

## Mortality in Moroccan children: Study of geographic distribution

*Hassan Barouaca*<sup>1,2</sup>

<sup>1</sup>Biology Department,  
Sidi Mohamed Ben Abdellah University,  
Faculty of Sciences, PB: 1796,  
Fez, Morocco

<sup>2</sup>Moroccan Association of Education for Health and Nutrition

---

Copyright © 2013 ISSR Journals. This is an open access article distributed under the *Creative Commons Attribution License*, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

**ABSTRACT:** Over the period 1986-1992 the U5MR in urban and rural areas decreased from 97 to 25.42 and from 165 to 35.07‰, respectively. Since 1987, each of the 7 regions has reduced its U5MR by 32.35 %, with the lowest rate of 20.26% for the Eastern region and the highest rate 55.34 % in the South-central region. The disparities in under-5 mortality rate (U5MR) between rural, urban and regions in Moroccan population are persistent. Morocco was at the nearest to meet the Millennium Development Goal 4 (MDG) in urban (25.45 ‰) area, but must make a steady progress towards the attainment of it in rural (35.07 ‰). The rate reduction in U5MR at regional level is at least of 5.3 % putting them well on track to meet MDG 4.

**KEYWORDS:** Under-5 mortality, trend, region, Morocco.

### 1 INTRODUCTION

Substantial reductions in child mortality occurred in low-income and middle-income countries in the last 20th century, but more than 10 million children younger than 5 years still die every year [1]-[2]. The highest rates of child mortality continue to be found in sub-Saharan Africa, where, in 2008, one out of seven children died before their fifth birthday. Also, from the 67 countries defined as having high child mortality rates, only 10 are currently on track to meet the Millennium Development Goal (MDG) target. Therefore, many studies have been done to assess the mortality trend at the global level but the big challenge is to measure it at regional level within a country to seek out the inequalities in health and to ensure that the MDGs related to child survival (MGD 4) may be achieved at regional levels. The Moroccan government has set performance targets for reducing under-5 mortality to target the MDG4 at national level.

The pattern of mortality distribution by place of residence (rural, urban and region), and the changes that occur in these patterns are important for development and achievement of the MDGs in the country. Thus, the global momentum and investment for accelerating child survival grow monitoring progress at regional levels has become even more critical. Accordingly, the objectives of this paper were to describe the under-5 mortality trends at regional, urban, and rural areas in Morocco.

### 2 MATERIALS AND METHODS

#### 2.1 SETTING

The population of Morocco was estimated at about 30 million in 2003, with children below 5 years old representing about 10 % of the total population. More than half (55 %) of the population reside in urban area and this proportion is expected to continue to increase, as urbanization continues.

## 2.2 METHODOLOGY AND DATA COLLECTION

This study is performed to highlight the trend of under-5 mortality through the exploration of demographic and health representative data survey conducted between 1960 and 2011. We focused on changes in U5MR and their annual rate decline. We are also interested in studying the difference between rural, urban and regional levels. Assessing the changes in mortality trends by analyzing the patterns of infant and under-5 mortality might provide some explanation for the effects of national health policy implementation and their effect in the possibilities of achieving the objectives of MDG 4 (reduce by two-thirds, between 1990 and 2015, the under-5 mortality rate). To achieve these objectives, we tried to homogenize the results, although sometimes the national data surveys are presented differently. Yet, during our study we encountered some limitations; because regional repartition used currently, are different from those used during the eighties. The regional distribution used during the eighties consists of 7 regions, while that of year 2000 consists of 16 regions which limit the comparisons over the time. However, we fixed our analysis on the trend of U5MR and just on the period 1984-1992 and 1984-85 to 2006-07 for regional, urban and rural. The data were drawn from the national representative survey that includes the Demographic Survey run by Center for Demographic Studies and Research (CERED) and Health Surveys conducted by the Ministry of Public Health. The data included information regarding health indicators (under-5 mortality and Infant mortality) and socio-economic indicators such as poverty rate and Gini-index.

## 3 RESULTS AND DISCUSSION

**Table 1.** *Distribution of infant and under-five mortality per 1000 births, by regions and areas of residence and their annual rate decline between 1987 and 1992*

	1987		1992		Annual rate decline of under-5 mortality (%)
	Infant mortality (%)	Under-5 mortality (%)	Infant mortality (%)	Under-5 mortality (%)	
Urban	66.10	81.40	51.90	58.70	5.58
Rural	91.00	137.30	69.30	97.80	5.75
North-west	99.30	131.00	77.30	96.00	5.38
North-central	88.80	127.20	69.80	95.50	4.98
Center	55.90	76.60	50.00	60.40	6.94
Oriental	60.20	90.80	57.60	72.40	4.05
South-central	71.30	109.50	48.90	72.10	11.07
Tensift	87.20	134.90	62.90	85.00	7.40
South	114.10	172.10	70.60	110.70	7.13

The distribution of infant-child mortality by region is reflected in table 1. There is a strong geographic disparity in mortality observed during the period 1987-1992: the observed U5MR range from 58.70 to over 172.10 %. We find a quasi-systematic high excess mortality (over 58%) in all regions and exceed the national average rate death (45.8 %) during the same period. We also observed the regions with the highest rate; the South region being about two times higher as in Centre region. In the same direction, the IMR varies from 55.9 deaths in Centre to 114.1 deaths in the south Region.

Since 1987, each of the 7 regions has reduced its U5MR by 32.35 %, with the lowest rate of 20.26% for the Eastern region and the highest rate 55.34 % in the South-central region. As we can observe in table 1, there are improvements in U5MR and IMR in all regions over the period 1987-1992. This overall trend also characterizes each region, although at different levels and speeds. The analysis show, also, that annual rate decline of U5MR, at regional level, are at least of 5.3 % and reached 11.07 % in South-central region with the lower pace of reduction in oriental region. Consequently, in except of Oriental region if all regions maintain this annual rate decline of U5MR to 2015 they will be well on track to meet MDG 4.

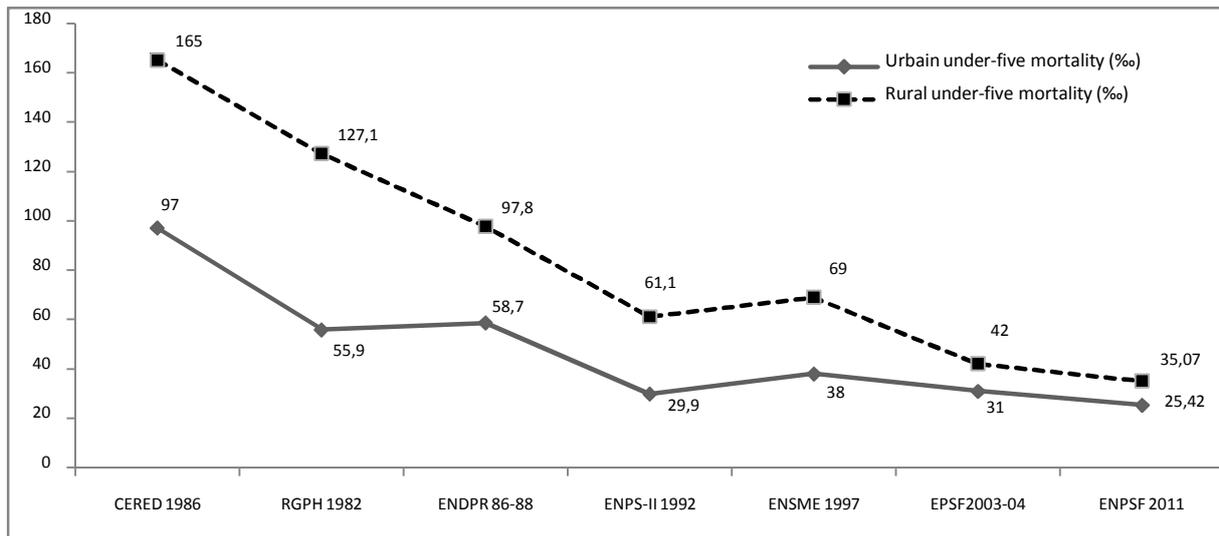


Fig. 1. Urban and rural under-5 mortality trend during the period 1986-2011

Estimated levels of under-5 mortality between 1986 and 2011 in urban and rural areas are shown in figure 1. Results show that urban and rural areas exhibited accelerate and high rate decline of U5MR (62.97% in rural areas vs. 69.17% in urban areas) over the period 1986-1992, succeeded by a slow decline in urban areas 14.98% and rural areas 42.60%, over the period 1992-2011. Generally, rapid gains during 1986-1992 were followed in the 1990s by a widespread deceleration. We suggested, that there are differences in U5MR between urban and rural population, with the rate being almost higher in rural than in the urban population over the period 1986-2011. In the opposite, the rural and urban population experiencing an equal and a rapid annual rate reduction of U5MR with an average of 5.58 % and 5.75 %, successively during the period 1987-1992 (Table 1).

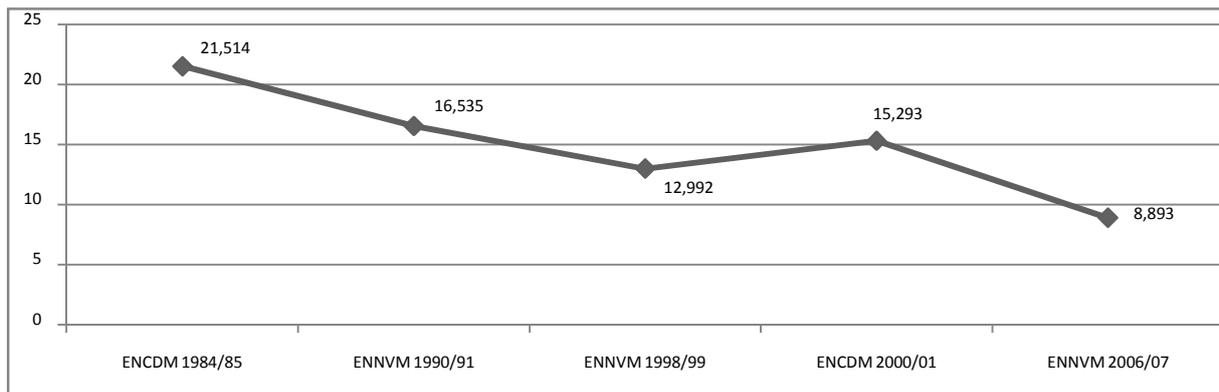
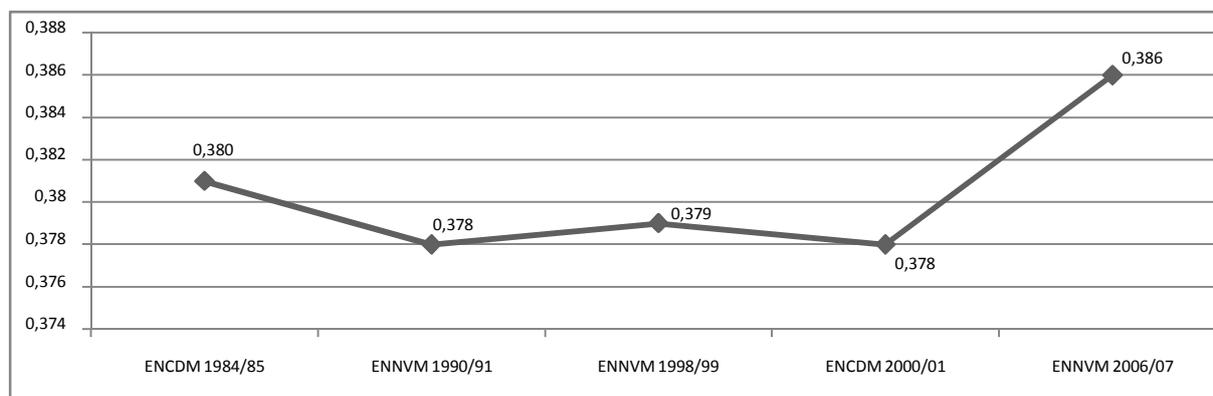


Fig. 2. The trend of poverty rate (%) in Moroccan regions during the period 1984-2007

This improvement in U5MR and IMR at regional, rural and urban levels seem to be due to socioeconomic development. As suggested by R.R Ettarh, and J. Kimani (2012) [3] the household poverty was a key predictor for mortality in rural areas. As we can observe in figure 2, the poverty rate decreased in Moroccan population region during the period 1984-2007. At the same time, the corresponding poverty rate dropped from the range of 21.51 to 8.89%. Also, the Moroccan's Gross National Income per capita increased by a staggering 617.15 % from US\$435.75 in 1980 to US\$2.735 in 2010.



**Fig. 3. The trend of annual mean of Gini-index at regional levels during the period 1984-2007**

As shown in figure 1, in 2011, the U5MR was lowered to 25.45 ‰ and 35.07 ‰ in urban and rural areas, respectively. The national health objectives for the year 2015 relating to under-5 mortality are to reduce the under-5 mortality rate to 25 ‰, and 19 ‰ for infant mortality. Nevertheless, in order to reach the fourth MDG U5MR of 25‰, more significant efforts are necessary, particularly, in rural areas marked by an abnormally high U5MR; but for urban area Morocco is to the nearest of MDG4.

It is known that the socioeconomic and spatial determinants of health inequities have demonstrated that lower-income and rural populations frequently experience worse child survival rates than their wealthier, more urban counterparts [4]-[5]. In our study, we suggested that improvement in U5MR can't be explained only by economic factor given the relatively low middle income (about US\$2.735 in parity purchasing power). This conclusion is supported by the fact that economic inequality, demonstrated by a trend of Gini-index (Figure 3), wasn't decreased during the period 1984-2007 and it reveals an increase between 2000 and 2007. However, this proves that there are many other factors implicated in this improvement. In my opinion, the progress in mortality is due to the health policy of Morocco that focused its strategy to maintaining this decline by making health care as a priority basic health and a special place was given to vulnerable populations including children and women.

Therefore, we suggested that other studies are needed to understand the relative importance of the variables associated with policy instruments that seek to reduce U5MR in Morocco at regional levels. These studies are important for identifying population groups, for example the poor and hungry, where they live and for defining their characteristics and identifying their needs. Also, they are important for explaining why they fall in the poverty and hunger traps and to pinpoint the policies and actions needed to address them. In this context, identification of other factors behind the U5MR might shed some light on the differences in the rates (and hence the differences in child health) between Moroccan regions, and might help explain why U5MR has fallen faster in some regions than others.

#### 4 CONCLUSION

Unlike to other African countries, Morocco's low U5MR has occurred against a backdrop of sustained economic growth between 1984 and early 2001. There is a clear evidence that Morocco was at the nearest to meet the MDG 4 in urban (25.45 ‰) area, but must make a steady progress towards the attainment of it in rural (35.07 ‰) and at regional levels. In spite of this improvement in U5MR, there is a significant disparity of rates across urban, rural and between the regions. Thus, urgent, accelerated and concerted actions are needed to deliver and scale up such interventions to achieve MDG 4 and other health-related goals in rural area and particularly Oriental region that exceed the national level of U5MR. Our finding presented here demonstrates that this can be done if concrete steps are taken and the economic growth may not be a limited factor for progress.

**REFERENCES**

- [1] O. B. Ahmad, A .D. Lopez, and Inoue, M., "The decline in child mortality: a reappraisal," *Bull World Health Organ*, vol. 78, pp. 1175–91, 2000.
- [2] World Health Organization, "The world health report 2002: reducing risks, promoting healthy life," *Geneva: World Health Organization*, 2002.
- [3] R. R. Ettarh, and J. Kimani, "Determinants of under-five mortality in rural and urban Kenya," *Rural Remote Health*, vol. 12, pp. 1812, 13 Mar 2012.
- [4] C. G. Victora, A. Wagstaff, J. A. Schellenberg, D. Gwatkin, M. Claeson, and J. P. Habicht, "Applying an equity lens to child health and mortality: more of the same is not enough," *Lancet*, vol. 362, pp. 233-41, 2003.
- [5] The World Bank, "Health, nutrition and population sector strategy," *Washington: The World Bank*, 1997.