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# Overall and abortion-related maternal mortality rates in Uruguay over the past 25 years and their association with policies and actions aimed at protecting women's rights

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## ABSTRACT

**Objective:** To evaluate changes in maternal mortality rates in Uruguay over the past 25 years, as well as their distribution by cause, and their temporal relationship with social changes and Human Development Index (HDI) indicators. **Methods:** Data on maternal mortality obtained directly from the Uruguayan Ministry of Public Health for the 2001 to 2015 period were analyzed together with data from the United Nations Inter-Agency Group for Child Mortality Estimation for the 1990 to 2015 period. The swiftness of the decrease in maternal mortality per five-year period, the variation in the percentage of abortion-related deaths, and the correlation with HDI indicators were evaluated. **Results:** Maternal mortality decreased significantly, basically due to a reduction in the number of deaths from unsafe abortion, which was the principal cause of maternal mortality in the 1990s. The reduction in maternal mortality over the past 10 years also coincides with a reduction in poverty and an improvement in the HDI. **Conclusion:** A rapid reduction occurred in maternal mortality in Uruguay, particularly in maternal mortality resulting from unsafe abortion. This coincided with the application of a model for reducing the risk and harm of unsafe abortions, which finally led to the decriminalization of abortion.

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## 1. Introduction

Maternal mortality remains unacceptably high. Every day, around 830 women die worldwide from complications related to pregnancy or childbirth [1]. It is estimated that around 10.7 million women died from maternal causes worldwide between 1990 and 2015. Nevertheless, significant progress in reducing maternal mortality globally was also made over this time period. The overall maternal mortality ratio fell by 44% (95% CI, 33%–48%) from 385 per 100 000 live births in 1990 to 216 per 100 000 live births in 2015. The overall risk of death from maternal causes fell from 1 in every 73 births in 1990 to 1 in 180 births in 2015 [2].

According to the 2014 United Nations Human Development Report, despite the advances achieved in all regions of the world, the maternal mortality ratio in low- and middle-income regions in 2013 was 14 times higher than that of high-income regions of the world, i.e. 230 versus 16 maternal deaths per 100 000 live births, respectively, during the same time period [2].

Globally, only nine countries have reported achieving Millennium Development Goal (MDG) 5, none of which is from the Latin American and Caribbean region, which registered the smallest comparative decrease in maternal mortality of all the regions in the world between 1990 and 2015 [2].

A dramatic reduction in maternal mortality has occurred in Uruguay over the past 25 years according to data from the Pan American Health Organization/World Health Organization (PAHO/WHO) [3]. Uruguay now has the second lowest maternal mortality rate in the Americas. The five countries with the lowest maternal mortality rates in the region are Canada (11 per 100 000 live-born infants), Uruguay (14 per 100 000), Puerto Rico (20 per 100 000), Chile (22 per 100 000), and the USA (28 per 100 000) [4].

According to the 2015 WHO estimates, maternal mortality in Uruguay fell by 59.5% over the past 25 years, with a mean annual decrease of 3.7% (95% CI, 2.4–5.1). This is greater than the decrease of 50% registered for Latin America and the Caribbean, where the mean annual decrease was 2.8%. It should be emphasized that there are countries in the region, such as Peru for example, that have also failed to achieve MDG 5, despite a decrease in maternal mortality of 73% according to the United Nations estimates [2].

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In the 1990s, the profile of maternal mortality in Uruguay indicated unsafe abortion as the principal cause of mortality, followed by hemorrhage and other complications [5]. Maternal mortality was significantly greater in the public healthcare sector compared with the private sector [6].

From the 1990s onward and particularly after the turn of the century, a marked reduction in maternal mortality occurred in Uruguay. The objective of the present paper was to analyze the changes that took place in Uruguay between 1990 and 2015 regarding maternal mortality, particularly mortality resulting from unsafe abortion. An evaluation was also made of the association between these changes and the social and health-related changes that occurred in the country, as well as the changes in the human development indicators.

## 2. Materials and methods

An analysis was conducted of the changes that occurred in maternal mortality ratios between 2001 and 2015, using data obtained directly from the Department of Vital Statistics of the Uruguayan Ministry of Public Health [7]. Analysis of the period between 1990 and 2015 was conducted using data obtained from WHO, UNICEF, UNFPA, the World Bank, and the United Nations Population Division [2]. An analysis was also conducted of the temporal association between the changes in maternal mortality and the implementation of health and social policies as well as the different indicators used to calculate the Human Development Index (HDI) [8].

The system for registering maternal deaths in Uruguay changed during this period. Up to 2004, data on maternal deaths were obtained exclusively from death certificates. From 2005 onward, a system was implemented to actively search for deaths of women of reproductive age. The institutions affiliated with the National Integrated Health System provide information to the Ministry (vital statistics). These data include a monthly declaration that no maternal deaths have occurred, i.e. a report of zero maternal mortality from the institutions that form part of the health system, both in the public and private sectors [7].

Between 2005 and 2010, data were obtained from death certificates and from notification; however, the data were not discriminated. Between 2010 and 2015, the data were differentiated with respect to how many of the cases were identified from death certificates and how many as a result of notification.

Furthermore, as a consequence of the country's commitment to reducing maternal mortality, there is recognition of the role of surveillance in maternal mortality, resulting in a more extensive and better investigation of the death of women of reproductive age through a system of intentional search, review, and reclassification of maternal deaths at central level and the creation and strengthening of a Committee to Reduce Maternal Morbidity and Mortality at national level. As a result of these efforts, the current system of registering maternal deaths in the country is reliable. In 2013, the clinical histories of 900 women aged 12 to 49 years who died were evaluated, with the same nine cases reported by the Morbidity and Mortality Committee being identified, thus confirming the reliability of the system.

Fig. 1 shows the two data sources used by the Ministry of Health since 2010 to identify cases of maternal death.

As Uruguay is a small country with around 50 000 live births annually, the maternal mortality rate may fluctuate greatly from year to year, since one maternal death can cause a considerable modification in the ratio. For this reason, it is more appropriate to compare five-year periods and the tables show both annual and five-year data.

Deaths resulting specifically from unsafe abortion are also reported, as well as their proportion in relation to the total number of maternal deaths. In addition, the social indicators (life expectancy at birth, expected years of schooling, mean number of years of schooling, and gross national income [GNI] per capita) that constitute the elements used to calculate the HDI were evaluated [8].

## 3. Results

Based exclusively on the data registered at the Ministry of Public Health for the past 15 years, analysis showed a steady decline in maternal mortality over the period evaluated, although with major

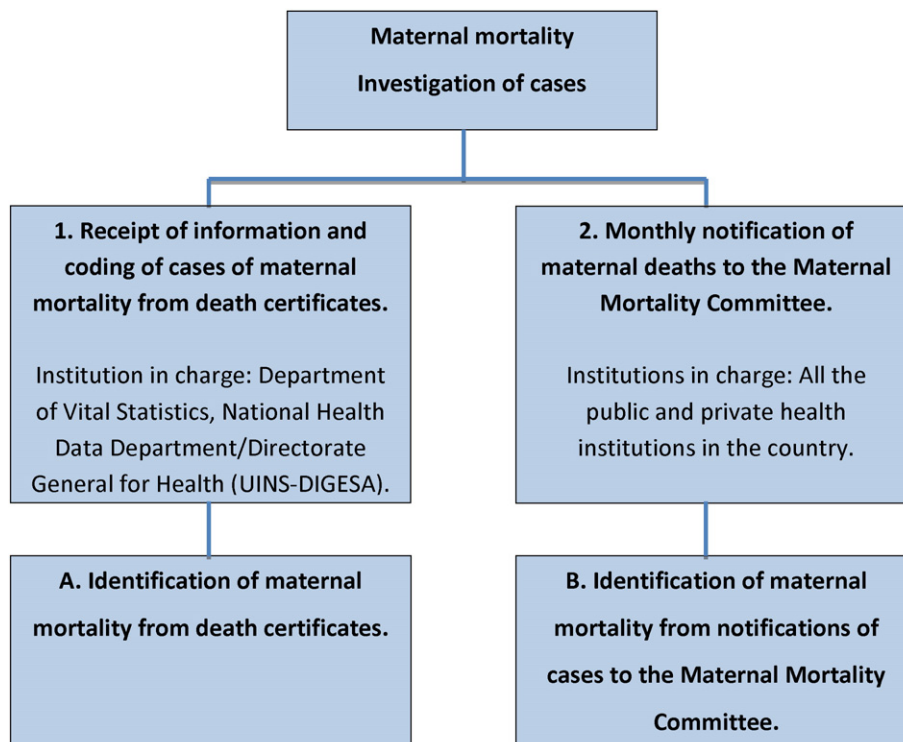


Fig. 1. Investigation of cases of maternal mortality.

fluctuations from year to year, as expected. There was a decrease of 19.2% (26.6%–21.5%) in maternal mortality between the first and the second five-year periods of the present century, and a greater decline of 28.4% (21.5%–15.4%) between the second and the third five-year segments (Table 1).

The number of maternal deaths from abortion fell dramatically from 25 to 4 deaths between the first and the second five-year period of this century and then to 3 in the final five-year segment (Table 2).

Abortion was responsible for around 40% of all maternal deaths in the first five-year segment, but decreased to around 8% in the next two periods. The lack of any change in this percentage in the final five-year segment was due to the rate of maternal mortality from other causes, which increased slightly between the first and second five-year segments but decreased significantly between the second and third five-year periods.

Due to the changes in the procedures used by the Uruguayan Ministry of Public Health to identify maternal deaths, statistics from the Maternal Mortality Estimation Inter-Agency Group composed of WHO, UNICEF, UNFPA, the World Bank, and the United Nations Population Division were used to evaluate changes over a longer period of time. According to the data from this source, historical evolution showed a marked decrease in the maternal mortality rate in Uruguay between 1985 and 2015 (Fig. 2), a decrease that was steady, with no significant fluctuations during the period.

This evaluation made over a longer period of time allowed the speed of the reduction in the maternal mortality rate to be analyzed and temporally associated with changes in the different social indicators that constitute the HDI, as shown in Table 3. Throughout the entire period evaluated in this study, significant improvements occurred in the social indicators of the population, with a gradual increase in the HDI.

#### 4. Discussion

The maternal mortality rate in Uruguay has decreased significantly over the past 25 years. Although the country failed to meet the MDG on this issue, this decline at least assured Uruguay the second lowest maternal mortality rate in the Americas, just behind Canada. It is evident, nonetheless, that this reduction was predominantly the result of the dramatic reduction in mortality due to unsafe abortion, which was responsible for almost 40% of maternal deaths at the beginning

**Table 1**  
Number of maternal deaths and maternal mortality rate per 100 000 live-born infants annually and per five-year segment. Uruguay, 2001–2015.

Year	Live-born infants	Number of deaths and maternal mortality rate per 100 000 live-born infants	
		No.	Rate
2001	51 598	19	37
2002	51 953	17	34
2003	50 631	11	22
2004	50 052	9	18
2005	47 334	11	23
<b>2001–2005</b>	<b>251 568</b>	<b>67</b>	<b>26.6</b>
2006	47 422	6	13
2007	48 243	14	29
2008	46 814	7	15
2009	47 152	16	34
2010	47 420	8	17
<b>2006–2010</b>	<b>237 051</b>	<b>51</b>	<b>21.5</b>
2011	46 706	4	8.5
2012 <sup>a</sup>	48 059	5	10
2013 <sup>b</sup>	48 681	9	18.5
2014	48 368	8	16.5
2015	48 954	11	22.5
<b>2011–2015</b>	<b>240 768</b>	<b>37</b>	<b>15.4</b>

Source: Department of Vital Statistics, Ministry of Public Health, Uruguay.

<sup>a</sup> Two maternal deaths from unsafe abortion outside the healthcare system in 2012.

<sup>b</sup> One maternal death reported outside the healthcare system in 2013.

**Table 2**  
Number of maternal deaths per five-year segment and the percentage of maternal deaths from unsafe abortion, Uruguay, 2001–2015.

Five-year segment	Live-born infants	Number of maternal deaths			Abortion-related maternal mortality (%)
		Abortion	Other causes	Total	
2001–2005	251 568	25	42	67	37.3
2006–2010	237 051	4	47	51	7.8
2011–2015	240 768	3	34	37	8.1

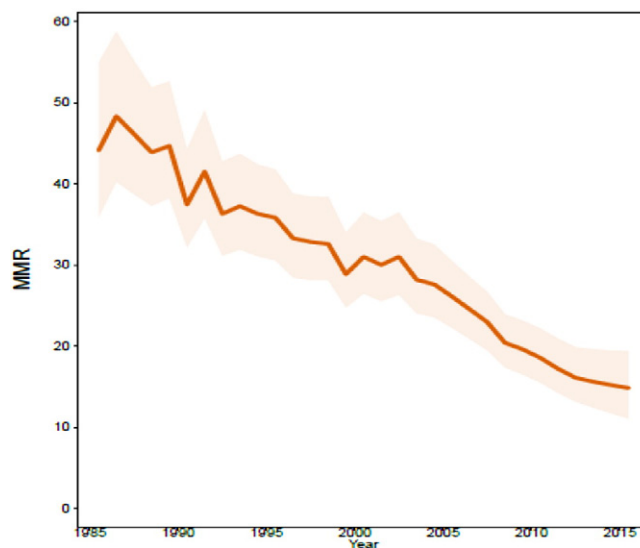
of this century, falling to 8% in the last 10 years. Furthermore, applying the same percentage of reduction in all contexts does not allow countries in which maternal mortality was already low to achieve the success attained by those in which the ratios were higher. Since there are no ideal situations of zero maternal deaths, there are no practical differences between maternal mortality rates that are below 10 per 100 000 live-born infants.

It is difficult not to accept that it was the progressively broader application of the model for reducing the risk and harm of unsafe abortions that clearly succeeded in reducing maternal mortality from unsafe abortion, even within the framework of legal restrictions.

This tendency toward a reduction in maternal mortality resulted in the decriminalization of abortion, although it is slightly disappointing that the maternal mortality rate has not yet reached zero, since some backstreet abortions continue to be performed under unsafe conditions. This finding obliges us to investigate why this type of abortion still exists so that measures can be taken to completely eliminate abortion-related death. Even so, it has to be mentioned that even abortions carried out under ideal circumstances imply a certain degree of risk and may occasionally result in maternal death.

The rapid decrease in maternal mortality registered from 2005 onward coincides with the implementation of a range of social and health actions aimed at protecting women. These actions intensified further after 2010 with the application of specific policies: the creation and expansion of universal sexual and reproductive health services, application of the risk and harm reduction model throughout the entire country, implementation of public education policies and, finally, the decriminalization of abortion.

Notably, this rapid reduction in maternal mortality coincides with a reduction in the official figures concerning poverty and inequality reported by the Uruguayan government [9], thus complying with the MDG of reducing poverty between 1990 and 2015. This was achieved through policies developed predominantly over the past 10 years.



**Fig. 2.** Maternal mortality rates in Uruguay, with their respective 95% confidence intervals. Source: WHO, UNICEF, UNFPA, World Bank Group, United Nations [2].

**Table 3**

Human Development Index values in Uruguay based on consistent time series data and new goalposts.

	Life expectancy at birth	Expected years of schooling	Mean years of schooling	Gross national income per capita (2011 PPP\$)	HDI value
1990	72.6	12.9	7.2	9 492	0.692
1995	73.6	13.1	7.4	11 344	0.711
2000	74.8	14.2	8.0	12 860	0.742
2005	75.8	15.3	8.0	12 625	0.756
2010	76.6	15.5	8.3	16 458	0.780
2011	76.7	15.5	8.4	17 312	0.784
2012	76.9	15.5	8.5	17 903	0.788
2013	77.0	15.5	8.5	18 697	0.790
2014	77.2	15.5	8.5	19 283	0.793

Abbreviation: HDI, human development index.

The parallel between the speed of the reduction in maternal mortality and of the political, economic, and social situation under different governments suggests a strong correlation between them. Public policies aimed at increasing social justice, development, and equality coincide with a faster reduction in maternal mortality. The deceleration in this speed in the final segment evaluated is explained by the greater difficulty in reducing maternal mortality as rates approach zero.

This correlation should not be surprising, since other previous studies have reported a similar association between public policies for equality and social justice and a reduction in maternal mortality [9]. Those results, added to the findings of the present analysis, tend to confirm that maternal mortality is directly associated with and is a very sensitive indicator of the development of populations. This is clearly expressed in all the social indicators constituting the HDI, which improved steadily in Uruguay throughout the entire evaluation period, while maternal mortality decreased.

For this reason, the results shown in this paper strongly suggest that in order to reduce maternal mortality other actors outside the health sector need to become involved. In addition, there must be strong political commitment, and effective measures must be adopted to improve social and economic conditions and protect women's sexual and reproductive rights.

It was also interesting to find that the implementation of a policy to decriminalize the practice of safe abortion not only reduces avoidable deaths in women but, furthermore, does not result in any increase in the number of induced abortions; on the contrary, the number of voluntary terminations of pregnancy tends to be reduced, as already described by other authors [10,11].

Nevertheless, some limitations in these results must be recognized. Although these efforts and public policies were sufficient to drastically reduce the occurrence of abortion-related maternal deaths, this was not the case, at least not at the same level, for the other causes of maternal deaths. The present study did not conduct a more detailed stratification of all causes; however, it must be assumed that there are still many direct causes of maternal death other than those related to abortion. Questions should be raised regarding why all the positive changes in life conditions, health care, and public policies did not have a similar positive effect on maternal mortality resulting from causes unrelated to abortion. We cannot be completely satisfied with having reached zero maternal deaths from unsafe abortion. Any maternal death, irrespective of its cause, should be prevented and an evaluation has to be made regarding what other interventions are required to improve the quality of care provided during pregnancy and childbirth to women in this country. One possible example may lie in implementing the systematic surveillance of conditions of severe maternal morbidity and applying rapid interventions through which to manage such cases.

The changes in the system used to register maternal deaths have increased the reliability of the data obtained, reducing under-registration

to almost zero. If the registration system had not been improved, the reported reduction in maternal mortality may have been even greater, possibly allowing Uruguay to get closer to achieving the MDG on maternal mortality [12].

The experience developed by Uruguay represents an important advance in the Latin America and Caribbean region and an example that could be followed by other countries with similar conditions as a means of achieving the Sustainable Development Goals (SDGs) recently established by the United Nations in 2015 [13]. One of the SDGs is to end the preventable deaths of all women, children, and adolescents, and to create an environment in which these population groups not only survive but also develop, transforming their environment, their health, and their well-being. The goal of the Sustainable Development Agenda is to reduce maternal mortality worldwide to less than 70 per 100 000 live-born infants between 2016 and 2030, assuring global priority for this issue [13].

This renewed commitment to reduce maternal mortality within the SDG framework requires the implementation of innovative practices such as those described in this analysis.

We expect that the publication of these results will encourage colleagues in other countries with higher maternal mortality rates to take equally effective initiatives to reduce maternal mortality in their countries to levels close to those of more advanced nations, as Uruguay has successfully done. Less affluent women, the group in whom maternal mortality and severe morbidity (near-miss) ratios are highest, deserve that effective measures be taken to reduce their suffering.

### Conflict of interest

The authors have no conflicts of interest.

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