

Health System Reform in Mexico 6



Improvement of child survival in Mexico: the diagonal approach

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Public health interventions aimed at children in Mexico have placed the country among the seven countries on track to achieve the goal of child mortality reduction by 2015. We analysed census data, mortality registries, the nominal registry of children, national nutrition surveys, and explored temporal association and biological plausibility to explain the reduction of child, infant, and neonatal mortality rates. During the past 25 years, child mortality rates declined from 64 to 23 per 1000 livebirths. A dramatic decline in diarrhoea mortality rates was recorded. Polio, diphtheria, and measles were eliminated. Nutritional status of children improved significantly for wasting, stunting, and underweight. A selection of highly cost-effective interventions bridging clinics and homes, what we called the diagonal approach, were central to this progress. Although a causal link to the reduction of child mortality was not possible to establish, we saw evidence of temporal association and biological plausibility to the high level of coverage of public health interventions, as well as significant association to the investments in women education, social protection, water, and sanitation. Leadership and continuity of public health policies, along with investments on institutions and human resources strengthening, were also among the reasons for these achievements.

Introduction

Despite substantial reductions in child mortality in low-income and middle-income countries in the late 20th century, more than 10 million children younger than 5 years still die every year, most of them from preventable causes, such as diarrhoea, pneumonia, measles, malaria, HIV/AIDS, undernutrition, and the cluster of other causes leading to neonatal deaths.^{1,2} The 2005 Report on the fourth Millennium Development Goal (MDG-4) is sobering, because it shows that the progress in reducing child mortality is slowing down worldwide. Between 1960 and 1990, the rates of decline in worldwide child mortality averaged 2·5% per year. By contrast, from 1990 to 2001 the rates of decline averaged 1·1% per year. Although this deceleration might be expected in areas that had already achieved low rates of mortality, such slowing has also happened in high-rate regions.¹

Efficacious interventions have been identified that can avert childhood deaths in settings where mortality is high and health systems are weak. In the 42 countries with 90% of childhood deaths worldwide in 2000, 63% of these deaths could have been prevented through full implementation of a few known and effective interventions.³

Recent analysis by Jennifer Bryce and colleagues⁴ confirms that in 2005, only seven of the 60 countries that account for more than 94% of child deaths in the world were on track to reach MDG-4. Additionally, coverage for the 16 key interventions identified in previous research remained seriously low, although some countries made giant leaps in coverage, increasing the proportion of mothers and children with access to life-saving interventions by as much as ten percentage points in 2 years.⁴

Mexico is one of the seven countries where a sustained decline in under-5 mortality has been recorded, and hence Mexico is estimated to be on track to achieve MDG-4—ie, to reduce the child mortality rate for these children from 44·9 deaths per 1000 livebirths in 1990 to 15·0 deaths per 1000 livebirths in 2015. This paper is the last of the *Lancet* series on health sector reform in Mexico and focuses on a specific health outcome. We hope that by sharing this experience, we can contribute to the acceleration of investment and actions for achieving MDG-4 in other countries.

Data sources

Information for this study has been drawn from different sources that include census data, mortality datasets registered by the Secretary of Health and the National Institute of Statistics Geography and Informatics, the nominal registry of children gathered by the Universal Vaccination Programme, and national nutrition surveys. The specific methodologies, including reliability and limitations, are included in each section.

Information about cause-of-death was derived from death certificates completed mostly by physicians. Physician completion of death certificates rose from 87% in 1980 to 98% in 2005. Causes were coded according to the 9th and 10th International Classification of Diseases. The information is registered by the Secretary of Health and the National Institute of Statistics Geography and Informatics, and undergoes periodic quality assurance. The census and mortality data refer to the entire Mexican population in the country's territory between 1980 and 2006. In some cases, definitions and methods have changed during the study (eg, for the International Classification of Diseases coding). However, Mexico was

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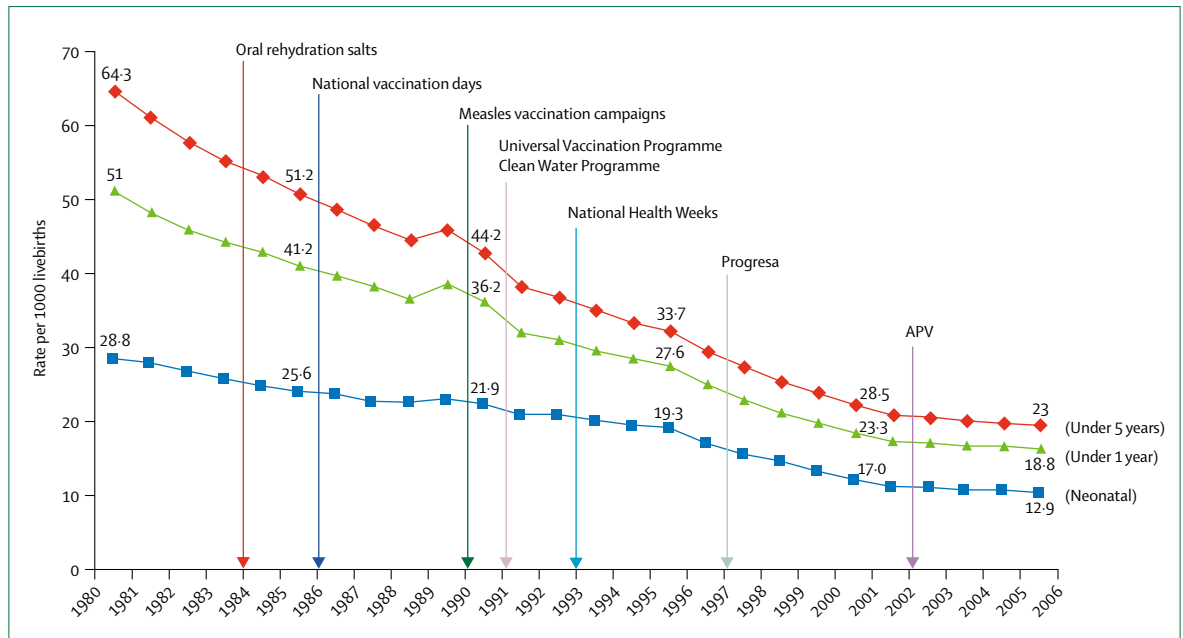


Figure 1: Mortality in children under 5 years, under 1 year, and neonates, Mexico 1980–2005. Rate per 1000 livebirths. Source: Ministry of Health Mexico/SEED and CONAPO.

recently ranked in the top 20 countries for high-quality system records for mortality.⁵

To correct the under-reporting of deaths of children in poor rural settings, standard demographic methods were used. The infant and child mortality rates were obtained in three steps.⁶ First, national rates were derived directly from pregnancy records from the National Fertility Surveys for 1980–2005. Second, initial rates at state level were estimated by applying indirect methods (Brass method⁷), with death rates for all children ever born based on the 1990, 2000, and 2005 Mexican population censuses. Third, values were corrected according to birth distribution by state.

Before 1990, information on vaccination coverage was based on unreliable administrative data. Since the initiation of the Universal Vaccination Programme, every child has an individual computerised record and a personal record for vaccines received. Periodically, probabilistic sero-epidemiological surveys are done to monitor effective coverage. Data for population size, household conditions, and women’s education came from the population census of 1980, 1990, 2000, and 2005.

Information about the nutritional status of the population during the study comes from three probabilistic, multi-staged, stratified, cluster household surveys done by the Mexican Secretariat of Health and the National Public Health Institute, representative of the civilian, non-institutionalised Mexican population in 1988, 1998–99, and 2005–06. All three surveys had national coverage and were representative of the population of Mexico at the national level and for four regions in 1988 and 1998–99, and for the 32 states in 2005–06. The

sampling methods and response rates are described in detail elsewhere.^{8,9} As with almost all household surveys, some segments of the population (eg, homeless people) could not be sampled because of their living arrangements, and therefore are not included in the results. Anthropometric indicators of nutritional status were used, including underweight (weight-for-age less than 2 SD from the World Health Organization/National Centre of Health Statistics [WHO/NCHS] reference), wasting (weight-for-height less than 2 SD from the WHO/NCHS reference) and stunting (height-for-age less than 2 SD from the WHO/NCHS reference).¹⁰

National probabilistic surveys on household income and expenses have been done since the 1980s on a regular basis, using standardised methods, by the autonomous National Institute of Statistics, Geography and Informatics. All of the surveys are representative at the national level.

	Percentage of 5 year period reduction		
	Neonates	Children under 1 year	Children under 5 years
1980–85	11.2%	19.3%	20.4%
1985–90	14.3%	12.1%	13.7%
1990–95	12.1%	23.8%	23.6%
1995–2000	10.9%	15.3%	15.4%
2000–05	24.1%	19.4%	19.5%

Source: CONAPO. *Rate per 1000 registered livebirths.

Table 1: Percentage of reduction in mortality rates by all causes in neonates, children under 1 year, and under 5 years, Mexico 1980–2005*

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