in access to hospitals for urgent complications could prevent 4 or 5 maternal deaths. Coverage of **prenatal care**[3] and **skilled attendance at birth** should also be increased. These factors likely explain why slightly more than 20% of maternal deaths over 10 years result from haemorrhage.[4]

Similar to other states, the current mortality pattern of **Guanajuato** is influenced by an aging population and **delayed motherhood**. With increasing pregnancies in the older age group (35 to 45 years), serious obstetric complications are more frequently observed.[5] Nearly half of maternal deaths in Guanajuato are caused by **high-risk pregnancies.** To prevent these deaths, these pregnancies need to be detected early and referred to more advanced **specialized obstetric care**.

Among the determinants of human development, there is still 10% female **illiteracy** in the state, and approximately 11% of the population does not have **access to clean water and sanitation**. Increased schooling influences better pregnancy care and utilization of available maternal health services. Clean water is a key determinant influencing maternal and child health in the most vulnerable populations. Consumption of dirty or feces-contaminated water weakens mothers and their children due to repeated infections.

[1] Source: INEGI. Birth statistics by state.
[2] Ectopic pregnancy, molar pregnancy, and other anomalies of conception represent 3.8% of deaths over 10 years.
[3] Every woman should have at least 4 prenatal visits during pregnancy.
[4] Deaths preventable by timely medical-surgical treatment and blood transfusion availability.
[5] Koch E, Thorp J, Bravo M, et al. Women's education level, maternal health facilities, abortion legislation and maternal deaths: a natural experiment in Chile from 1957 to 2007. *PLoS One*. 2012;7(5): e36613.

DETERMINANTS OF MATERNAL MORTALITY

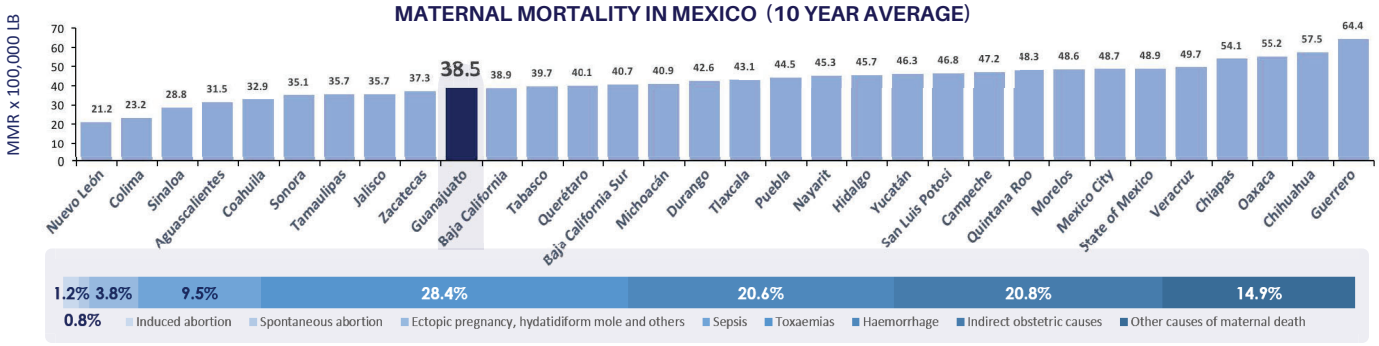
GUANAJUATO

MELISA INSTITUTE

NATIONAL 44.6

LOWER — HIGHER

MATERNAL MORTALITY IN MEXICO (10 YEAR AVERAGE)



DETERMINANTS OF MATERNAL MORTALITY - STATE VS. NATIONAL

SKILLED ATTENDANCE AT BIRTH

90.1%

(NATIONAL 92.7%)

EMERGENCY OBSTETRIC CARE

7.0 / 100 LIVE BIRTHS

(GOAL 10.0/100 LB)

LOW BIRTH WEIGHT

8.9%

(NATIONAL 8.4%)

WOMEN'S EDUCATION

LITERACY

90.1% (National 92.9%)

SANITATION COVERAGE

89.3% (National 91.0%)

VIOLENCE AGAINST WOMEN

6.4% ✓ (National 10.8%)

FECUNDITY AND DELAYED MOTHERHOOD

2.4 children / woman

(National 2.3 children / woman)

EVIDENCE-BASED PUBLIC HEALTH INTERVENTIONS TO IMPROVE MATERNAL HEALTH

- INCREASE ANTENATAL CARE VISITS AND SKILLED ATTENDANCE AT BIRTH
- INCREASE NUMBER OF AND ACCESS TO EMERGENCY OBSTETRIC UNITS
- EXPAND SPECIALISED PRENATAL CARE FOR HIGH-RISK PREGNANCIES AND NUTRITIONAL PROGRAMMES FOR MALNOURISHED PREGNANT WOMEN
- EXPAND AND STRENGTHEN PUBLIC POLICIES DIRECTED TO ERADICATE ILLITERACY AND INCREASE THE NUMBER OF SCHOOLING YEARS OF THE FEMALE POPULATION
- INCREASE THE NUMBER OF HOUSEHOLDS WITH ACCESS TO CLEAN WATER AND SANITATION COVERAGE

NATIONAL RANKING

10

Adapted from Koch et al. BMJ Open 2015;5:e006013. doi: 10.1136/bmjopen-2014-006013

BAJA CALIFORNIA

Nº Women of childbearing age: 917,626 **Nº Births: 65,631 (2.5% of the National total)[1]**

The state of **Baja California** ranks 11th in the national ranking of maternal mortality over the past 10 years. On average, 38.9 women die per 100 thousand live births per year.

The main causes of death are related to previously existing diseases that may worsen during pregnancy, representing 29.6% of deaths. Next, deaths due to gestational hypertension, eclampsia, and toxemias of pregnancy represent 28.9%. Haemorrhage represents 13% of deaths.[2]

Ninety point five percent (90.5%) of maternal deaths are currently unrelated to abortion. Induced abortion represents 2% and spontaneous abortion 1.2% of deaths over 10 years.[3]

MAJOR DETERMINANTS

Similar to other states, the maternal health profile of **Baja California** is influenced by decreased fecundity, an aging population, and **delayed motherhood**. With increasing pregnancies in the segment from 35 to 45 years, obstetric complications and concomitant diseases are more frequently observed.[4]

Among the determinants of public health, **Baja California** has insufficient coverage of access to **prenatal care**.[5] Increasing this coverage is key to reducing maternal deaths in the state. **Skilled attendance at birth** reaches little more than 75% and is the lowest in the country. Likewise, coverage of **emergency obstetric care** is also below the threshold. These factors likely result in over 58% of maternal deaths over 10 years being related to complex causes associated with high-risk pregnancies. To prevent deaths, these pregnancies need to be detected early in prenatal visits to receive more advanced or **specialized obstetric care**.

The prevalence of **intimate-partner violence against women** is 11.7%, higher than the country's median. Affected women often face barriers to accessing adequate prenatal care or timely health care. Physical violence during pregnancy **increases the risk of obstetric complications** from beatings, injuries, premature births, and haemorrhage. It is necessary to detect this violence during prenatal visits to prevent deaths from these complications.

[1] Source: INEGI. Birth statistics by state.
[2] Deaths preventable by timely medical-surgical treatment and blood transfusion availability.
[3] Ectopic pregnancy, molar pregnancy, and other anomalies of conception represent 6.3% of deaths over 10 years.
[4] Koch E, Thorp J, Bravo M, et al. Women's education level, maternal health facilities, abortion legislation and maternal deaths: a natural experiment in Chile from 1957 to 2007. *PLoS One*. 2012;7(5): e36613.
[5] Every pregnant woman should have at least 4 prenatal visits during her pregnancy with a qualified professional.

DETERMINANTS OF MATERNAL MORTALITY

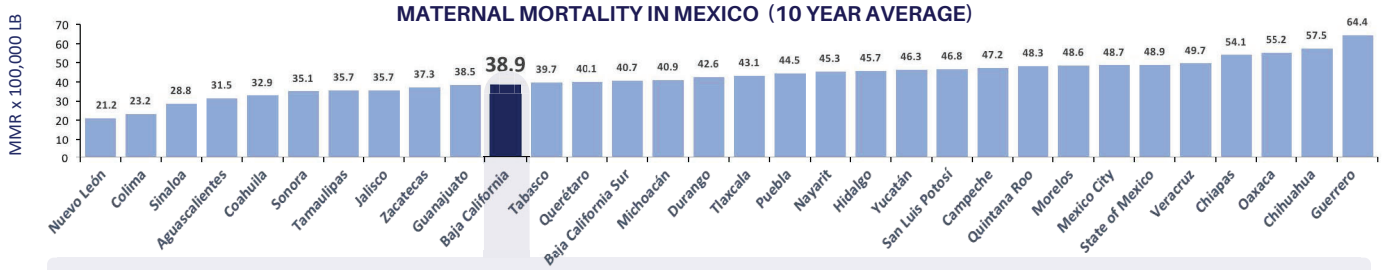
BAJA CALIFORNIA

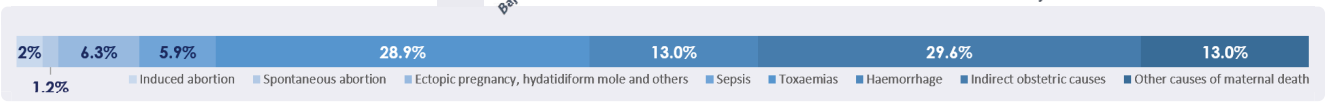
MELISA INSTITUTE

NATIONAL 44.6

LOWER — HIGHER

MATERNAL MORTALITY IN MEXICO (10 YEAR AVERAGE)





DETERMINANTS OF MATERNAL MORTALITY - STATE VS. NATIONAL

SKILLED ATTENDANCE AT BIRTH

75.7%

(NATIONAL 92.7%)

EMERGENCY OBSTETRIC CARE

9.2 / 100 LIVE BIRTHS

(GOAL 10.0/100 LB)

LOW BIRTH WEIGHT

6.9% ✓

(NATIONAL 8.4%)

WOMEN'S EDUCATION

LITERACY

96.0% ✓ (National 92.9%)

CLEAN WATER

95.3% ✓ (National 91.8%)

VIOLENCE AGAINST WOMEN

11.7%

(National 10.8%)

FECUNDITY AND DELAYED MOTHERHOOD

2.1 children / woman

(National 2.3 children / woman)

EVIDENCE-BASED PUBLIC HEALTH INTERVENTIONS TO IMPROVE MATERNAL HEALTH

- INCREASE ANTENATAL CARE VISITS AND SKILLED ATTENDANCE AT BIRTH
- INCREASE NUMBER OF AND ACCESS TO EMERGENCY OBSTETRIC UNITS
- PRECONCEPTION COUNSELLING IN ORDER TO PROMOTE HEALTHY CHILDBEARING
- DETECT VIOLENCE AGAINST WOMEN DURING PRENATAL VISITS

NATIONAL RANKING

11

Adapted from Koch et al. BMJ Open 2015;5:e006013. doi: 10.1136/bmjopen-2014-006013

TABASCO

Nº Women of childbearing age: 646,003 **Nº Births: 49,575 (1.9% of the National total)**[1]

The state of **Tabasco** ranks 12th in the national ranking of maternal mortality over the past 10 years. On average, 39.7 women die per 100 thousand live births per year.

The main causes of death are related to previously existing diseases, representing 29.8% of total deaths. Next, deaths due to gestational hypertension, eclampsia, and toxemias of pregnancy represent 26%. Haemorrhage represents 13.5% of deaths.[2]

Ninety-three percent (93%) of maternal deaths are unrelated to abortion. Induced abortion represents 4.2% of deaths over 10 years. There were no deaths from spontaneous abortion in this period.[3]

MAJOR DETERMINANTS

Among the determinants of public health, **Tabasco** has insufficient coverage of access to **prenatal care**. **Skilled attendance at birth** reaches only 82.4%. These factors likely result in slightly over 58% of maternal deaths over 10 years being related to complex causes associated with **high-risk pregnancies.** To prevent deaths, these pregnancies need to be detected early in prenatal visits and referred to a more advanced or specialized obstetric care center.

The state also has insufficient coverage of **emergency obstetric care**, partly determined by insufficient prenatal care.[4]

Approximately 26% of the population in the state does not have access to **clean water** services, and approximately 8% does not have access to **sanitation.** Clean water is a key determinant influencing maternal and child health in the most vulnerable and poorest populations. Consumption of dirty or feces-contaminated water weakens mothers and their children due to repeated infections.

Illiteracy still affects 10% of the female population. A low educational level of mothers is a predictor of maternal mortality because it affects pregnancy care and negatively influences the use of available public health services, such as prenatal care and institutional birth care, and access to emergency care if complications arise.

[1] Source: INEGI. Birth statistics by state.
[2] Deaths preventable by timely medical-surgical treatment and blood transfusion availability.
[3] Ectopic pregnancy, molar pregnancy, and other anomalies of conception represent 2.8% of deaths over 10 years.
[4] Every woman should have at least 4 prenatal visits during pregnancy.

DETERMINANTS OF MATERNAL MORTALITY

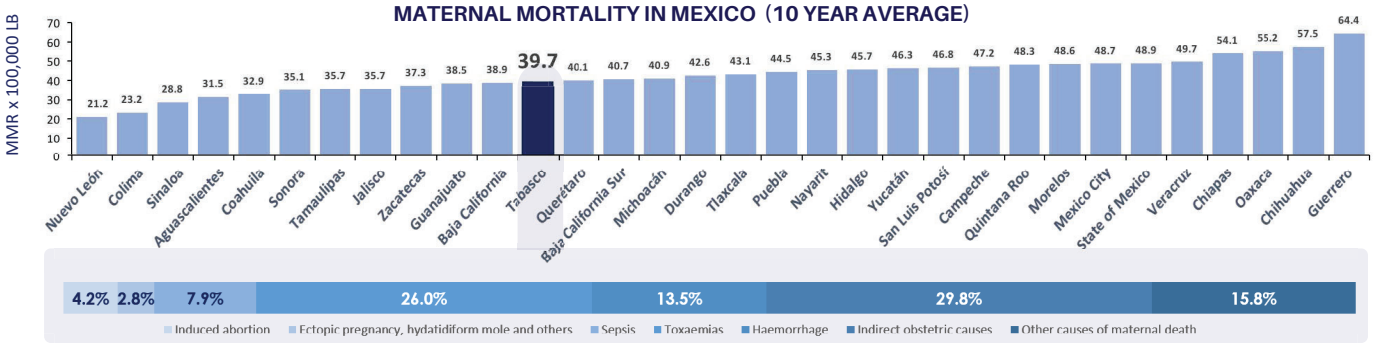
TABASCO

MELISA INSTITUTE

NATIONAL 44.6

LOWER ← → HIGHER

MATERNAL MORTALITY IN MEXICO (10 YEAR AVERAGE)



DETERMINANTS OF MATERNAL MORTALITY - STATE VS. NATIONAL

SKILLED ATTENDANCE AT BIRTH

82.4%

(NATIONAL 92.7%)

EMERGENCY OBSTETRIC CARE

7.2 / 100 LIVE BIRTHS

(GOAL 10.0/100 LB)

LOW BIRTH WEIGHT

8.4%

(NATIONAL 8.4%)

WOMEN'S EDUCATION

LITERACY

90.9% (National 92.9%)

CLEAN WATER

73.8% (National 91.8%)

VIOLENCE AGAINST WOMEN

9.6% ✓ (National 10.8%)

FECUNDITY AND DELAYED MOTHERHOOD

2.3 children / woman

(National 2.3 children / woman)

EVIDENCE-BASED PUBLIC HEALTH INTERVENTIONS TO IMPROVE MATERNAL HEALTH

- INCREASE ANTENATAL CARE VISITS AND SKILLED ATTENDANCE AT BIRTH
- INCREASE NUMBER OF AND ACCESS TO EMERGENCY OBSTETRIC UNITS
- EXPAND SPECIALISED PRENATAL CARE FOR HIGH-RISK PREGNANCIES AND NUTRITIONAL PROGRAMMES FOR MALNOURISHED PREGNANT WOMEN
- EXPAND AND STRENGTHEN PUBLIC POLICIES DIRECTED TO ERADICATE ILLITERACY AND INCREASE THE NUMBER OF SCHOOLING YEARS OF THE FEMALE POPULATION
- INCREASE THE NUMBER OF HOUSEHOLDS WITH ACCESS TO CLEAN WATER AND SANITATION COVERAGE

NATIONAL RANKING

12

Adapted from Koch et al. BMJ Open 2015;5:e006013. doi: 10.1136/bmjopen-2014-006013

QUERÉTARO

Nº Women of childbearing age: 539,013 **Nº Births: 41,714 (1.6% of the National total)[1]**

The state of **Querétaro** ranks 13th in the national ranking of maternal mortality. On average, 40.1 women die per 100 thousand live births per year.

The main causes of death are gestational hypertension and toxemias of pregnancy, representing 32%. Previously existing diseases represent 24.9%. Haemorrhage represents 17.8% of deaths.[2]

Ninety-five point three percent (95.3%) of maternal deaths are unrelated to abortion. Induced abortion represents 1.8% and spontaneous abortion 0.6% over 10 years.[3]

MAJOR DETERMINANTS

Maternal health in the state is influenced by decreased fecundity, an aging population, and **delayed motherhood**. With increasing pregnancies at older ages (35 to 45 years), obstetric complications and concomitant diseases are more frequently observed.[4] In fact, **high-risk pregnancies** represent 56% of deaths over 10 years. More advanced **emergency obstetric care** should be strengthened in the state.

The **low birth weight** prevalence is higher than the country's median. Maternal malnutrition in poor places is not the only explanatory factor. **Maternal aging** increases the risk of **premature birth.** Pregnancies by in vitro fertilization (IVF) have also increased, which result in more premature births and low-birth-weight newborns.[5]

Approximately 9% of the population does not have access to **clean water and sanitation**. Consumption of dirty or feces-contaminated water weakens mothers and their children due to repeated infections.

Illiteracy still affects 9% of the female population. A low educational level of mothers affects pregnancy self-care and negatively influences access to available public health services.

The prevalence of **intimate-partner violence against women** is 11.6%. Affected women often face barriers to accessing adequate prenatal care. **Physical violence** increases the risk of obstetric complications from beatings, injuries, premature birth, and haemorrhage. It is necessary to detect this violence during prenatal visits to prevent deaths from these complications.

[1] Source: INEGI. Birth statistics by state.
[2] Deaths preventable by timely medical-surgical treatment and blood transfusion availability.
[3] Ectopic pregnancy, molar pregnancy, and other anomalies of conception represent 2.4% of deaths over 10 years.
[4] Koch E, Thorp J, Bravo M, et al. Women's education level, maternal health facilities, abortion legislation and maternal deaths: a natural experiment in Chile from 1957 to 2007. *PLoS One*. 2012;7(5): e36613.
[5] McGovern PG, et al. Increased risk of preterm birth in singleton pregnancies resulting from in vitro fertilization-embryo transfer or gamete intrafallopian transfer: a meta-analysis. Fertil Steril. 2004 Dec; 82(6): 1514-20.

DETERMINANTS OF MATERNAL MORTALITY

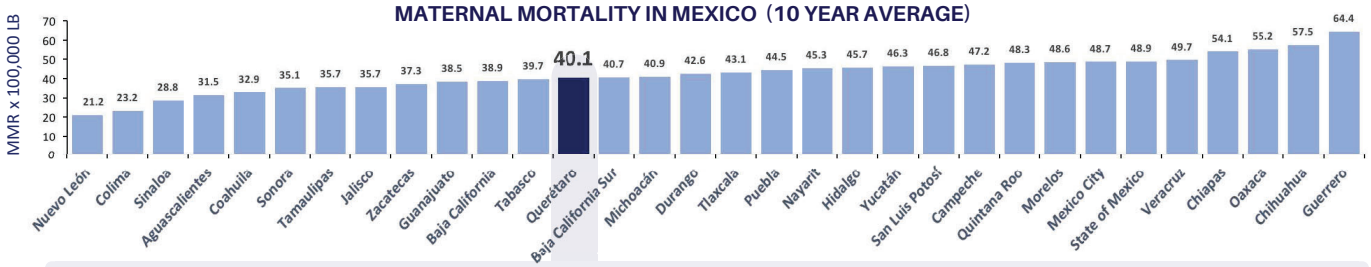
QUERÉTARO

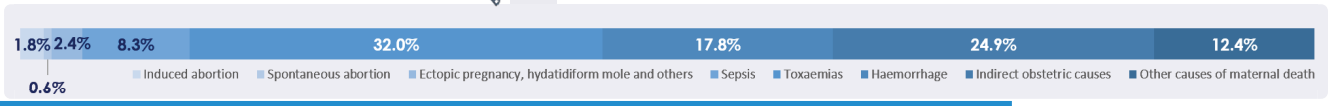
MELISA INSTITUTE

NATIONAL 44.6

LOWER — HIGHER

MATERNAL MORTALITY IN MEXICO (10 YEAR AVERAGE)





DETERMINANTS OF MATERNAL MORTALITY - STATE VS. NATIONAL

SKILLED ATTENDANCE AT BIRTH

97.6% ✓

(NATIONAL 92.7%)

EMERGENCY OBSTETRIC CARE

9.1 / 100 LIVE BIRTHS

(GOAL 10.0/100 LB)

LOW BIRTH WEIGHT

9.2%

(NATIONAL 8.4%)

WOMEN'S EDUCATION

LITERACY

91.7% (National 92.9%)

SANITATION COVERAGE

91.0% (National 91.0%)

VIOLENCE AGAINST WOMEN

11.6% (National 10.8%)

FECUNDITY AND DELAYED MOTHERHOOD

2.3 children / woman (National 2.3 children / woman)

EVIDENCE-BASED PUBLIC HEALTH INTERVENTIONS TO IMPROVE MATERNAL HEALTH

- INCREASE NUMBER OF AND ACCESS TO EMERGENCY OBSTETRIC UNITS
- EXPAND SPECIALISED PRENATAL CARE FOR HIGH-RISK PREGNANCIES AND NUTRITIONAL PROGRAMMES FOR MALNOURISHED PREGNANT WOMEN
- EXPAND AND STRENGTHEN PUBLIC POLICIES DIRECTED TO ERADICATE ILLITERACY AND INCREASE THE NUMBER OF SCHOOLING YEARS OF THE FEMALE POPULATION
- DETECT VIOLENCE AGAINST WOMEN DURING PRENATAL VISITS
- PRECONCEPTION COUNSELLING IN ORDER TO PROMOTE HEALTHY CHILDBEARING

NATIONAL RANKING

13

Adapted from Koch et al. BMJ Open 2015;5:e006013. doi: 10.1136/bmjopen-2014-006013

BAJA CALIFORNIA SUR

Nº Women of childbearing age: 185,560 **Nº Births: 13,412 (0.5% of the National total)**[1]

The state of **Baja California Sur** ranks 14th in the national ranking of maternal mortality over the past 10 years. On average, 40.7 women die per 100 thousand live births per year.

The main causes of death are gestational hypertension, eclampsia, and toxemias of pregnancy, representing 38.9% of deaths. Deaths from previously existing diseases represent 27.8%. Haemorrhage represents 13% of deaths.[2]

Abortion deaths are an uncommon event in the state. In fact, there were no deaths from abortion over the 10-year period evaluated.[3]

MAJOR DETERMINANTS

Maternal health in the state is strongly influenced by an aging population, decreased fecundity, and **delayed motherhood**. Pregnancies have increased in women aged 35 to 45 years, with more frequent complications, especially when they are primiparous.[4] In fact, more than 65% of deaths are associated with **high-risk pregnancies**. These require early detection during prenatal visits and referrals to more advanced obstetric care centers to prevent deaths.

Approximately 12% of the population does not have access to **clean water** services. Consumption of dirty or feces-contaminated water weakens mothers and their children due to repeated infections.

The prevalence of **violence against women** is 16.3%, higher than the country's median. Demographic changes, such as a decrease in marriages, an increase in informal unions, and alcohol and drug use, are associated with higher levels of violence against women.[5]

Physical violence during pregnancy increases the risk of obstetric complications from beatings, injuries, premature labor, and haemorrhage. Affected women often face barriers to accessing regular prenatal care or timely emergency obstetric care. It is necessary to **detect this violence in prenatal visits** to prevent complications, pregnancy losses, premature births, and accidental maternal deaths.

[1] Source: INEGI. Birth statistics by state.
[2] Deaths preventable by timely medical-surgical treatment and blood transfusion availability.
[3] Deaths due to ectopic pregnancy, molar pregnancy, and other conception abnormalities were also not recorded over 10 years.
[4] Koch E, Thorp J, Bravo M, et al. Women's education level, maternal health facilities, abortion legislation and maternal deaths: a natural experiment in Chile from 1957 to 2007. *PLoS One.* 2012;7(5): e36613.
[5] Pliego, F. Families in Mexico. Organizational Structures. Processes of Change 2000-2010 and consequences for the well-being of children and adults. (1st ed.). Mexico City: Editorial Porrúa; 2014.

DETERMINANTS OF MATERNAL MORTALITY

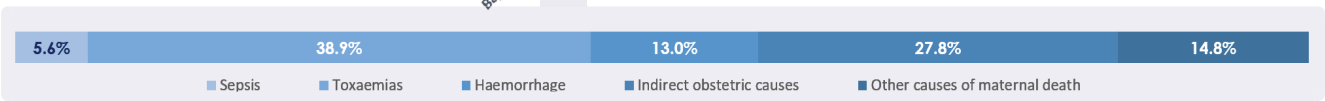
BAJA CALIFORNIA SUR

MELISA INSTITUTE

NATIONAL 44.6

LOWER — HIGHER

MATERNAL MORTALITY IN MEXICO (10 YEAR AVERAGE)



DETERMINANTS OF MATERNAL MORTALITY - STATE VS. NATIONAL

SKILLED ATTENDANCE AT BIRTH

99.5% ✓

(NATIONAL 92.7%)

EMERGENCY OBSTETRIC CARE

10.6 ✓

100 LIVE BIRTHS

(GOAL 10.0/100 LB)

LOW BIRTH WEIGHT

6.0% ✓

(NATIONAL 8.4%)

WOMEN'S EDUCATION

LITERACY

95.8% ✓ (National 92.9%)

CLEAN WATER

88.1% (National 91.8%)

VIOLENCE AGAINST WOMEN

16.3% (National 10.8%)

FECUNDITY AND DELAYED MOTHERHOOD

2.0 children / woman (National 2.3 children / woman)

EVIDENCE-BASED PUBLIC HEALTH INTERVENTIONS TO IMPROVE MATERNAL HEALTH

- INCREASE THE NUMBER OF HOUSEHOLDS WITH ACCESS TO CLEAN WATER AND SANITATION COVERAGE
- DETECT VIOLENCE AGAINST WOMEN DURING PRENATAL VISITS
- PRECONCEPTION COUNSELLING IN ORDER TO PROMOTE HEALTHY CHILDBEARING

NATIONAL RANKING

14

Adapted from Koch et al. BMJ Open 2015;5:e006013. doi: 10.1136/bmjopen-2014-006013

MICHOACÁN

Nº Women of childbearing age: 1,221,325 **Nº Births: 111,362 (4.3% of the National total)**[1]

The state of **Michoacán** ranks 15th in the national ranking of maternal mortality over the past 10 years. On average, 40.9 women die per 100 thousand live births per year.

The main causes of death are gestational hypertension, eclampsia, and toxemias of pregnancy, representing 24.2% of deaths. Haemorrhage represents 22.5% of deaths.[2] Deaths due to previously existing diseases that may worsen during pregnancy represent 18.2%.

Ninety-two point five percent (92.5%) of maternal deaths are currently unrelated to abortion. Induced abortion represents 2.5% and spontaneous abortion 0.6% of deaths over 10 years.[3]

MAJOR DETERMINANTS

Among the determinants of public health, the state of **Michoacán** has insufficient coverage of **emergency obstetric care**. The same applies to coverage of prenatal care **and skilled attendance at birth**. This likely results in haemorrhage being the second highest cause of death over 10 years.

Illiteracy still affects approximately 12% of the female population. A low educational level of mothers affects pregnancy self-care and negatively influences the use of and access to available public health services, especially when not attending regular prenatal care.

Malnutrition in the poorest places in the region likely influences the 8.6% prevalence **of low birth weight**, slightly above the country's median. **Maternal aging** also increases **high-risk pregnancies,** premature births, and low-birth-weight newborns. These pregnancies need to be detected early in prenatal care and referred to a more advanced obstetric care center.[4]

Approximately 12% of the population in the state does not have access to clean water services, and approximately 15% does not have access to **sanitation**. Clean water is a key determinant influencing maternal and child health in the most vulnerable and poorest populations. Consumption of dirty or feces-contaminated water weakens mothers and their children due to repeated infections.

[1] Source: INEGI. Birth statistics by state.
[2] Deaths preventable by timely medical-surgical treatment and blood transfusion availability.
[3] Ectopic pregnancy, molar pregnancy, and other anomalies of conception represent 4.4% of deaths over 10 years.
[4] Koch E, Thorp J, Bravo M, et al. Women´s education level, maternal health facilities, abortion legislation and maternal deaths: natural experiment in Chile from 1957 to 2007. PLoS One. 2012; 7(5): e36613.

DETERMINANTS OF MATERNAL MORTALITY

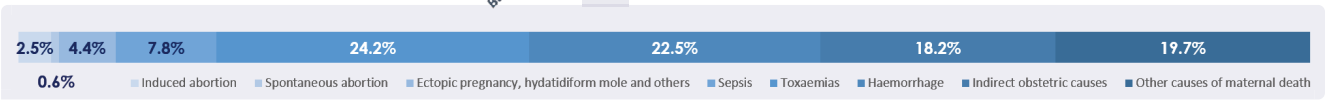
MICHOACÁN

MELISA INSTITUTE

NATIONAL 44.6

LOWER — HIGHER

MATERNAL MORTALITY IN MEXICO (10 YEAR AVERAGE)



DETERMINANTS OF MATERNAL MORTALITY - STATE VS. NATIONAL

SKILLED ATTENDANCE AT BIRTH

92.1%

(NATIONAL 92.7%)

EMERGENCY OBSTETRIC CARE

6.1 / 100 LIVE BIRTHS

(GOAL 10.0/100 LB)

LOW BIRTH WEIGHT

8.6%

(NATIONAL 8.4%)

WOMEN'S EDUCATION

LITERACY

88.4% (National 92.9%)

CLEAN WATER

88.1% (National 91.8%)

VIOLENCE AGAINST WOMEN

9.1% ✓ (National 10.8%)

FECUNDITY AND DELAYED MOTHERHOOD

2.4 children / woman
(National 2.3 children / woman)

EVIDENCE-BASED PUBLIC HEALTH INTERVENTIONS TO IMPROVE MATERNAL HEALTH

- INCREASE ANTENATAL CARE VISITS AND SKILLED ATTENDANCE AT BIRTH
- INCREASE NUMBER OF AND ACCESS TO EMERGENCY OBSTETRIC UNITS
- EXPAND SPECIALISED PRENATAL CARE FOR HIGH-RISK PREGNANCIES AND NUTRITIONAL PROGRAMMES FOR MALNOURISHED PREGNANT WOMEN
- EXPAND AND STRENGTHEN PUBLIC POLICIES DIRECTED TO ERADICATE ILLITERACY AND INCREASE THE NUMBER OF SCHOOLING YEARS OF THE FEMALE POPULATION
- INCREASE THE NUMBER OF HOUSEHOLDS WITH ACCESS TO CLEAN WATER AND SANITATION COVERAGE

NATIONAL RANKING

15

Adapted from Koch et al. BMJ Open 2015;5:e006013. doi: 10.1136/bmjopen-2014-006013

DURANGO

Nº Women of childbearing age: 455,643 **Nº Births: 41,922 (1.6% of the National total)**[1]

The state of **Durango** ranks 16th in the national ranking of maternal mortality over the past 10 years. On average, 42.6 women die per 100 thousand live births per year.

The main causes of death are gestational hypertension, eclampsia, and toxemias of pregnancy, representing 29% of deaths. Haemorrhage represents 22.4% of deaths.[2] Indirect obstetric deaths resulting from previously existing diseases represent 15.8%.

Ninety-four point one percent (94.1%) of maternal deaths are currently unrelated to abortion. Induced abortion represents 2.7% and spontaneous abortion 0.5% of total maternal deaths over 10 years.[3]

MAJOR DETERMINANTS

The maternal health profile in the state is influenced by decreased fecundity and **delayed motherhood**. With increasing pregnancies at older ages (35 to 45 years), obstetric complications and concomitant diseases are more frequently observed.[4] These high-risk pregnancies need to be detected early in prenatal care and referred to specialized care.

Among the determinants of public health, the state of Durango has insufficient access to **emergency obstetric care**. This results in haemorrhage being the 2nd most common cause of death over 10 years.

Approximately 12% of the population in the state does not have access to **sanitation**. Consumption of dirty or feces-contaminated water weakens mothers and their children due to repeated infections.

The prevalence of **violence against women** is 10.2%, somewhat lower than the country's median. Demographic changes, such as a decrease in marriages, an increase in informal unions, and alcohol and drug use, are associated with higher levels of violence against women.[5]

Physical violence during pregnancy increases the risk of obstetric complications from beatings, injuries, premature labor, and haemorrhage. Affected women often face barriers to accessing regular prenatal care or timely emergency obstetric care. It is necessary to **detect this violence in prenatal visits** to prevent complications, pregnancy losses, premature births, and accidental maternal deaths.

[1] Source: INEGI. Birth statistics by state.
[2] Deaths preventable by timely medical-surgical treatment and blood transfusion availability.
[3] Ectopic pregnancy, molar pregnancy, and other anomalies of conception represent 2.7% of deaths over 10 years.
[4] Koch E, Thorp J, Bravo M, et al. Women's education level, maternal health facilities, abortion legislation and maternal deaths: a natural experiment in Chile from 1957 to 2007. *PLoS One*. 2012;7(5): e36613.
[5] Pliego, F. Families in Mexico. Organizational Structures. Processes of Change 2000-2010 and consequences for the well-being of children and adults. (1st ed.). Mexico City: Editorial Porrúa; 2014.

DETERMINANTS OF MATERNAL MORTALITY

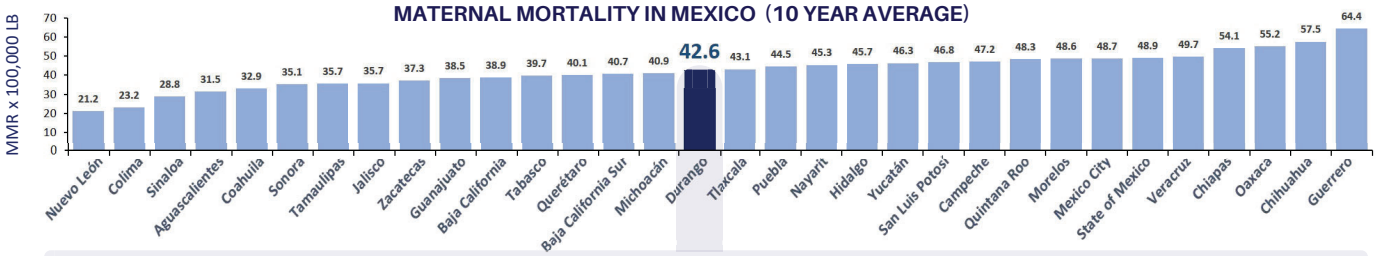
DURANGO

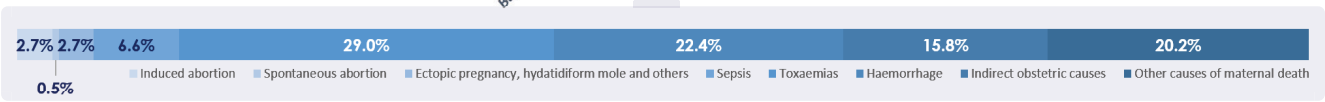
MELISA INSTITUTE

NATIONAL 44.6

LOWER ⟵ ⟶ HIGHER

MATERNAL MORTALITY IN MEXICO (10 YEAR AVERAGE)





DETERMINANTS OF MATERNAL MORTALITY - STATE VS. NATIONAL

SKILLED ATTENDANCE AT BIRTH

93.3% ✓

(NATIONAL 92.7%)

EMERGENCY OBSTETRIC CARE

8.2 / 100 LIVE BIRTHS

(GOAL 10.0/100 LB)

LOW BIRTH WEIGHT

8.0% ✓

(NATIONAL 8.4%)

WOMEN'S EDUCATION

LITERACY

95.5% ✓ (National 92.9%)

SANITATION COVERAGE

88.3% (National 91.0%)

VIOLENCE AGAINST WOMEN

10.2% (National 10.8%)

FECUNDITY AND DELAYED MOTHERHOOD

2.4 children / woman (National 2.3 children / woman)

EVIDENCE-BASED PUBLIC HEALTH INTERVENTIONS TO IMPROVE MATERNAL HEALTH

- INCREASE NUMBER OF AND ACCESS TO EMERGENCY OBSTETRIC UNITS
- INCREASE THE NUMBER OF HOUSEHOLDS WITH ACCESS TO CLEAN WATER AND SANITATION COVERAGE
- PRECONCEPTION COUNSELLING IN ORDER TO PROMOTE HEALTHY CHILDBEARING
- DETECT VIOLENCE AGAINST WOMEN DURING PRENATAL VISITS

NATIONAL RANKING

16

Adapted from Koch et al. BMJ Open 2015;5:e006013. doi: 10.1136/bmjopen-2014-006013

TLAXCALA

Nº Women of childbearing age: 337,572 **Nº Births: 27,867 (1.1% of the National total)**[1]

The state of **Tlaxcala** ranks 17th in the national ranking of maternal mortality. On average, 43.1 women die per 100 thousand live births per year.

The main causes of death are gestational hypertension, eclampsia, and toxemias of pregnancy, representing 46.7% of deaths. Haemorrhage represents 14.8% of deaths.[2] Obstetric deaths due to previously existing diseases that may worsen during pregnancy represent 12.3%.

Ninety-two point seven percent (92.7%) of maternal deaths are unrelated to abortion. Induced abortion represents 5.7%. There were no deaths from spontaneous abortion in this period.[3]

MAJOR DETERMINANTS

Maternal health in the state is influenced by decreased fecundity, an aging population, and **delayed motherhood**. With increasing pregnancies at older ages (35 to 45 years), obstetric complications and concomitant diseases are more frequently observed.[4] These **high-risk pregnancies** need to be detected early in prenatal care and referred to a more advanced specialized obstetric care center.

Among the determinants of public health, the state of **Tlaxcala** has insufficient coverage of **emergency obstetric care**. This likely results in haemorrhage being the second most important cause of death over 10 years.

The **low birth weight** prevalence is higher than the country's median. Maternal malnutrition in poor places does not seem to be the only explanatory factor. Maternal aging, which results in increasing pregnancies with more advanced diseases, has also increased the risk of **premature births** and low-birth-weight newborns.

Illiteracy still affects approximately 8% of the female population. A low educational level of mothers affects pregnancy self-care and negatively influences the use of and access to available public health services, especially in the absence of regular prenatal care.

[1] Source: INEGI. Birth statistics by state.
[2] Deaths preventable by timely medical-surgical treatment and blood transfusion availability.
[3] Ectopic pregnancy, molar pregnancy, and other anomalies of conception represent 1.6% of deaths over 10 years.
[4] Koch E, Thorp J, Bravo M, et al. Women's education level, maternal health facilities, abortion legislation and maternal deaths: a natural experiment in Chile from 1957 to 2007. *PLoS One*. 2012;7(5): e36613.

DETERMINANTS OF MATERNAL MORTALITY

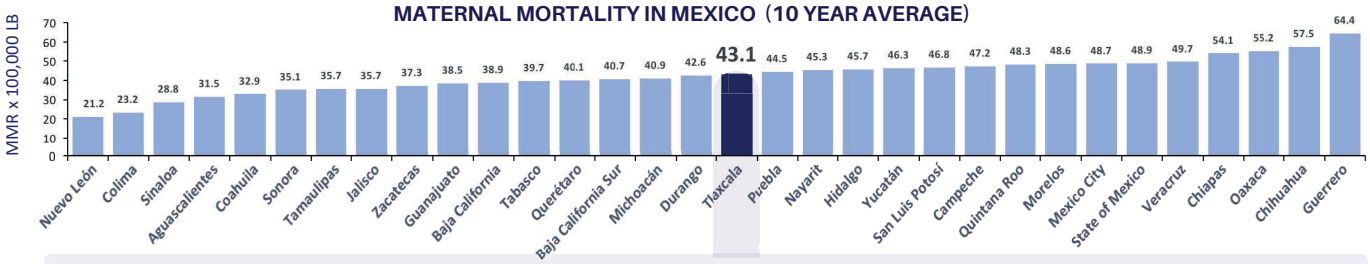
TLAXCALA

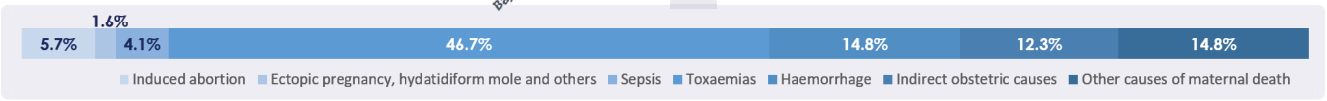
MELISA INSTITUTE

NATIONAL 44.6

LOWER — HIGHER

MATERNAL MORTALITY IN MEXICO (10 YEAR AVERAGE)





DETERMINANTS OF MATERNAL MORTALITY - STATE VS. NATIONAL

SKILLED ATTENDANCE AT BIRTH

98.2% ✓

(NATIONAL 92.7%)

EMERGENCY OBSTETRIC CARE

7.6 / 100 LIVE BIRTHS

(GOAL 10.0/100 LB)

LOW BIRTH WEIGHT

10.1%

(NATIONAL 8.4%)

WOMEN'S EDUCATION

LITERACY

92.8% (National 92.9%)

CLEAN WATER

95.6% ✓ (National 91.8%)

VIOLENCE AGAINST WOMEN

9.3% ✓ (National 10.8%)

FECUNDITY AND DELAYED MOTHERHOOD

2.4 children / woman

(National 2.3 children / woman)

EVIDENCE-BASED PUBLIC HEALTH INTERVENTIONS TO IMPROVE MATERNAL HEALTH

- INCREASE NUMBER OF AND ACCESS TO EMERGENCY OBSTETRIC UNITS
- EXPAND SPECIALISED PRENATAL CARE FOR HIGH-RISK PREGNANCIES AND NUTRITIONAL PROGRAMMES FOR MALNOURISHED PREGNANT WOMEN
- EXPAND AND STRENGTHEN PUBLIC POLICIES DIRECTED TO ERADICATE ILLITERACY AND INCREASE THE NUMBER OF SCHOOLING YEARS OF THE FEMALE POPULATION
- PRECONCEPTION COUNSELLING IN ORDER TO PROMOTE HEALTHY CHILDBEARING

NATIONAL RANKING

17

Adapted from Koch et al. BMJ Open 2015;5:e006013. doi: 10.1136/bmjopen-2014-006013

PUEBLA

Nº Women of childbearing age: 1,633,117 **Nº Births: 146,865 (5.7% of the National total)**[1]

The state of **Puebla** ranks 18th in the national ranking of maternal mortality over the past 10 years. On average, 44.5 women die per 100 thousand live births, similar to the country's average.

The main causes of death are gestational hypertension, eclampsia, and toxemias of pregnancy, representing 26.2% of deaths. Haemorrhage represents 25.2% of deaths.[2] Indirect obstetric deaths resulting from previously existing diseases represent 20.9%.

Ninety-four point one percent (94.1%) of maternal deaths are unrelated to abortion. Induced abortion represents 2.6% and spontaneous abortion 0.5% of total deaths over 10 years.[3]

MAJOR DETERMINANTS

Among the determinants of public health, the state of **Puebla** has insufficient coverage of **emergency obstetric care**. The same goes for **skilled attendance at birth** and prenatal care. This likely results in haemorrhage being the second most important cause of death over 10 years.

Illiteracy still affects approximately 14% of the female population. A low educational level of mothers affects pregnancy self-care and negatively influences the use of and access to available public health services, especially regarding the absence or lack of regular **prenatal care**.

Maternal malnutrition in the poorest places likely influences the **low birth weight** prevalence of 9.6%, higher than the country's median. On the other hand, **maternal aging**, that is, an increase in pregnancies in older women resulting from decreased fecundity and delayed motherhood, also causes an increase **in high-risk pregnancies**[4], increasing the number of premature births and low-birth-weight newborns. These pregnancies need to be detected early in prenatal care and referred to a more advanced **specialized obstetric care center**.

Approximately 16% of the population in the state does not have access to **clean water** services, and approximately 15% does not have access to **sanitation**. Clean water is a key determinant influencing maternal and child health in the most vulnerable populations. Consumption of dirty or feces-contaminated water weakens mothers and their children due to repeated infections.

[1] Source: INEGI. Birth statistics by state.
[2] Deaths preventable by timely medical-surgical treatment and blood transfusion availability.
[3] Ectopic pregnancy, molar pregnancy, and other anomalies of conception represent 2.8% of deaths over 10 years.
[4] Koch E, Thorp J, Bravo M, et al. Women's education level, maternal health facilities, abortion legislation and maternal deaths: a natural experiment in Chile from 1957 to 2007. *PLoS One*. 2012;7(5): e36613.

DETERMINANTS OF MATERNAL MORTALITY

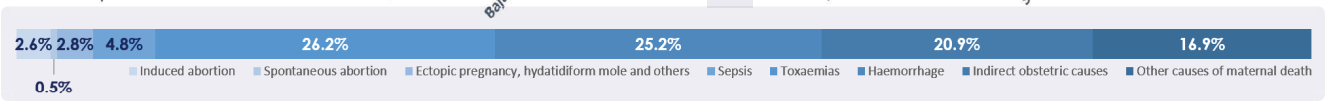
PUEBLA

MELISA INSTITUTE

NATIONAL 44.6

LOWER — HIGHER

MATERNAL MORTALITY IN MEXICO (10 YEAR AVERAGE)



DETERMINANTS OF MATERNAL MORTALITY - STATE VS. NATIONAL

SKILLED ATTENDANCE AT BIRTH

90.8%

(NATIONAL 92.7%)

EMERGENCY OBSTETRIC CARE

4.0

100 LIVE BIRTHS

(GOAL 10.0/100 LB)

LOW BIRTH WEIGHT

9.6%

(NATIONAL 8.4%)

WOMEN'S EDUCATION

LITERACY

86.8%

(National 92.9%)

CLEAN WATER

83.8%

(National 91.8%)

VIOLENCE AGAINST WOMEN

8.6% ✓

(National 10.8%)

FECUNDITY AND DELAYED MOTHERHOOD

2.6 children / woman

(National 2.3 children / woman)

EVIDENCE-BASED PUBLIC HEALTH INTERVENTIONS TO IMPROVE MATERNAL HEALTH

- INCREASE ANTENATAL CARE VISITS AND SKILLED ATTENDANCE AT BIRTH
- INCREASE NUMBER OF AND ACCESS TO EMERGENCY OBSTETRIC UNITS
- EXPAND SPECIALISED PRENATAL CARE FOR HIGH-RISK PREGNANCIES AND NUTRITIONAL PROGRAMMES FOR MALNOURISHED PREGNANT WOMEN
- EXPAND AND STRENGTHEN PUBLIC POLICIES DIRECTED TO ERADICATE ILLITERACY AND INCREASE THE NUMBER OF SCHOOLING YEARS OF THE FEMALE POPULATION
- INCREASE THE NUMBER OF HOUSEHOLDS WITH ACCESS TO CLEAN WATER AND SANITATION COVERAGE

NATIONAL RANKING

18

Adapted from Koch et al. BMJ Open 2015;5:e006013. doi: 10.1136/bmjopen-2014-006013

NAYARIT

Nº Women of childbearing age: 301,241 **Nº Births: 24,949 (1.0% of the National total)**[1]

The state of **Nayarit** ranks 19th in the national ranking of maternal mortality. On average, 45.3 women die per 100 thousand live births per year.

Haemorrhage represents 28.2% of deaths.[2] Next, gestational hypertension, eclampsia, and toxemias of pregnancy represent 20.5% of deaths. Then, indirect deaths from previously existing diseases represent 18.8%.

Ninety point six percent (90.6%) of maternal deaths are unrelated to abortion. Induced abortion represents 3.4% of total deaths over 10 years. There were no deaths from spontaneous abortion in this period.[3]

MAJOR DETERMINANTS

Among the determinants of public health, the state of **Nayarit** has insufficient coverage of **emergency obstetric care**. This likely results in haemorrhage being the main cause of death over 10 years. The same goes for **skilled attendance at birth** and prenatal care.

Maternal health in the state is influenced by decreased fecundity**, an aging population, and delayed motherhood**. With increasing pregnancies at older ages (35 to 45 years), obstetric complications occur more frequently.[4] In fact**, high-risk pregnancies** represent 39% of deaths over 10 years.

Approximately 12% of the population does not have access to **clean water** services. Consumption of dirty or feces-contaminated water weakens mothers and their children due to repeated infections.

The prevalence of **violence against women** is 14.8%. Demographic changes, such as a decrease in marriages, an increase in informal unions, and alcohol and drug use, are associated with higher levels of violence against women.[5]

Physical violence during pregnancy increases the risk of obstetric complications from beatings, injuries, premature labor, and haemorrhage. Affected women often face barriers to accessing regular prenatal care or timely emergency obstetric care. It is necessary to **detect this violence in prenatal visits** to prevent complications, pregnancy losses, premature births, and deaths.

[1] Source: INEGI. Birth statistics by state.
[2] Deaths preventable by timely medical-surgical treatment and blood transfusion availability.
[3] Ectopic pregnancy, molar pregnancy, and other anomalies of conception represent 6% of deaths over 10 years.
[4] Koch E, Thorp J, Bravo M, et al. Women's education level, maternal health facilities, abortion legislation and maternal deaths: a natural experiment in Chile from 1957 to 2007. *PLoS One*. 2012;7(5): e36613.
[5] Pliego, F. Families in Mexico. Organizational Structures. Processes of Change 2000-2010 and consequences for the well-being of children and adults. (1st ed.). Mexico City: Editorial Porrúa; 2014.

DETERMINANTS OF MATERNAL MORTALITY

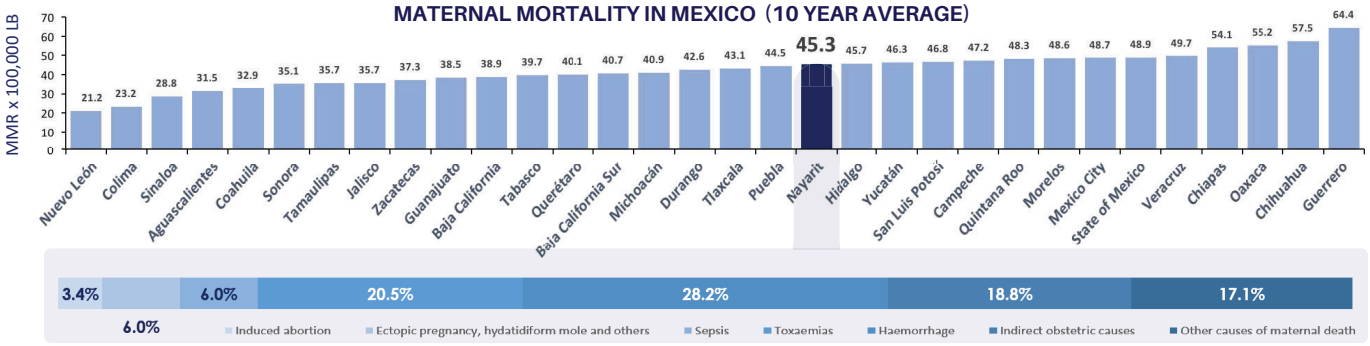
NAYARIT

MELISA INSTITUTE

NATIONAL 44.6

LOWER ← → HIGHER

MATERNAL MORTALITY IN MEXICO (10 YEAR AVERAGE)



DETERMINANTS OF MATERNAL MORTALITY - STATE VS. NATIONAL

SKILLED ATTENDANCE AT BIRTH

81.8%

(NATIONAL 92.7%)

EMERGENCY OBSTETRIC CARE

7.4 / 100 LIVE BIRTHS

(GOAL 10.0/100 LB)

LOW BIRTH WEIGHT

6.8% ✓

(NATIONAL 8.4%)

WOMEN'S EDUCATION

LITERACY

92.9% ✓ (National 92.9%)

CLEAN WATER

88.3%

(National 91.8%)

VIOLENCE AGAINST WOMEN

14.8%

(National 10.8%)

FECUNDITY AND DELAYED MOTHERHOOD

2.3 children / woman

(National 2.3 children / woman)

EVIDENCE-BASED PUBLIC HEALTH INTERVENTIONS TO IMPROVE MATERNAL HEALTH

- INCREASE ANTENATAL CARE VISITS AND SKILLED ATTENDANCE AT BIRTH
- INCREASE NUMBER OF AND ACCESS TO EMERGENCY OBSTETRIC UNITS
- INCREASE THE NUMBER OF HOUSEHOLDS WITH ACCESS TO CLEAN WATER AND SANITATION COVERAGE
- DETECT VIOLENCE AGAINST WOMEN DURING PRENATAL VISITS

NATIONAL RANKING

19

Adapted from Koch et al. BMJ Open 2015;5:e006013. doi: 10.1136/bmjopen-2014-006013

HIDALGO

Nº Women of childbearing age: 756,232 **Nº Births: 63,380 (2.5% of the National total)**[1]

The state of **Hidalgo** ranks 20th in the national ranking of maternal mortality over the past 10 years. On average, 45.7 women die per 100 thousand live births per year.

The main causes of death are gestational hypertension, eclampsia, and toxemias of pregnancy, representing 30.9% of deaths. Haemorrhage represents 24.6% of maternal deaths.[2] Indirect obstetric deaths resulting from previously existing diseases represent 16.9%.

Ninety-two point four percent (92.4%) of maternal deaths are unrelated to abortion. Induced abortion represents 4% and spontaneous abortion 0.3% of total deaths over 10 years.[3]

MAJOR DETERMINANTS

Among the determinants of public health, the state of **Hidalgo** has insufficient coverage of **emergency obstetric care**. This likely results in haemorrhage being the second cause of death over 10 years. The same goes for **skilled attendance at birth** and prenatal care.

Approximately 13% of the population does not have access to **clean water services**, and 17% does not have **sanitation**. Consumption of dirty or feces-contaminated water weakens mothers and their children due to repeated infections.

Illiteracy still affects approximately 14% of the female population. A low educational level of mothers affects pregnancy self-care and negatively influences access to available public health services, especially regarding compliance with regular prenatal care or seeking emergency obstetric care if complications arise.

Maternal health in the state also begins to be influenced by decreased fecundity and **delayed motherhood**. With increasing pregnancies at older ages (35 to 45 years), complications of gestational hypertension, preeclampsia, toxemias, and concomitant diseases occur more frequently.[4] In fact, **high-risk pregnancies** represent 47% of deaths over 10 years. Preterm births and **low-birth-weight newborns** may increase, which is also negatively influenced by pregnancy malnutrition. To prevent deaths, high-risk pregnancies should be detected early in **prenatal care** and referred to a more advanced specialized obstetric care center.

[1] Source: INEGI. Birth statistics by state.
[2] Deaths preventable by timely medical-surgical treatment and blood transfusion availability.
[3] Ectopic pregnancy, molar pregnancy, and other anomalies of conception represent 3.3% of deaths over 10 years.
[4] Koch E, Thorp J, Bravo M, et al. Women's education level, maternal health facilities, abortion legislation and maternal deaths: a natural experiment in Chile from 1957 to 2007. *PLoS One*. 2012;7(5): e36613.

DETERMINANTS OF MATERNAL MORTALITY

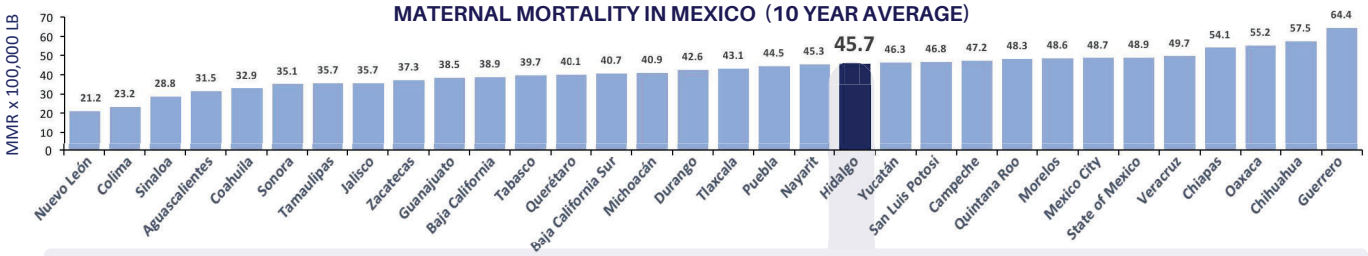
HIDALGO

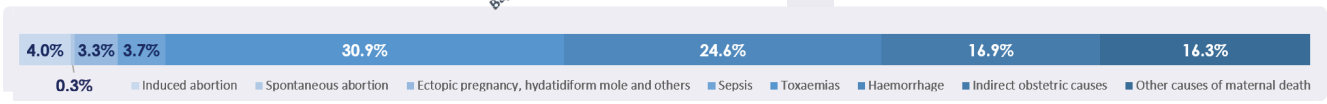
MELISA INSTITUTE

NATIONAL 44.6

LOWER — HIGHER

MATERNAL MORTALITY IN MEXICO (10 YEAR AVERAGE)





DETERMINANTS OF MATERNAL MORTALITY - STATE VS. NATIONAL

SKILLED ATTENDANCE AT BIRTH

89.7%

(NATIONAL 92.7%)

EMERGENCY OBSTETRIC CARE

6.2 / 100 LIVE BIRTHS

(GOAL 10.0/100 LB)

LOW BIRTH WEIGHT

8.5%

(NATIONAL 8.4%)

WOMEN'S EDUCATION

LITERACY

87.2%

(National 92.9%)

CLEAN WATER

87.2%

(National 91.8%)

VIOLENCE AGAINST WOMEN

8.6% ✓

(National 10.8%)

FECUNDITY AND DELAYED MOTHERHOOD

2.4 children / woman

(National 2.3 children / woman)

EVIDENCE-BASED PUBLIC HEALTH INTERVENTIONS TO IMPROVE MATERNAL HEALTH

- INCREASE ANTENATAL CARE VISITS AND SKILLED ATTENDANCE AT BIRTH
- INCREASE NUMBER OF AND ACCESS TO EMERGENCY OBSTETRIC UNITS
- EXPAND SPECIALISED PRENATAL CARE FOR HIGH-RISK PREGNANCIES AND NUTRITIONAL PROGRAMMES FOR MALNOURISHED PREGNANT WOMEN
- EXPAND AND STRENGTHEN PUBLIC POLICIES DIRECTED TO ERADICATE ILLITERACY AND INCREASE THE NUMBER OF SCHOOLING YEARS OF THE FEMALE POPULATION
- INCREASE THE NUMBER OF HOUSEHOLDS WITH ACCESS TO CLEAN WATER AND SANITATION COVERAGE

NATIONAL RANKING

20

Adapted from Koch et al. BMJ Open 2015;5:e006013. doi: 10.1136/bmjopen-2014-006013

YUCATÁN

Nº Women of childbearing age: 551,965 **Nº Births: 36,860 (1.4% dof the National total)**[1]

The state of **Yucatán** ranks 21st in the national ranking of maternal mortality. On average, 46.3 women die per 100 thousand live births per year.

Gestational hypertension, eclampsia, and toxemias of pregnancy represent 34.8% of deaths. Indirect obstetric deaths resulting from previously existing diseases represent 24.9%. Haemorrhage represents 16.6% of maternal deaths.[2]

Ninety-two point eight percent (92.8%) of maternal deaths are unrelated to abortion. Induced abortion represents 2.8% of deaths over 10 years. There were no deaths from spontaneous abortion in this period.[3]

MAJOR DETERMINANTS

Among the determinants of public health that must be improved in Yucatán is access to **emergency obstetric care,** which is insufficient.

Maternal malnutrition in the poorest places contributes to the 10.7% prevalence of **low birth weight**. On the other hand, decreased fecundity and **delayed motherhood** (35 to 45 years) increase the number of complicated pregnancies, premature births, and low-birth-weight newborns.[4] In fact, 60% of deaths over 10 years are caused by these **high-risk pregnancies.**

Approximately 12% of the female population is **illiterate**. A low educational level of mothers affects pregnancy self-care and negatively influences access to health services, resulting in a lack of compliance with **regular prenatal care** or going to an emergency service if pregnancy complications arise.

Approximately 20% of the population does not have access to **sanitation**. Consumption of dirty or feces-contaminated water weakens mothers and their children due to repeated infections.

The prevalence of **intimate-partner violence against women** is 11.5%. Affected women often face barriers to accessing adequate prenatal care. **Physical violence** increases the risk of obstetric complications from beatings, injuries, premature birth, and haemorrhage. It is necessary to **detect this violence during prenatal visits** to intervene and prevent deaths from these complications.

[1] Fuente: INEGI. Estadísticas de natalidad por entidad federativa
[2] Deaths preventable by timely medical-surgical treatment and blood transfusion availability.
[3] Ectopic pregnancy, molar pregnancy, and other anomalies of conception represent 4.4% of deaths over 10 years.
[4] Koch E, Thorp J, Bravo M, et al. Women's education level, maternal health facilities, abortion legislation and maternal deaths: a natural experiment in Chile from 1957 to 2007. *PLoS One*. 2012;7(5): e36613.

DETERMINANTS OF MATERNAL MORTALITY

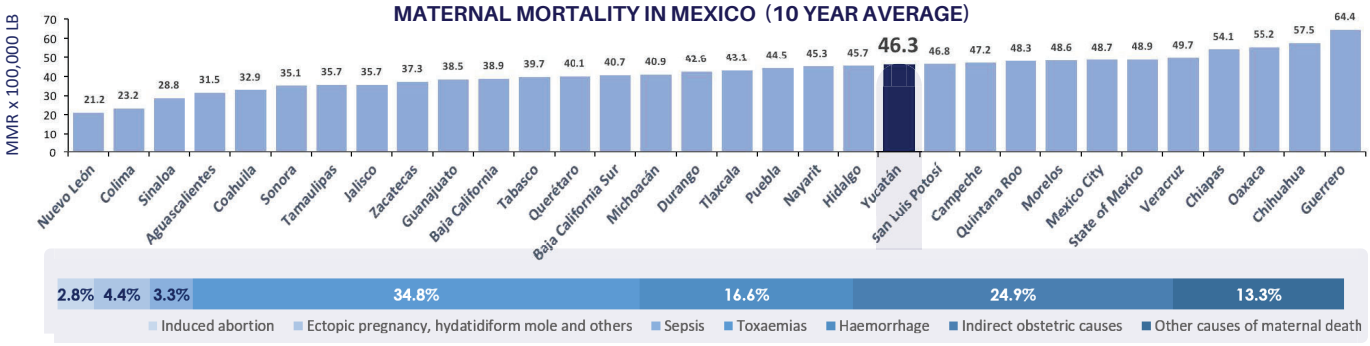
YUCATÁN

MELISA INSTITUTE

NATIONAL 44.6

LOWER ⟷ HIGHER

MATERNAL MORTALITY IN MEXICO (10 YEAR AVERAGE)



DETERMINANTS OF MATERNAL MORTALITY - STATE VS. NATIONAL

SKILLED ATTENDANCE AT BIRTH

97.5% ✓

(NATIONAL 92.7%)

EMERGENCY OBSTETRIC CARE

7.2 / 100 LIVE BIRTHS

(GOAL 10.0/100 LB)

LOW BIRTH WEIGHT

10.7%

(NATIONAL 8.4%)

WOMEN'S EDUCATION

LITERACY

88.6% (National 92.9%)

SANITATION COVERAGE

80.1% (National 91.0%)

VIOLENCE AGAINST WOMEN

11.5% (National 10.8%)

FECUNDITY AND DELAYED MOTHERHOOD

2.3 children / woman (National 2.3 children / woman)

EVIDENCE-BASED PUBLIC HEALTH INTERVENTIONS TO IMPROVE MATERNAL HEALTH

- INCREASE NUMBER OF AND ACCESS TO EMERGENCY OBSTETRIC UNITS
- EXPAND SPECIALISED PRENATAL CARE FOR HIGH-RISK PREGNANCIES AND NUTRITIONAL PROGRAMMES FOR MALNOURISHED PREGNANT WOMEN
- EXPAND AND STRENGTHEN PUBLIC POLICIES DIRECTED TO ERADICATE ILLITERACY AND INCREASE THE NUMBER OF SCHOOLING YEARS OF THE FEMALE POPULATION
- INCREASE THE NUMBER OF HOUSEHOLDS WITH ACCESS TO CLEAN WATER AND SANITATION COVERAGE
- DETECT VIOLENCE AGAINST WOMEN DURING PRENATAL VISITS

NATIONAL RANKING

21

Adapted from Koch et al. BMJ Open 2015;5:e006013. doi: 10.1136/bmjopen-2014-006013

SAN LUIS POTOSÍ

Nº Women of childbearing age: 710,305 **Nº Births: 57,549 (2.2% of the National total)[1]**

The state of **San Luis Potosí** ranks 22nd in the national ranking of maternal mortality. On average, 46.8 women die per 100 thousand live births per year.

The main causes of death are gestational hypertension, eclampsia, and toxemias of pregnancy, representing 33.7%. Haemorrhage represents 23.5% of maternal deaths.[2] Indirect obstetric deaths due to previously existing diseases that may worsen during pregnancy represent 17.2%.

Ninety-three point three percent (93.3%) of maternal deaths are unrelated to abortion. Induced abortion represents 1.8% and spontaneous abortion 0.7% of deaths over 10 years.[3]

MAJOR DETERMINANTS

Among the determinants of public health, the state of **San Luis Potosí** has insufficient coverage of **emergency obstetric care**. The same goes for **skilled attendance at birth** and **prenatal care**. This likely results in haemorrhage being the second cause of maternal death over 10 years.

Illiteracy still affects approximately 10% of the female population. A low educational level of mothers negatively influences access to available public health services, especially regarding compliance with regular prenatal care or access to emergency care if complications arise.

Approximately 17% of the population does not have access to **clean water** services, and 20% does not have **sanitation**. Consumption of dirty or feces-contaminated water weakens mothers and their children due to repeated infections.

The prevalence of **violence against women** is 10.5%. Demographic changes, such as a decrease in marriages, an increase in informal unions, and alcohol and drug use, are associated with higher levels of violence against women.[4] **Physical violence** during pregnancy increases the risk of obstetric complications from beatings, injuries, premature labor, and haemorrhage. Affected women face barriers to accessing regular prenatal care or timely emergency obstetric care. It is necessary to **detect this violence in prenatal visits** to prevent complications, pregnancy losses, premature births, and deaths.

[1] Source: INEGI. Birth statistics by state.
[2] Deaths preventable by timely medical-surgical treatment and blood transfusion availability.
[3] Ectopic pregnancy, molar pregnancy, and other anomalies of conception represent 4.2% of deaths over 10 years.
[4] Pliego, F. Families in Mexico. Organizational Structures. Processes of Change 2000-2010 and consequences for the well-being of children and adults. (1st ed.). Mexico City: Editorial Porrúa; 2014.

DETERMINANTS OF MATERNAL MORTALITY

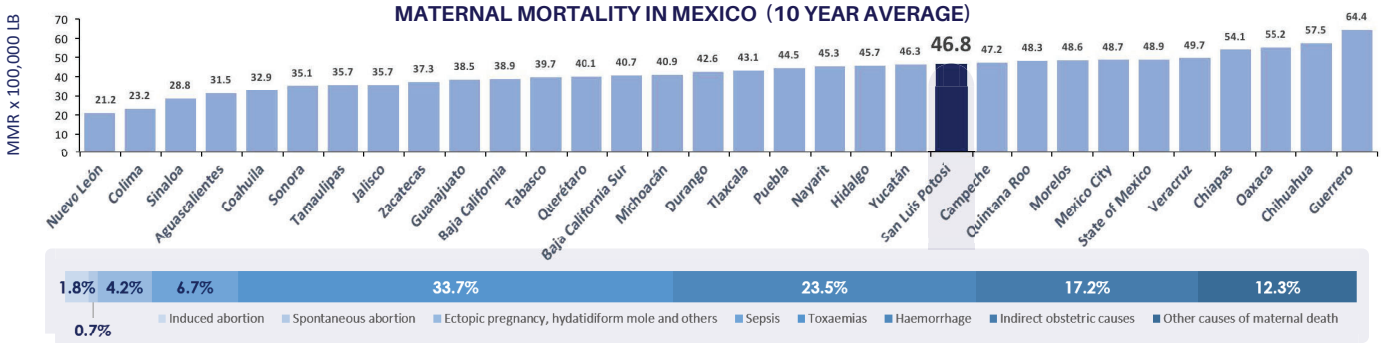
SAN LUIS POTOSÍ

MELISA INSTITUTE

NATIONAL 44.6

LOWER — HIGHER

MATERNAL MORTALITY IN MEXICO (10 YEAR AVERAGE)



DETERMINANTS OF MATERNAL MORTALITY - STATE VS. NATIONAL

SKILLED ATTENDANCE AT BIRTH

91.7%

(NATIONAL 92.7%)

EMERGENCY OBSTETRIC CARE

6.6 / 100 LIVE BIRTHS

(GOAL 10.0/100 LB)

LOW BIRTH WEIGHT

8.1% ✓

(NATIONAL 8.4%)

WOMEN'S EDUCATION

LITERACY

90.5%

(National 92.9%)

CLEAN WATER

83.1%

(National 91.8%)

VIOLENCE AGAINST WOMEN

10.5%

(National 10.8%)

FECUNDITY AND DELAYED MOTHERHOOD

2.5 children / woman

(National 2.3 children / woman)

EVIDENCE-BASED PUBLIC HEALTH INTERVENTIONS TO IMPROVE MATERNAL HEALTH

- INCREASE NUMBER OF AND ACCESS TO EMERGENCY OBSTETRIC UNITS
- INCREASE ANTENATAL CARE VISITS AND SKILLED ATTENDANCE AT BIRTH
- EXPAND AND STRENGTHEN PUBLIC POLICIES DIRECTED TO ERADICATE ILLITERACY AND INCREASE THE NUMBER OF SCHOOLING YEARS OF THE FEMALE POPULATION
- INCREASE THE NUMBER OF HOUSEHOLDS WITH ACCESS TO CLEAN WATER AND SANITATION COVERAGE
- DETECT VIOLENCE AGAINST WOMEN DURING PRENATAL VISITS

NATIONAL RANKING

22

Adapted from Koch et al. BMJ Open 2015;5:e006013. doi: 10.1136/bmjopen-2014-006013

CAMPECHE

Nº Women of childbearing age: 240,697 **Nº Births: 22,138 (0.9% of the National total)**[1]

The state of **Campeche** ranks 23rd in the national ranking of maternal mortality. On average, 47.2 women die per 100 thousand live births per year.

The main causes of death are gestational hypertension, eclampsia, and toxemias of pregnancy, representing 31.9% of deaths. Indirect obstetric deaths due to previously existing diseases that may worsen during pregnancy represent 20.9%. Haemorrhage represents 17.6% of maternal deaths.[2]

Ninety-five point six percent (95.6%) of maternal deaths are unrelated to abortion. Induced abortion represents 2.2% of deaths over 10 years. There were no deaths from spontaneous abortion in this period.[3]

MAJOR DETERMINANTS

The maternal health profile of **Campeche** is influenced by an aging population, decreased fecundity, and **delayed motherhood**. Pregnancies have increased in women aged 35 to 45 years, who have more frequent complications, especially when they are primiparous.[4] In fact, over 10 years, 52% of deaths are associated with **high-risk pregnancies**. These require early detection during prenatal care and referrals to more advanced obstetric care centers to prevent deaths.

Although the state has a high coverage of skilled attendance at birth (98%), timely access to **emergency obstetric care** is insufficient.
Approximately 15% of the population does not have access to **clean water** services, and 14% does not have **sanitation**. Consumption of dirty or feces-contaminated water weakens mothers and their children due to repeated infections.

Illiteracy still affects approximately 10% of the female population. A low educational level of mothers affects pregnancy self-care and negatively influences access to available public health and emergency services.

The prevalence **of intimate-partner violence against women** is 10.7%. Physical violence increases the risk of obstetric complications from beatings, injuries, premature births, and haemorrhage. It is necessary to **detect this violence during prenatal visits** to intervene and prevent deaths from these complications.

[1] Source: INEGI. Birth statistics by state.
[2] Deaths preventable by timely medical-surgical treatment and blood transfusion availability.
[3] Ectopic pregnancy, molar pregnancy, and other anomalies of conception represent 2.2% of deaths over 10 years.
[4] Koch E, Thorp J, Bravo M, et al. Women's education level, maternal health facilities, abortion legislation and maternal deaths: a natural experiment in Chile from 1957 to 2007. *PLoS One*. 2012;7(5): e36613.

DETERMINANTS OF MATERNAL MORTALITY

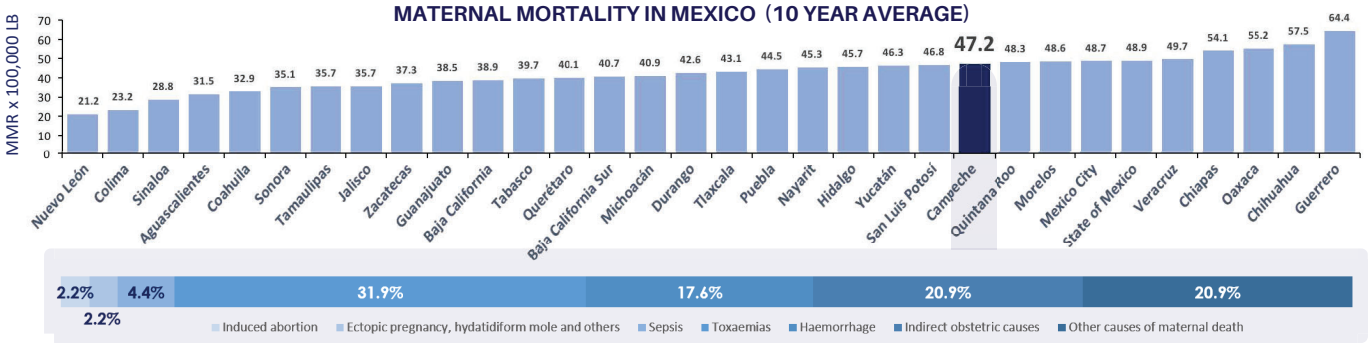
CAMPECHE

MELISA INSTITUTE

NATIONAL 44.6

LOWER ⟷ HIGHER

MATERNAL MORTALITY IN MEXICO (10 YEAR AVERAGE)



DETERMINANTS OF MATERNAL MORTALITY - STATE VS. NATIONAL

SKILLED ATTENDANCE AT BIRTH

98.2% ✓

(NATIONAL 92.7%)

EMERGENCY OBSTETRIC CARE

7.8 / 100 LIVE BIRTHS

(GOAL 10.0/100 LB)

LOW BIRTH WEIGHT

7.2% ✓

(NATIONAL 8.4%)

WOMEN'S EDUCATION

LITERACY

89.7% (National 92.9%)

CLEAN WATER

85.0% (National 91.8%)

VIOLENCE AGAINST WOMEN

10.7% (National 10.8%)

FECUNDITY AND DELAYED MOTHERHOOD

2.2 children / woman (National 2.3 children / woman)

EVIDENCE-BASED PUBLIC HEALTH INTERVENTIONS TO IMPROVE MATERNAL HEALTH

- INCREASE NUMBER OF AND ACCESS TO EMERGENCY OBSTETRIC UNITS
- PRECONCEPTION COUNSELLING IN ORDER TO PROMOTE HEALTHY CHILDBEARING
- EXPAND AND STRENGTHEN PUBLIC POLICIES DIRECTED TO ERADICATE ILLITERACY AND INCREASE THE NUMBER OF SCHOOLING YEARS OF THE FEMALE POPULATION
- INCREASE THE NUMBER OF HOUSEHOLDS WITH ACCESS TO CLEAN WATER AND SANITATION COVERAGE
- DETECT VIOLENCE AGAINST WOMEN DURING PRENATAL VISITS

NATIONAL RANKING

23

Adapted from Koch et al. BMJ Open 2015;5:e006013. doi: 10.1136/bmjopen-2014-006013

QUINTANA ROO

Nº Women of childbearing age: 406,139 **Nº Births: 28,848 (1.1% of the National total)**[1]

The state of **Quintana Roo** ranks 24th in the national ranking of maternal mortality. On average, 48.3 women die per 100 thousand live births per year.

The main causes of death are gestational hypertension, eclampsia, and toxemias of pregnancy, representing 27.9%. Indirect obstetric deaths resulting from previously existing diseases represent 26.4%. Haemorrhage represents 17.9% of maternal deaths.[2]

Ninety-two point nine percent (92.9%) of maternal deaths are currently unrelated to abortion. Induced abortion represents 1.4% of deaths over 10 years. There were no deaths from spontaneous abortion in this period.[3]

MAJOR DETERMINANTS

Among the determinants of public health, the state of Quintana Roo should still improve its coverage of **emergency obstetric care**. The same goes **for skilled attendance at birth and prenatal care**.

The maternal health profile in the state is influenced by decreased fecundity, an aging population, and **delayed motherhood**. With increasing pregnancies at older ages (35 to 45 years), obstetric complications and concomitant diseases are more frequently observed.[4] These **high-risk pregnancies** need to be detected early in prenatal care and referred to a more advanced obstetric care center.

Illiteracy still affects approximately 8% of the female population. A low educational level of mothers affects pregnancy self-care and negatively influences the use of and access to available public health services, especially regarding compliance with regular prenatal care or access to emergency care if complications arise.

Approximately 9% of the population does not have access to **clean water** services. Consumption of dirty or feces-contaminated water weakens mothers and their children due to repeated infections.

The prevalence of **intimate-partner violence against women** is 10.7%. Physical violence increases the risk of obstetric complications from beatings, injuries, premature births, and haemorrhage. It is necessary to **detect this violence during prenatal visits** to intervene and prevent deaths from these complications.

[1] Source: INEGI. Birth statistics by state.
[2] Deaths preventable by timely medical-surgical treatment and blood transfusion availability.
[3] Ectopic pregnancy, molar pregnancy, and other anomalies of conception represent 5.7% of deaths over 10 years.
[4] Koch E, Thorp J, Bravo M, et al. Women's education level, maternal health facilities, abortion legislation and maternal deaths: a natural experiment in Chile from 1957 to 2007. *PLoS One*. 2012;7(5): e36613.

DETERMINANTS OF MATERNAL MORTALITY

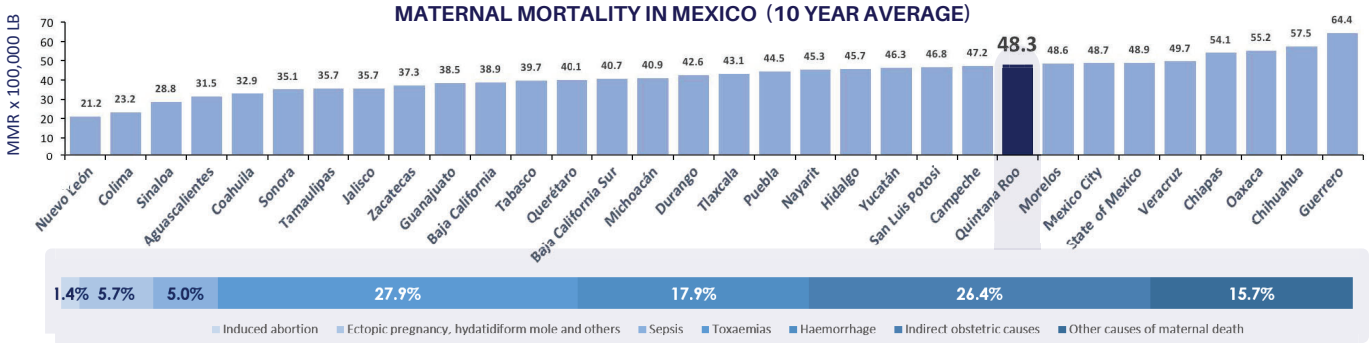
QUINTANA ROO

MELISA INSTITUTE

NATIONAL 44.6

LOWER — HIGHER

MATERNAL MORTALITY IN MEXICO (10 YEAR AVERAGE)



DETERMINANTS OF MATERNAL MORTALITY - STATE VS. NATIONAL

SKILLED ATTENDANCE AT BIRTH

91.5%

(NATIONAL 92.7%)

EMERGENCY OBSTETRIC CARE

9.7 / 100 LIVE BIRTHS

(GOAL 10.0/100 LB)

LOW BIRTH WEIGHT

8.3% ✓

(NATIONAL 8.4%)

WOMEN'S EDUCATION

LITERACY

92.4%

(National 92.9%)

CLEAN WATER

91.7%

(National 91.8%)

VIOLENCE AGAINST WOMEN

10.7%

(National 10.8%)

FECUNDITY AND DELAYED MOTHERHOOD

2.1 children / woman

(National 2.3 children / woman)

EVIDENCE-BASED PUBLIC HEALTH INTERVENTIONS TO IMPROVE MATERNAL HEALTH

- INCREASE NUMBER OF AND ACCESS TO EMERGENCY OBSTETRIC UNITS
- INCREASE ANTENATAL CARE VISITS AND SKILLED ATTENDANCE AT BIRTH
- EXPAND AND STRENGTHEN PUBLIC POLICIES DIRECTED TO ERADICATE ILLITERACY AND INCREASE THE NUMBER OF SCHOOLING YEARS OF THE FEMALE POPULATION
- INCREASE THE NUMBER OF HOUSEHOLDS WITH ACCESS TO CLEAN WATER AND SANITATION COVERAGE
- DETECT VIOLENCE AGAINST WOMEN DURING PRENATAL VISITS

NATIONAL RANKING

24

Adapted from Koch et al. BMJ Open 2015;5:e006013. doi: 10.1136/bmjopen-2014-006013

MORELOS

Nº Women of childbearing age: 509,159 **Nº Births: 40,230 (1.6% of the National total)**[1]

The state of **Morelos** ranks 25th in the national ranking of maternal mortality over the past 10 years. On average, 48.6 women die per 100 thousand live births per year.

The main causes of death are gestational hypertension, eclampsia, and toxemias of pregnancy, representing 33% of deaths. Haemorrhage represents 19.4% of deaths.[2] Indirect obstetric deaths resulting from previously existing diseases represent 17.3%.

Ninety-two point seven percent (92.7%) of maternal deaths are currently unrelated to abortion. Induced abortion represents 3.7% and spontaneous abortion 0.5% of total deaths over 10 years.[3]

MAJOR DETERMINANTS

Among the determinants of public health, the state of **Morelos** seems to have insufficient coverage of **emergency obstetric care**. This likely results in haemorrhage being the second cause of maternal death over 10 years. The same goes for **skilled attendance at birth** and prenatal care, still below the national median.

Maternal malnutrition in the poorest places likely results in the prevalence of **low birth weight** of 10.5%, higher than the country's median. Maternal aging, that is, an increase in pregnancies in older women (35 to 45 years), caused by decreased fecundity and increasingly **delayed motherhood**, also influences an increase in pregnancies with gestational hypertension, preeclampsia, and concomitant diseases, most often causing premature births. These high-risk pregnancies need to be detected early in prenatal care and referred to a more advanced obstetric care center.

Illiteracy still affects approximately 8% of the female population. A low educational level of mothers affects pregnancy self-care and negatively influences access to available health services, for example, poor compliance with **regular prenatal care.**

Approximately 13% of the population does not have access to **clean water** services, and 8% does not have **sanitation**. Consumption of dirty or feces-contaminated water weakens mothers and their children due to repeated infections.

[1] Source: INEGI. Birth statistics by state.
[2] Deaths preventable by timely medical-surgical treatment and blood transfusion availability.
[3] Ectopic pregnancy, molar pregnancy, and other anomalies of conception represent 3.1% of deaths over 10 years.

DETERMINANTS OF MATERNAL MORTALITY

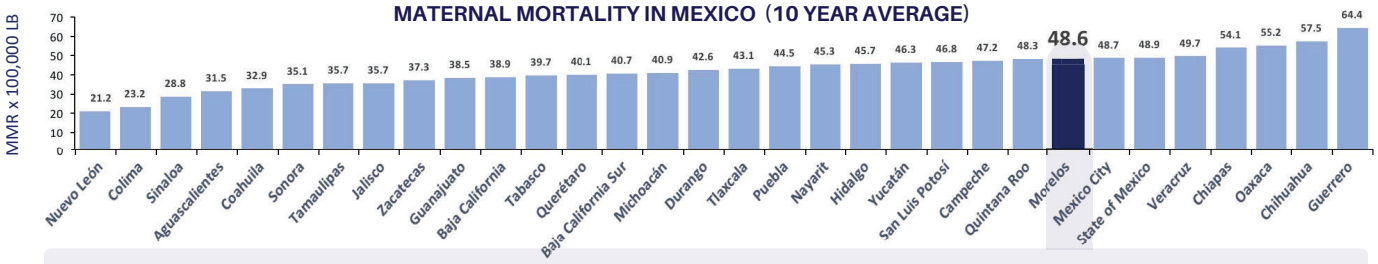
MORELOS

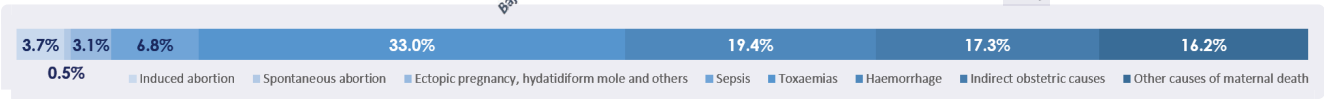
MELISA INSTITUTE

NATIONAL 44.6

LOWER — HIGHER

MATERNAL MORTALITY IN MEXICO (10 YEAR AVERAGE)





DETERMINANTS OF MATERNAL MORTALITY - STATE VS. NATIONAL

SKILLED ATTENDANCE AT BIRTH

91.7%

(NATIONAL 92.7%)

EMERGENCY OBSTETRIC CARE

8.8

100 LIVE BIRTHS

(GOAL 10.0/100 LB)

LOW BIRTH WEIGHT

10.5%

(NATIONAL 8.4%)

WOMEN'S EDUCATION

LITERACY

91.8%

(National 92.9%)

CLEAN WATER

87.6%

(National 91.8%)

VIOLENCE AGAINST WOMEN

9.7% ✓

(National 10.8%)

FECUNDITY AND DELAYED MOTHERHOOD

2.2 children / woman

(National 2.3 children / woman)

EVIDENCE-BASED PUBLIC HEALTH INTERVENTIONS TO IMPROVE MATERNAL HEALTH

- INCREASE ANTENATAL CARE VISITS AND SKILLED ATTENDANCE AT BIRTH
- INCREASE NUMBER OF AND ACCESS TO EMERGENCY OBSTETRIC UNITS
- EXPAND SPECIALISED PRENATAL CARE FOR HIGH-RISK PREGNANCIES AND NUTRITIONAL PROGRAMMES FOR MALNOURISHED PREGNANT WOMEN
- EXPAND AND STRENGTHEN PUBLIC POLICIES DIRECTED TO ERADICATE ILLITERACY AND INCREASE THE NUMBER OF SCHOOLING YEARS OF THE FEMALE POPULATION
- INCREASE THE NUMBER OF HOUSEHOLDS WITH ACCESS TO CLEAN WATER AND SANITATION COVERAGE

NATIONAL RANKING

25

Adapted from Koch et al. BMJ Open 2015;5:e006013. doi: 10.1136/bmjopen-2014-006013

MEXICO CITY

Nº Women of childbearing age: 2,549,595 **Nº Births: 156,549 (6.1% of the National total)**[1]

Mexico City ranks 26th in the national ranking of maternal mortality over the past 10 years. On average, 48.7 women die per 100 thousand live births.

Gestational hypertension, eclampsia, and toxemias of pregnancy represent 30.2% of deaths. Haemorrhage follows, with 19.5%.[2] Indirect obstetric deaths resulting from previously existing diseases represent 17.6%.

Ninety point six percent (90.6%) of maternal deaths are unrelated to abortion. Induced abortion represents 3.6% and spontaneous abortion 0.5% of total deaths over 10 years.[3]

MAJOR DETERMINANTS

Although **Mexico City** is one of the states with the greatest human development in the republic, the best healthcare infrastructure, and the lowest total fecundity rate, paradoxically, the prevalence of **low birth weight** is almost double the country's average. Maternal malnutrition in poor places is not the only explanatory factor.

Delayed motherhood, along with a fall in the fecundity rate, has increased pregnancies in women aged 35 to 45 years. These women, especially the primiparous ones, are at increased risk of **premature births** due to some major complication during their pregnancies.[4] Motherhood at older ages has increased the demand for **in vitro fertilization (IVF)**. These pregnancies are also at increased risk of premature births and low birth weight. Other factors may also be contributing.[5]

While the mortality of resident mothers living in **Mexico City** is 48.7 per 100 thousand live births, **the mortality by place of occurrence,** including nonresident mothers, reaches 61.9 per 100 thousand. This difference occurs because the more advanced hospitals in the capital attract a floating population of women with high-risk pregnancies, who move from other states seeking specialist care.

Finally, the prevalence of **violence against women** reaches 20.9%, one of the highest in the country. Demographic changes, such as a decrease in marriages, an increase in informal unions, and alcohol and drug use, are associated with higher levels of violence against women.[6] **Physical violence** during pregnancy increases the risk of obstetric complications from beatings, injuries, premature labor, and haemorrhage. It is necessary to **detect this violence in prenatal visits** to prevent these complications.

[1] Source: INEGI. Birth statistics by state.
[2] Deaths preventable by timely medical-surgical treatment and blood transfusion availability.
[3] Ectopic pregnancy, molar pregnancy, and other anomalies of conception represent 6% of deaths over 10 years.
[4] Koch E, Thorp J, Bravo M, et al. Women's education level, maternal health facilities, abortion legislation and maternal deaths: a natural experiment in Chile from 1957 to 2007. *PLoS One*. 2012;7(5):e36613.
[5] Swingle HM et al Abortion and the risk of subsequent preterm birth: a systematic review with meta-analyses. J Reprod Med. 2009;54(2):95-108.
[6] Pliego, F. Families in Mexico. Organizational Structures. Processes of Change 2000-2010 and consequences for the well-being of children and adults. (1st ed.). Mexico City: Editorial Porrúa; 2014.

DETERMINANTS OF MATERNAL MORTALITY

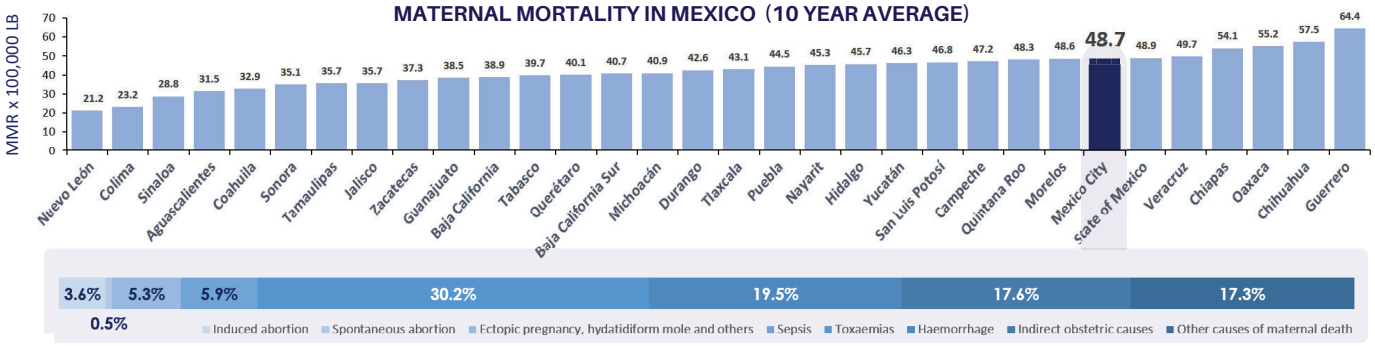
MEXICO CITY

MELISA INSTITUTE

NATIONAL 44.6

LOWER — HIGHER

MATERNAL MORTALITY IN MEXICO (10 YEAR AVERAGE)



DETERMINANTS OF MATERNAL MORTALITY - STATE VS. NATIONAL

SKILLED ATTENDANCE AT BIRTH

94.3% ✓

(NATIONAL 92.7%)

EMERGENCY OBSTETRIC CARE

14.2 ✓

100 LIVE BIRTHS

(GOAL 10.0/100 LB)

LOW BIRTH WEIGHT

14.0%

(NATIONAL 8.4%)

WOMEN'S EDUCATION

LITERACY

96.3% ✓ (National 92.9%)

CLEAN WATER

97.5% ✓ (National 91.8%)

VIOLENCE AGAINST WOMEN

20.9%

(National 10.8%)

FECUNDITY AND DELAYED MOTHERHOOD

1.8 children / woman

(National 2.3 children / woman)

EVIDENCE-BASED PUBLIC HEALTH INTERVENTIONS TO IMPROVE MATERNAL HEALTH

- EXPAND SPECIALISED PRENATAL CARE FOR HIGH-RISK PREGNANCIES AND NUTRITIONAL PROGRAMMES FOR MALNOURISHED PREGNANT WOMEN
- DETECT VIOLENCE AGAINST WOMEN DURING PRENATAL VISITS
- PRECONCEPTION COUNSELLING IN ORDER TO PROMOTE HEALTHY CHILDBEARING

NATIONAL RANKING

26

Adapted from Koch et al. BMJ Open 2015;5:e006013. doi: 10.1136/bmjopen-2014-006013

STATE OF MEXICO

Nº Women of childbearing age: 4,499,349 **Nº Births: 327,165 (12.6% of the National total)**[1]

The **State of Mexico** ranks 27th in the national ranking of maternal mortality. On average, 48.9 women die per 100 thousand live births per year.

The main causes of death are gestational hypertension, eclampsia, and toxemias of pregnancy, representing 31.6%. Haemorrhage represents 17.7% of deaths. Indirect obstetric deaths resulting from previously existing diseases represent 16.8%.

Ninety-two point one percent (92.1%) of maternal deaths are currently unrelated to abortion. Induced abortion represents 3.3% and spontaneous abortion 0.6% of total deaths over 10 years.[2]

MAJOR DETERMINANTS

Among the determinants of public health, The **State of Mexico** has insufficient coverage of **emergency obstetric care**. This likely results in haemorrhage being the second cause of death over 10 years, which is considered preventable with timely medical-surgical treatment and blood transfusion availability. The same occurs with **skilled attendance at birth** reaching only 84.7%.

Maternal health in the state is influenced by an aging population, decreased fecundity, and **delayed motherhood**. More than 62% of current maternal deaths occur in **high-risk pregnancies**. Pregnancies have increased in women between 35 and 45 years of age, who have a higher incidence of serious obstetric complications.[3] They also have a higher risk of premature birth and **low birth weight,** regardless of whether there is maternal malnutrition or not. This factor is also present in the state.

The prevalence of **violence against women** is 11.9%. Demographic changes, such as a decrease in marriages, an increase in informal unions, and alcohol and drug use, are associated with higher levels of violence against women.[4]

Physical violence during pregnancy increases the risk of obstetric complications from beatings, injuries, premature labor, and haemorrhage. Affected women often face barriers to accessing regular prenatal care or timely emergency obstetric care. It is necessary to **detect this violence in prenatal visits** to prevent complications, pregnancy losses, premature births, and deaths.

[1] Source: INEGI. Birth statistics by state.
[2] Ectopic pregnancy, molar pregnancy, and other anomalies of conception represent 4% of deaths over 10 years.
[3] Koch E, Thorp J, Bravo M, et al. Women's education level, maternal health facilities, abortion legislation and maternal deaths: a natural experiment in Chile from 1957 to 2007. *PLoS One*. 2012;7(5):e36613.
[4] Pliego, F. Families in Mexico. Organizational Structures. Processes of Change 2000-2010 and consequences for the well-being of children and adults. (1st ed.). Mexico City: Editorial Porrúa; 2014.

DETERMINANTS OF MATERNAL MORTALITY

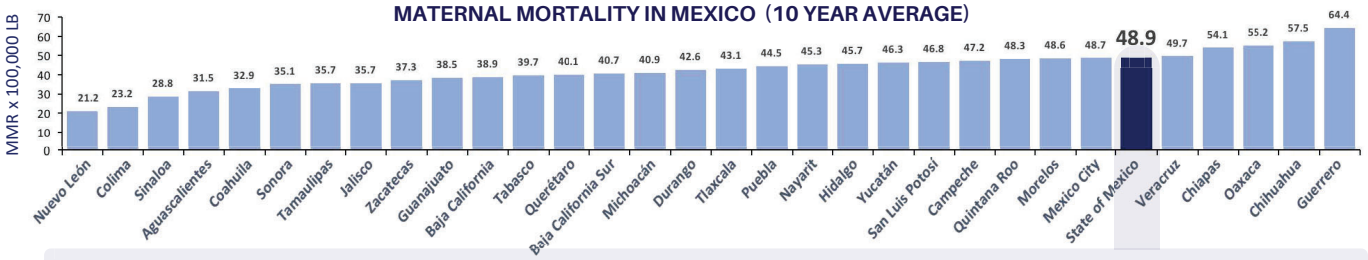
STATE OF MEXICO

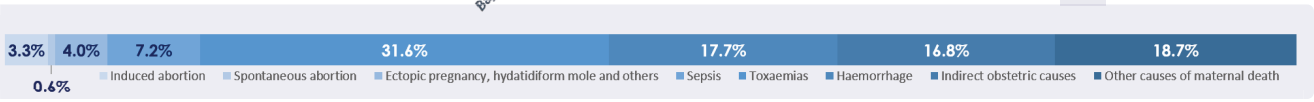
MELISA INSTITUTE

NATIONAL 44.6

LOWER — HIGHER

MATERNAL MORTALITY IN MEXICO (10 YEAR AVERAGE)





DETERMINANTS OF MATERNAL MORTALITY - STATE VS. NATIONAL

SKILLED ATTENDANCE AT BIRTH

84.7%

(NATIONAL 92.7%)

EMERGENCY OBSTETRIC CARE

4.4

100 LIVE BIRTHS

(GOAL 10.0/100 LB)

LOW BIRTH WEIGHT

10.9%

(NATIONAL 8.4%)

WOMEN'S EDUCATION

LITERACY

93.6% ✓ (National 92.9%)

CLEAN WATER

92.2% ✓ (National 91.8%)

VIOLENCE AGAINST WOMEN

11.9%

(National 10.8%)

FECUNDITY AND DELAYED MOTHERHOOD

2.2 children / woman

(National 2.3 children / woman)

EVIDENCE-BASED PUBLIC HEALTH INTERVENTIONS TO IMPROVE MATERNAL HEALTH

- INCREASE ANTENATAL CARE VISITS AND SKILLED ATTENDANCE AT BIRTH
- INCREASE NUMBER OF AND ACCESS TO EMERGENCY OBSTETRIC UNITS
- EXPAND SPECIALISED PRENATAL CARE FOR HIGH-RISK PREGNANCIES AND NUTRITIONAL PROGRAMMES FOR MALNOURISHED PREGNANT WOMEN
- DETECT VIOLENCE AGAINST WOMEN DURING PRENATAL VISITS
- PRECONCEPTION COUNSELLING IN ORDER TO PROMOTE HEALTHY CHILDBEARING

NATIONAL RANKING

27

Adapted from Koch et al. BMJ Open 2015;5:e006013. doi: 10.1136/bmjopen-2014-006013

VERACRUZ

Nº Women of childbearing age: 2,138,575 **Nº Births: 171,417 (6.7% of the National total)**[1]

The state of **Veracruz** ranks 28th in the national ranking of maternal mortality. On average, 49.7 women die per 100 thousand live births per year.

The main causes of death are gestational hypertension, eclampsia, and toxemias of pregnancy, representing 27.1%. Haemorrhage represents 22.8% of deaths.[2] Indirect obstetric deaths resulting from previously existing diseases represent 18.5%.

Ninety-two point seven percent (92.7%) of maternal deaths are unrelated to abortion. Induced abortion represents 2.7% and spontaneous abortion 0.3% of total maternal deaths over 10 years.[3]

MAJOR DETERMINANTS

Among the determinants of public health, Veracruz has 98% coverage of skilled attendance at birth, but paradoxically, it has insufficient coverage of access to more advanced **emergency obstetric care**.

The maternal health profile in the state is influenced by decreased fecundity, an aging population, and **delayed motherhood**. With increasing pregnancies at older ages (35 to 45 years), obstetric complications and concomitant diseases are more frequently observed.[4] These high-risk pregnancies, representing more than 45% of deaths over 10 years, need to be detected early in prenatal care and referred to a more advanced obstetric care center to prevent complications.

Illiteracy still affects approximately 14% of the female population. A low educational level of mothers affects pregnancy self-care and negatively influences access to available maternal health services.

Approximately 24% of the population does not have access to **clean water** services, and 20% does not have **sanitation**. Consumption of dirty or feces-contaminated water weakens mothers and their children due to repeated infections.

The prevalence of **intimate-partner violence against women** is 10.9%. Physical violence increases the risk of obstetric complications from beatings, injuries, premature births, and haemorrhage. It is necessary to detect this violence during prenatal visits to intervene and prevent deaths from these complications.

[1] Source: INEGI. Birth statistics by state.
[2] Deaths preventable by timely medical-surgical treatment and blood transfusion availability.
[3] Ectopic pregnancy, molar pregnancy, and other anomalies of conception represent 4.3% of deaths over 10 years.
[4] Koch E, Thorp J, Bravo M, et al. Women's education level, maternal health facilities, abortion legislation and maternal deaths: a natural experiment in Chile from 1957 to 2007. *PLoS One*. 2012;7(5): e36613.

DETERMINANTS OF MATERNAL MORTALITY

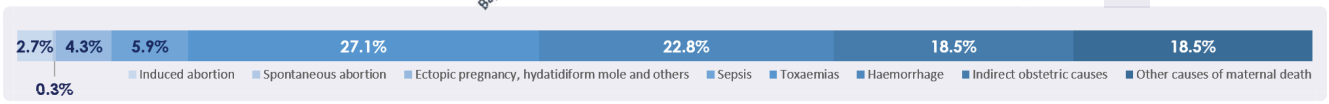
VERACRUZ

MELISA INSTITUTE

NATIONAL 44.6

LOWER ⟵ ⟶ HIGHER

MATERNAL MORTALITY IN MEXICO (10 YEAR AVERAGE)



DETERMINANTS OF MATERNAL MORTALITY - STATE VS. NATIONAL

SKILLED ATTENDANCE AT BIRTH

97.8% ✓

(NATIONAL 92.7%)

EMERGENCY OBSTETRIC CARE

4.8 / 100 LIVE BIRTHS

(GOAL 10.0/100 LB)

LOW BIRTH WEIGHT

7.1% ✓

(NATIONAL 8.4%)

WOMEN'S EDUCATION

LITERACY

86.1%

(National 92.9%)

CLEAN WATER

76.3%

(National 91.8%)

VIOLENCE AGAINST WOMEN

10.9%

(National 10.8%)

FECUNDITY AND DELAYED MOTHERHOOD

2.2 children / woman

(National 2.3 children / woman)

EVIDENCE-BASED PUBLIC HEALTH INTERVENTIONS TO IMPROVE MATERNAL HEALTH

- INCREASE NUMBER OF AND ACCESS TO EMERGENCY OBSTETRIC UNITS
- EXPAND AND STRENGTHEN PUBLIC POLICIES DIRECTED TO ERADICATE ILLITERACY AND INCREASE THE NUMBER OF SCHOOLING YEARS OF THE FEMALE POPULATION
- INCREASE THE NUMBER OF HOUSEHOLDS WITH ACCESS TO CLEAN WATER AND SANITATION COVERAGE
- DETECT VIOLENCE AGAINST WOMEN DURING PRENATAL VISITS

NATIONAL RANKING

28

Adapted from Koch et al. BMJ Open 2015;5:e006013. doi: 10.1136/bmjopen-2014-006013

CHIAPAS

Nº Women of childbearing age: 1,346,495 **Nº Births: 168,256 (6.5% of the National total)**[1]

The state of **Chiapas** ranks 29th in the national ranking of maternal mortality over the past 10 years. On average, 54.1 women die per 100 thousand live births per year.

Haemorrhage represents 32.5% of deaths. Next, gestational hypertension, eclampsia, and toxemias of pregnancy represent 23% of deaths. Then, indirect obstetric causes resulting from previously existing diseases represent 14.5%.

Ninety-two point three percent (92.3%) of maternal deaths are currently unrelated to abortion. Induced abortion represents 3.7% and spontaneous abortion 0.1% of total maternal deaths over 10 years.[2]

MAJOR DETERMINANTS

Among the determinants of public health, the state of **Chiapas** has insufficient coverage of **emergency obstetric care**. This likely results in haemorrhage being the leading cause of death over 10 years.[3] The same goes for **skilled attendance at birth** and prenatal care.

Illiteracy still affects approximately 23% of the female population. A low educational level of mothers affects pregnancy self-care and negatively influences access to available public health services, especially regarding compliance with regular prenatal care or access to emergency care if complications arise.

Approximately 26% of the population does not have access to **clean water** services, and 20% does not have **sanitation**. Clean water is a key determinant influencing maternal and child health in the most vulnerable populations. Consumption of dirty or feces-contaminated water weakens mothers and their children due to repeated infections.

Maternal malnutrition in the poorest places in the region likely results in the prevalence of **low birth weight** reaching 8.6%, somewhat higher than the country's median.

[1] Source: INEGI. Birth statistics by state.
[2] Ectopic pregnancy, molar pregnancy, and other anomalies of conception represent 3.9% of deaths over 10 years.
[3] Deaths preventable by timely medical-surgical treatment and blood transfusion availability.

DETERMINANTS OF MATERNAL MORTALITY

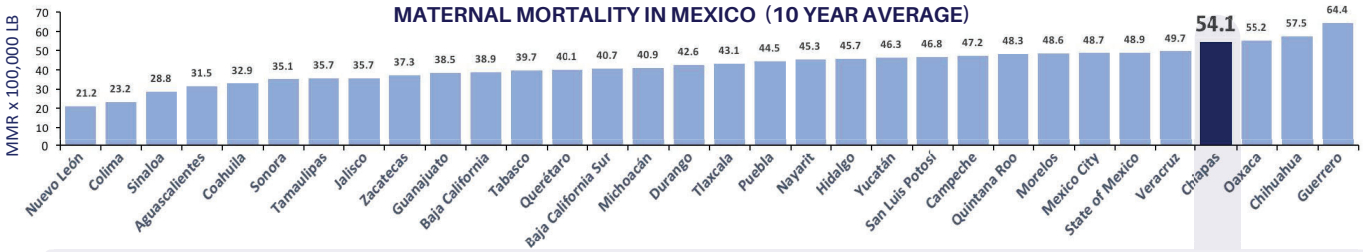
CHIAPAS

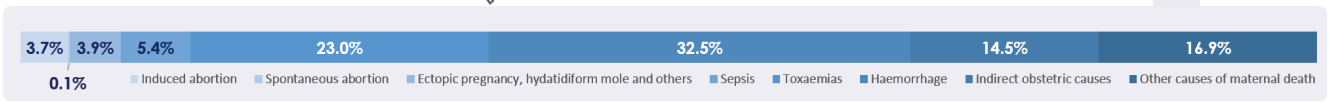
MELISA INSTITUTE

NATIONAL 44.6

LOWER — HIGHER

MATERNAL MORTALITY IN MEXICO (10 YEAR AVERAGE)





DETERMINANTS OF MATERNAL MORTALITY - STATE VS. NATIONAL

SKILLED ATTENDANCE AT BIRTH

90.2%

(NATIONAL 92.7%)

EMERGENCY OBSTETRIC CARE

5.1

100 LIVE BIRTHS

(GOAL 10.0/100 LB)

LOW BIRTH WEIGHT

8.6%

(NATIONAL 8.4%)

WOMEN'S EDUCATION

LITERACY

77.5%

(National 92.9%)

CLEAN WATER

73.8%

(National 91.8%)

VIOLENCE AGAINST WOMEN

7.0% ✓

(National 10.8%)

FECUNDITY AND DELAYED MOTHERHOOD

2.8 children / woman

(National 2.3 children / woman)

EVIDENCE-BASED PUBLIC HEALTH INTERVENTIONS TO IMPROVE MATERNAL HEALTH

- INCREASE ANTENATAL CARE VISITS AND SKILLED ATTENDANCE AT BIRTH
- INCREASE NUMBER OF AND ACCESS TO EMERGENCY OBSTETRIC UNITS
- EXPAND SPECIALISED PRENATAL CARE FOR HIGH-RISK PREGNANCIES AND NUTRITIONAL PROGRAMMES FOR MALNOURISHED PREGNANT WOMEN
- EXPAND AND STRENGTHEN PUBLIC POLICIES DIRECTED TO ERADICATE ILLITERACY AND INCREASE THE NUMBER OF SCHOOLING YEARS OF THE FEMALE POPULATION
- INCREASE THE NUMBER OF HOUSEHOLDS WITH ACCESS TO CLEAN WATER AND SANITATION COVERAGE

NATIONAL RANKING

29

Adapted from Koch et al. BMJ Open 2015;5:e006013. doi: 10.1136/bmjopen-2014-006013

OAXACA

Nº Women of childbearing age: 1,039,797 **Nº Births: 98,888 (3.8% of the National total)**[1]

The state of **Oaxaca** ranks 30th in the national ranking of maternal mortality over the past 10 years. On average, 55.2 women die per 100 thousand live births per year.

The main cause is haemorrhage, representing 34.3% of deaths. Next, gestational hypertension, eclampsia, and toxemias of pregnancy represent 23.7%. Then, indirect obstetric deaths resulting from previously existing diseases represent 11.9%.

Ninety-four percent (94%) of maternal deaths are currently unrelated to abortion. Induced abortion represents 3.4% and spontaneous abortion 0.5% of total deaths over 10 years.[2]

MAJOR DETERMINANTS

Among the determinants of public health, the state of Oaxaca has markedly insufficient coverage of **emergency obstetric care**. This likely results in haemorrhage being by far the leading cause of death over 10 years, which is considered preventable with timely medical-surgical treatment and blood transfusion availability.

Illiteracy still affects more than 20% of the female population. A low educational level of mothers affects pregnancy self-care and negatively influences the use of and access to available public health services, especially regarding compliance with regular prenatal care or seeking emergency obstetric care if complications arise.

Approximately 30% of the population does not have access to **clean water** or **sanitation**. Clean water is a key determinant influencing maternal and child health in the most vulnerable populations. Consumption of dirty or feces-contaminated water weakens mothers and their children due to repeated infections.

[1] Source: INEGI. Birth statistics by state.
[2] Ectopic pregnancy, molar pregnancy, and other anomalies of conception represent 2.1% of deaths over 10 years.

DETERMINANTS OF MATERNAL MORTALITY

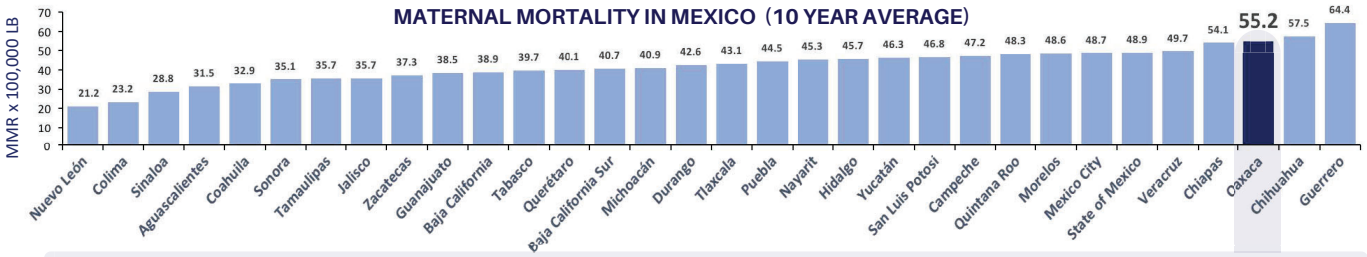
OAXACA

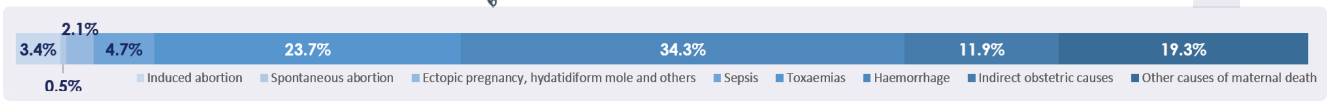
MELISA INSTITUTE

NATIONAL 44.6

LOWER ⟵ ⟶ HIGHER

MATERNAL MORTALITY IN MEXICO (10 YEAR AVERAGE)





DETERMINANTS OF MATERNAL MORTALITY - STATE VS. NATIONAL

SKILLED ATTENDANCE AT BIRTH

95.0% ✓

(NATIONAL 92.7%)

EMERGENCY OBSTETRIC CARE

3.7 / 100 LIVE BIRTHS

(GOAL 10.0/100 LB)

LOW BIRTH WEIGHT

7.8% ✓

(NATIONAL 8.4%)

WOMEN'S EDUCATION

LITERACY

79.4% (National 92.9%)

CLEAN WATER

69.8% (National 91.8%)

VIOLENCE AGAINST WOMEN

6.3% ✓ (National 10.8%)

FECUNDITY AND DELAYED MOTHERHOOD

2.6 children / woman
(National 2.3 children / woman)

EVIDENCE-BASED PUBLIC HEALTH INTERVENTIONS TO IMPROVE MATERNAL HEALTH

- INCREASE NUMBER OF AND ACCESS TO EMERGENCY OBSTETRIC UNITS
- EXPAND AND STRENGTHEN PUBLIC POLICIES DIRECTED TO ERADICATE ILLITERACY AND INCREASE THE NUMBER OF SCHOOLING YEARS OF THE FEMALE POPULATION
- INCREASE THE NUMBER OF HOUSEHOLDS WITH ACCESS TO CLEAN WATER AND SANITATION COVERAGE

NATIONAL RANKING

30

Adapted from Koch et al. BMJ Open 2015;5:e006013. doi: 10.1136/bmjopen-2014-006013

CHIHUAHUA

Nº Women of childbearing age: 973,346 **Nº Births: 69,376 (2.7% of the National total)**[1]

The state of **Chihuahua** ranks 31st in the national ranking of maternal mortality. On average, 57.5 women die per 100 thousand live births per year.

The main causes of death are gestational hypertension, eclampsia, and toxemias of pregnancy, representing 32.6% of deaths. Haemorrhage represents 22% of deaths.[2] Indirect obstetric deaths resulting from previously existing diseases represent 18.6%.

Ninety-four point two percent (94.2%) of maternal deaths are unrelated to abortion. Induced abortion represents 2.4% and spontaneous abortion 0.6% of total maternal deaths over 10 years.[3]

MAJOR DETERMINANTS

Among the most decisive public health determinants, the state of **Chihuahua** has insufficient coverage of **emergency obstetric care** for its maternal population. This likely results in haemorrhage being persistently the second cause of death over 10 years. The same applies to **skilled attendance at birth** and prenatal care for pregnant women.

The prevalence of **intimate-partner violence against women** is 12.1%. Demographic changes, such as a decrease in marriages, an increase in informal unions, and alcohol and drug use, are associated with higher levels of violence against women.[4]

Physical violence during pregnancy increases the risk of obstetric complications from beatings, injuries, premature labor, and haemorrhage. Affected women often face barriers to accessing regular prenatal care or timely emergency obstetric care. It is necessary to **detect this violence in prenatal visits** to prevent complications, pregnancy losses, premature births, and deaths.

Maternal health in **Chihuahua** begins to be influenced by an aging population and **delayed motherhood.** With increasing pregnancies at older ages (35 to 45 years), there are increased complications, such as gestational hypertension, eclampsia, gestational diabetes, and toxemias of pregnancy.[5] These women also have a higher risk of haemorrhage during labor and complications of concomitant diseases that may worsen during pregnancy.

[1] Source: INEGI. Birth statistics by state.
[2] Deaths preventable by timely medical-surgical treatment and blood transfusion availability.
[2] Ectopic pregnancy, molar pregnancy, and other anomalies of conception represent 2.8% of deaths over 10 years.
[3] Pliego, F. Families in Mexico. Organizational Structures. Processes of Change 2000-2010 and consequences for the well-being of children and adults. (1st ed.). Mexico City: Editorial Porrúa; 2014.
[5] Koch E, Thorp J, Bravo M, et al. Women's education level, maternal health facilities, abortion legislation and maternal deaths: a natural experiment in Chile from 1957 to 2007. *PLoS One*. 2012;7(5):e36613.

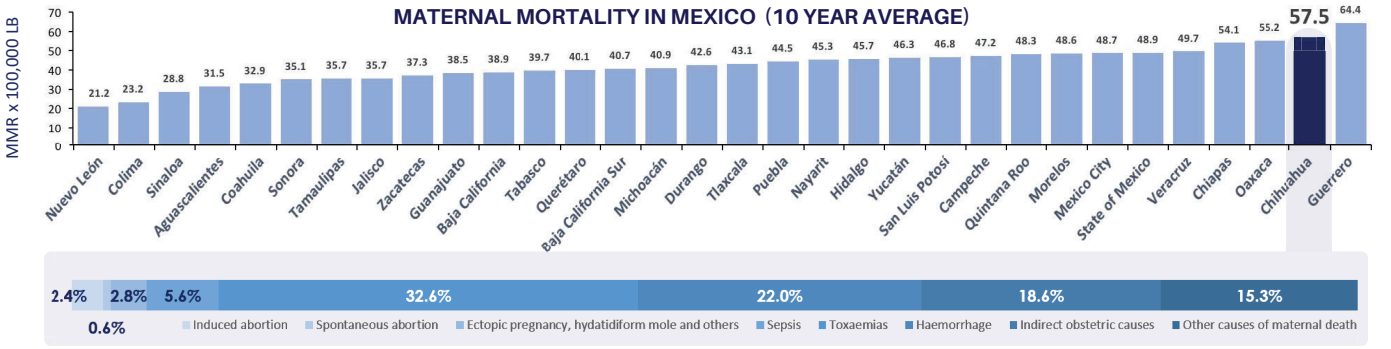
DETERMINANTS OF MATERNAL MORTALITY

CHIHUAHUA

MELISA INSTITUTE

NATIONAL 44.6

LOWER — HIGHER



DETERMINANTS OF MATERNAL MORTALITY - STATE VS. NATIONAL

SKILLED ATTENDANCE AT BIRTH

82.2%

(NATIONAL 92.7%)

EMERGENCY OBSTETRIC CARE

6.2 / 100 LIVE BIRTHS

(GOAL 10.0/100 LB)

LOW BIRTH WEIGHT

7.6% ✓

(NATIONAL 8.4%)

WOMEN'S EDUCATION

LITERACY

95.3% ✓ (National 92.9%)

CLEAN WATER

94.9% ✓ (National 91.8%)

VIOLENCE AGAINST WOMEN

12.1%

(National 10.8%)

FECUNDITY AND DELAYED MOTHERHOOD

2.4 children / woman

(National 2.3 children / woman)

EVIDENCE-BASED PUBLIC HEALTH INTERVENTIONS TO IMPROVE MATERNAL HEALTH

- INCREASE ANTENATAL CARE VISITS AND SKILLED ATTENDANCE AT BIRTH
- INCREASE NUMBER OF AND ACCESS TO EMERGENCY OBSTETRIC UNITS
- PRECONCEPTION COUNSELLING IN ORDER TO PROMOTE HEALTHY CHILDBEARING
- DETECT VIOLENCE AGAINST WOMEN DURING PRENATAL VISITS

NATIONAL RANKING

31

Adapted from Koch et al. BMJ Open 2015;5:e006013. doi: 10.1136/bmjopen-2014-006013

GUERRERO

Nº Women of childbearing age: 910,022 **Nº Births: 113,692 (4.4% of the National total)[1]**

The state of **Guerrero** ranks 32nd in the national ranking of maternal mortality. On average, 64.4 women die per 100 thousand live births per year.

Haemorrhage represents 34.3% of deaths.[2] Next, gestational hypertension, eclampsia, and toxemias of pregnancy represent 24.9%. Then, indirect obstetric deaths resulting from previously existing diseases represent 13.2%.

Ninety-three point seven percent (93.7%) of maternal deaths are unrelated to abortion. Induced abortion represents 4.5% and spontaneous abortion 0.3% of total maternal deaths over 10 years.[3]

MAJOR DETERMINANTS

Among the most decisive public health determinants, the state of **Guerrero** has markedly insufficient coverage of **emergency obstetric care** for its maternal population. This likely results in haemorrhage being persistently the leading cause of death over 10 years. The same applies to **skilled attendance at birth** and prenatal care for pregnant women.

Approximately 38% of the population does not have access to **clean water** services, and 28% does not have **sanitation or sewers**. Clean water is a key determinant influencing maternal and child health in the most vulnerable populations. Consumption of dirty or feces-contaminated water weakens mothers and their children due to repeated infections.

Illiteracy still affects approximately 20% of the female population. A low educational level of mothers affects pregnancy self-care and negatively influences the use of and access to available public health services, especially regarding compliance with regular prenatal care or seeking emergency obstetric care if complications arise during pregnancy.

Maternal malnutrition in the poorest places in the region likely results in the prevalence of **low birth weight** reaching 9.3%, higher than the country's median.

[1] Source: INEGI. Birth statistics by state.
[2] Deaths preventable by timely medical-surgical treatment and blood transfusion availability.
[3] Ectopic pregnancy, molar pregnancy, and other anomalies of conception represent 1.5% of deaths over 10 years.

DETERMINANTS OF MATERNAL MORTALITY

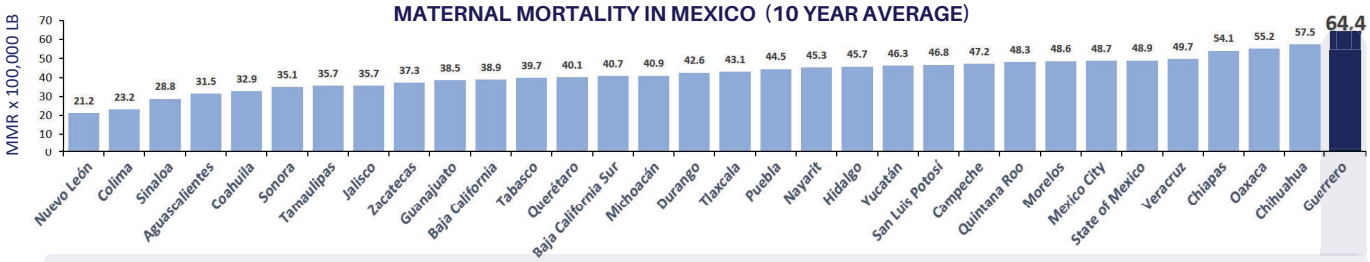
GUERRERO

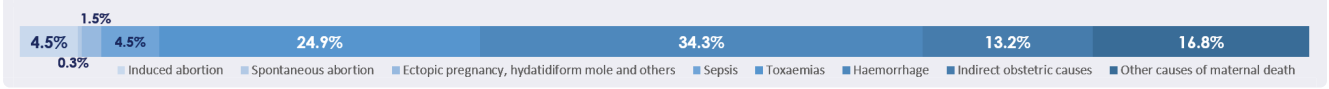
MELISA INSTITUTE

NATIONAL 44.6

LOWER — HIGHER

MATERNAL MORTALITY IN MEXICO (10 YEAR AVERAGE)





DETERMINANTS OF MATERNAL MORTALITY - STATE VS. NATIONAL

SKILLED ATTENDANCE AT BIRTH

80.8%

(NATIONAL 92.7%)

EMERGENCY OBSTETRIC CARE

3.2 / 100 LIVE BIRTHS

(GOAL 10.0/100 LB)

LOW BIRTH WEIGHT

9.3%

(NATIONAL 8.4%)

WOMEN'S EDUCATION

LITERACY

79.8% (National 92.9%)

CLEAN WATER

62.0% (National 91.8%)

VIOLENCE AGAINST WOMEN

8.3% ✓ (National 10.8%)

FECUNDITY AND DELAYED MOTHERHOOD

2.8 children / woman
(National 2.3 children / woman)

EVIDENCE-BASED PUBLIC HEALTH INTERVENTIONS TO IMPROVE MATERNAL HEALTH

- INCREASE ANTENATAL CARE VISITS AND SKILLED ATTENDANCE AT BIRTH
- INCREASE NUMBER OF AND ACCESS TO EMERGENCY OBSTETRIC UNITS
- EXPAND SPECIALISED PRENATAL CARE FOR HIGH-RISK PREGNANCIES AND NUTRITIONAL PROGRAMMES FOR MALNOURISHED PREGNANT WOMEN
- EXPAND AND STRENGTHEN PUBLIC POLICIES DIRECTED TO ERADICATE ILLITERACY AND INCREASE THE NUMBER OF SCHOOLING YEARS OF THE FEMALE POPULATION
- INCREASE THE NUMBER OF HOUSEHOLDS WITH ACCESS TO CLEAN WATER AND SANITATION COVERAGE

NATIONAL RANKING

32

Adapted from Koch et al. BMJ Open 2015;5:e006013. doi: 10.1136/bmjopen-2014-006013

MELISA INSTITUTE

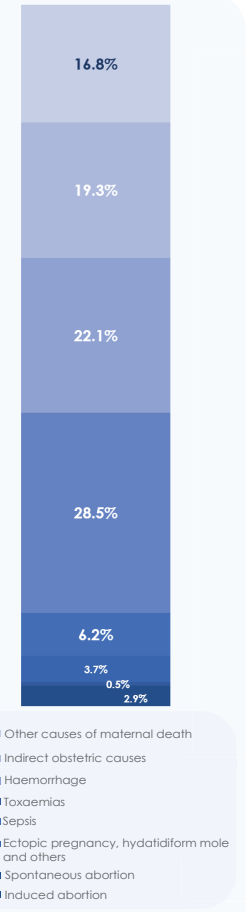
ABORTION LEGISLATION AND MATERNAL MORTALITY

There is a notion that abortion legislation could be a determinant of maternal health. The study of the 32 Mexican states evaluated whether the abortion legislation had an impact or association with maternal deaths. The states were classified into two groups according to their legal codes.[1] The trends in mortality of both groups were compared and controlled for the distribution of the other determinants of maternal health. The map above shows the geographical distribution of mortality in a blue colored gradient, the darker the gradient, the greater the mortality. The yellow and orange dots show a more or less permissive legislation correspondingly.

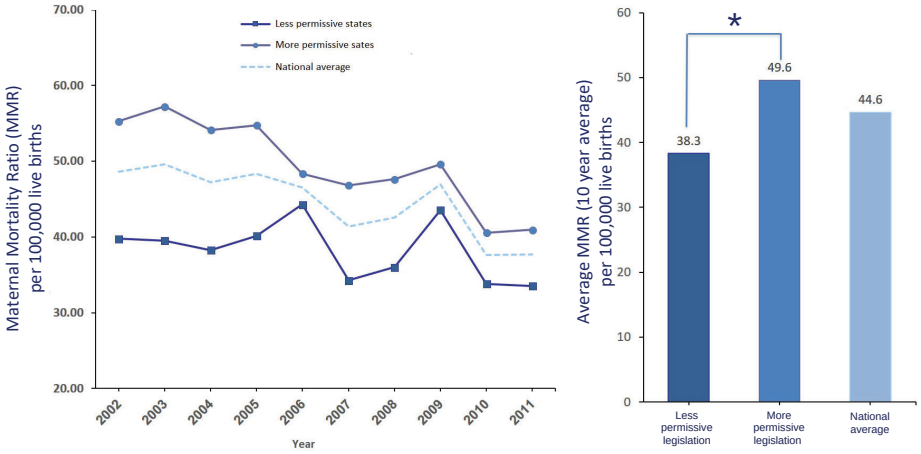
[1] Classified according to whether or not abortion was allowed in each state for fetal genetic or congenital anomalies in combination with other causes: n = 18 states were grouped as "less permissive legislation" and n = 14 states as "more permissive legislation", this last group including Mexico City.

Adapted from Koch et al. BMJ Open 2015;5:e006013. doi: 10.1136/bmjopen-2014-006013

RESULTS



MATERNAL MORTALITY (TOTAL)



When comparing the maternal mortality of the states with more permissive legislations, with respect to the states with less permissive legislations, the latter showed 23% lower maternal mortality. However, the statistical analyses showed that these differences are not explained by the different laws of abortion, but by the determinants, such as; higher education of women, greater access to prenatal care, skilled attendance at birth, emergency obstetric care, clean water, sanitation, access to family planning and fertility regulation, etc.

MAGNITUDE OF ABORTION-RELATED MORTALITY IN MEXICO

Overall, it was observed that the majority of maternal deaths occur due to causes unrelated to abortion. In fact, 93% of deaths are due to causes such as:, gestational hypertension, eclampsia, postpartum haemorrhage, concomitant diseases and other obstetric causes. Of the total causes of death in 10 years, induced abortion accounted for 2.9%, spontaneous abortion 0.5% and ectopic pregnancies 3.7% of the total maternal deaths registered in Mexico.[2]

CONCLUSIONS

- No evidence was found suggesting an association (positive or negative) between the different abortion laws and maternal deaths.
- The differences observed between the states are currently explained by the effect of other determinants of maternal health.
- Death from abortion in Mexico is infrequent and seems to occur independently of its legal status.

[2]For different types of abortion, the International Classification of Diseases Tenth Edition (ICD-10) was used as proposed in Koch et al (2012) Fundamental discrepancies in abortion estimates and abortion-related mortality: A reevaluation of recent studies in Mexico with special reference to the International Classification of Diseases.. Int J Womens Health. 4: 613-23.

Adapted from Koch et al. BMJ Open 2015;5:e006013. doi: 10.1136/bmjopen-2014-006013

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