Traffic accidents mortality in Brazil: a silent tragedy

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INTRODUCTION

Traffic injuries are one of the main causes of injuries and mortality in Brazil, as in other developed and developing countries (Lima, 1995; Evans, 1991; Nantulya et al, 2002, Peden et al, 2004). Worldwide, the World Health Organization (WHO) estimates, at almost 1,2 million deaths and 50 million injured each year (Peden et al, 2004). These numbers are expected to increase due to the fast motorization process in developing countries, mainly in Asia and Africa.

In Brazil, traffic injuries phenomenon started in the 1960's together with the fast and disordered urban growth. In 1960, 45% of the total Brazilian population was classified as urban. This proportion increased to 81% in 2000. The process of urbanization was accelerated in all regions of the country. Along with the urbanization, the motorization rates increased (from 3,1 million of motor vehicles in 1970 to 34,3 million in 2002) as well as the number of accidents with fatal and non-fatal victims.

Despite of the quality of the data of traffic injuries and their victims, official statistics enumerate 30000 deaths and more than 340000 injured each year, between 1991 and 2002 (Ministério das Cidades-Denatran, 2004; Ministério da Saúde, 2004; Vasconcellos EA, 1999; Lima, 1997). Besides this tragedy, frequently neglected, there is a large social and economic cost. The large numbers of fatal victims in Brazil only represent "the tip of the iceberg" of this silent tragedy. A great number of non-fatal victims with severe injuries must face every day their incapacities, overstated by the inadequacies of the labor and mobility environments.

In January 1998, the new Brazilian Traffic Code was introduced in an attempt to adapt the legislation with the new traffic conditions. The new Code implemented a lot of strategies to reduce road traffic deaths and injuries: improving educational programs, setting and enforcing appropriate speed limits, setting severe penalties for drivers' infractions, among others. The aim of this paper is to show the impact of the new Code on the traffic injuries mortality levels.

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DATA SOURCE

In despite of its importance, the mortality from traffic injuries is not well known. The quality of data explains the lack of information. In Brazil, there are two systems of information about mortality from traffic injuries: 1) the national mortality system of the Health Ministry based on the death certificates; and 2) the system of the National Traffic Department based on the police bulletins. Both of them are incomplete at the national level, but the quality of the data varies from one state to another (Drumond et al., 1999; Vasconcelos e Lima, 1998). A comparison of the two systems shows that the system of the Health Ministry collects more events than the National Traffic Department's system. However, the Health's system does not collect information about the accident and its circumstance, but only about the death. Despite the lack of information about the characteristics of the accidents, information about the demographic characteristics and the type of users of the fatal victims can be analyzed. The analysis of the trends of the mortality in Brazil also faces the problem of the change of the ICD revision in 1996. Since 1996, the 10th revision of the ICD has been used in Brazil.

For the international comparisons, data published by the World Health Organization were considered.

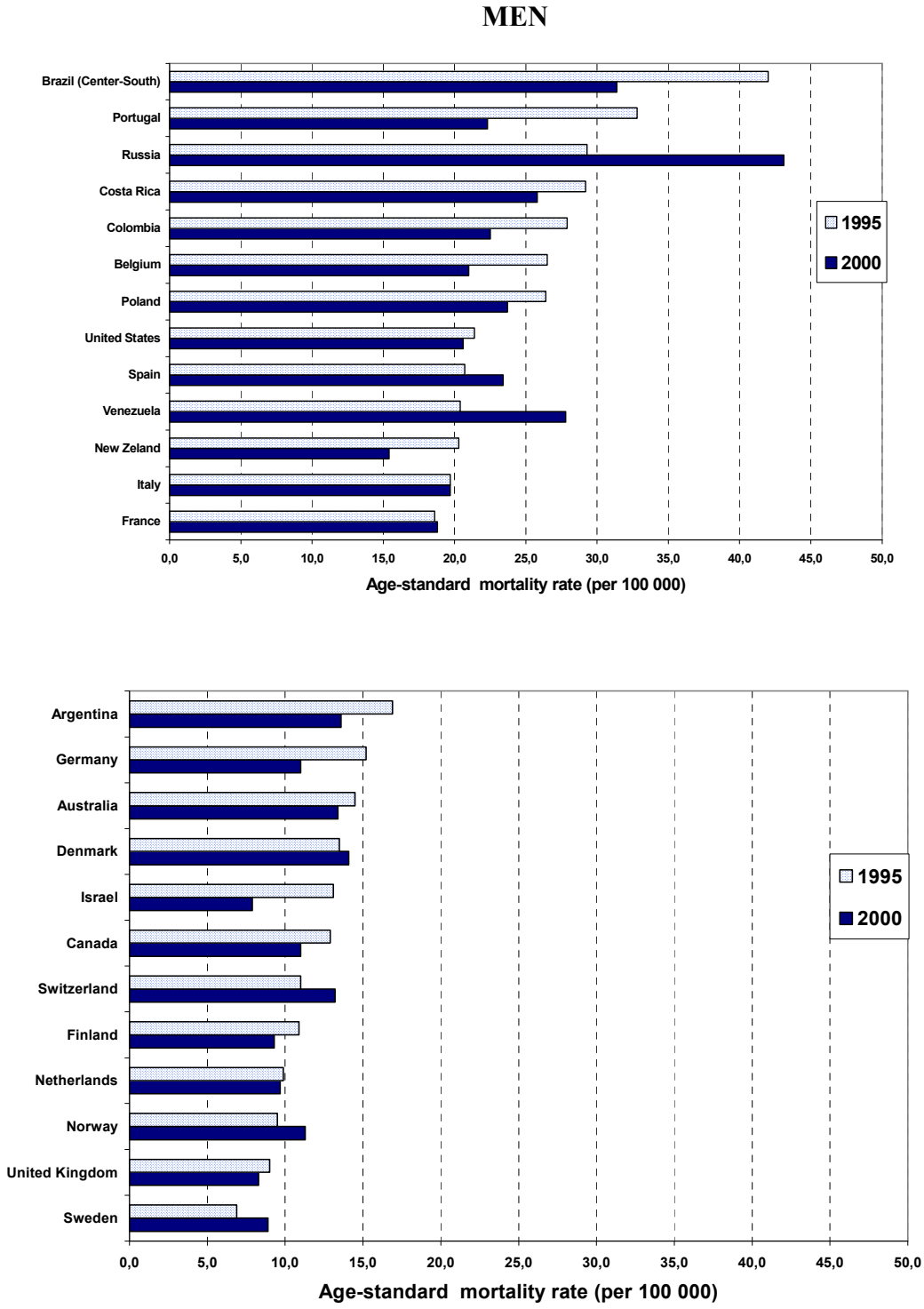
RESULTS

- **International comparison (1995 - 2000)**

In 1995, mortality statistics published by WHO revealed the dramatic situation of Brazil in relation to traffic injuries mortality. For the Center-South region, with better data quality, traffic injuries mortality rates were very high, even higher than in European countries or in Argentina and Costa Rica, in Latin America (Figure 1). The distribution by sex shows that traffic injuries in Brazil are a matter of men. In 1995, the male mortality rate due to road traffic injury, 42 per 100 000 population, was 2 times higher than in United States and 4 times higher than in United Kingdom. In general, traffic injuries mortality rates are higher among males than among females. In 1995, traffic injuries mortality rate in Brazil among males was 3.8 times higher than among females, with 11.2 per 100 000 population. Nevertheless, the

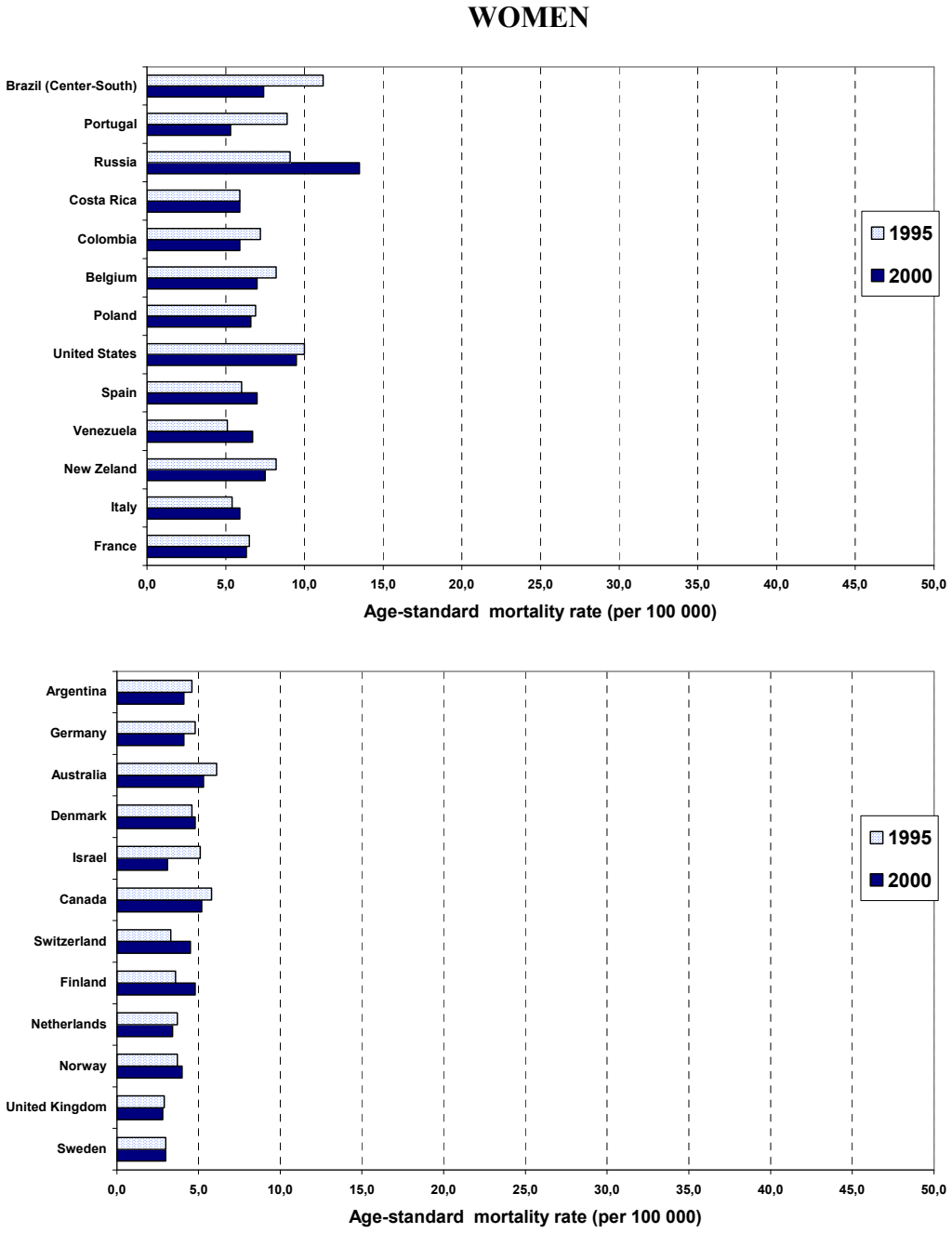
excess male mortality varies with age: it is greater among the young adults and lower among children and elderly.

Figure 1 – Traffic injuries mortality standardized rates (per 100 000). Men. Selected countries. 1995 and 2000



Source: WHO, World Health Statistics Annual (on-line), 2003

Figure 2 – Traffic injuries mortality standardized rates (per 100 000). Women, Selected countries. 1995 and 2000



Source: WHO, World Health Statistics Annual (on-line), 2003

In 2000, data from WHO showed that the strategies implemented with the introduction of the new Traffic Code had had a significant impact in reducing mortality rates due to traffic injuries in Brazil. However, despite of the reduction about 25% among males and about 34% among females, Brazil is until now in the group of countries with higher traffic injuries

mortality rates. As we will see in this paper, the decrease of the rates was unequal by sex, age and type of user (pedestrian or non-pedestrian).

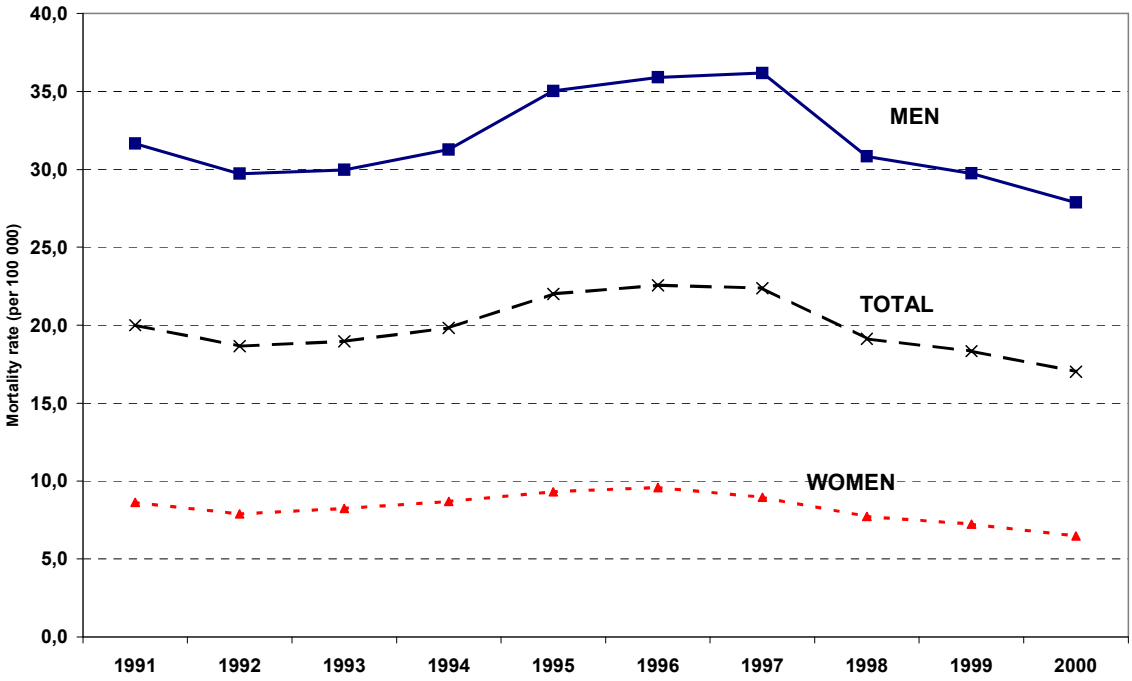
- **Trends in traffic injuries mortality: 1991-2000**

According to Ministry of Health data, trends of traffic injuries mortality rates in Brazil between 1991 and 2000 show (Figure3): 1) increase of mortality level from 1994 (begin of the economic plan, the "Real Plan") to peak at about 22 deaths per 100 000 population between 1995 and 1997. Figure 3 also shows differences by sex: among males, the rate reached the peak in the 1997 at about 35 deaths per 100 000, among females the peak was in 1996 at about 10 deaths per 100 000; 2) declining of mortality level from 1998, the year of the implementation of the new Traffic Code.

As traffic injuries are a complex phenomenon, there are many factors contributing to these trends. In relation to the economic activity, Vasconcelos e Lima (1998) proposed that changes in traffic injuries mortality levels can be associated to: 1) change in level of economic production, 2) number of motor vehicles (motorization), 3) road and vehicles conditions (road safety engineering and vehicle design and conservation). These factors can explain the increase of traffic injuries mortality rates just after the "Real Plan" implantation in 1994. With the new economic plan, the Brazilian economic production have risen, increasing mobility and growing numbers of vehicles, without investments to improve road conservation and to adequate road design. Others factors must be included to try to understand the declining rates since 1998: 1) speed enforcement on urban and interstate roads, 2) mass media campaigns, and 3) setting severe penalties to traffic infractions.

Just after the introduction of the new Traffic Code, declining trend in mortality rates is very clear. From 22 deaths per 100 000 population in 1995-1997, the rate reduced to 17 deaths per 100 000 population in 2000 (representing a reduction of 22%). Among males, the reduction was about 20% (from 35 to 28 deaths per 100 000 population) and among females, the reduction was about 33% (from 9.5 to 6.5 deaths per 100 000 population) for the same period.

Figure 3 –Traffic injuries mortality standardized rates (per 100 000) by sex, Brazil, 1991-2000.



Source: Ministério da Saúde, Sistema de Informações sobre Mortalidade (CD-ROM), 2004; Ministério da Saúde, Datasus, Informações de Saúde (www.datasus.gov.br), 2004.

- ✓ *Age*

The declining traffic injuries mortality rate trends are, however, significant different by age. Between 1995 and 2000, all specific mortality rates by age declined for both sex, but even more, among elderly, who have the highest mortality rates. Lower reductions were observed among children and adults aged between 15 and 29 years. The last age group accounts for about 33% of all road traffic deaths in Brazil, and 70% of these deaths were in motor vehicles crash (Vasconcelos e Lima, 1998). In this age group, traffic injuries are one of the main causes of death with homicides. A lower rate reduction among adults aged between 15 and 29 years shows that the new strategies were less assimilated among young adults, among who vehicles crash injuries are the main nature of the traffic accident. On the other hand, the higher rates declining among elderly can be associated to major declining rates among pedestrian.

Figure 4 – Traffic injuries mortality standardized rates (per 100 000) by age, Brazil, 1991, 1995 and 2000

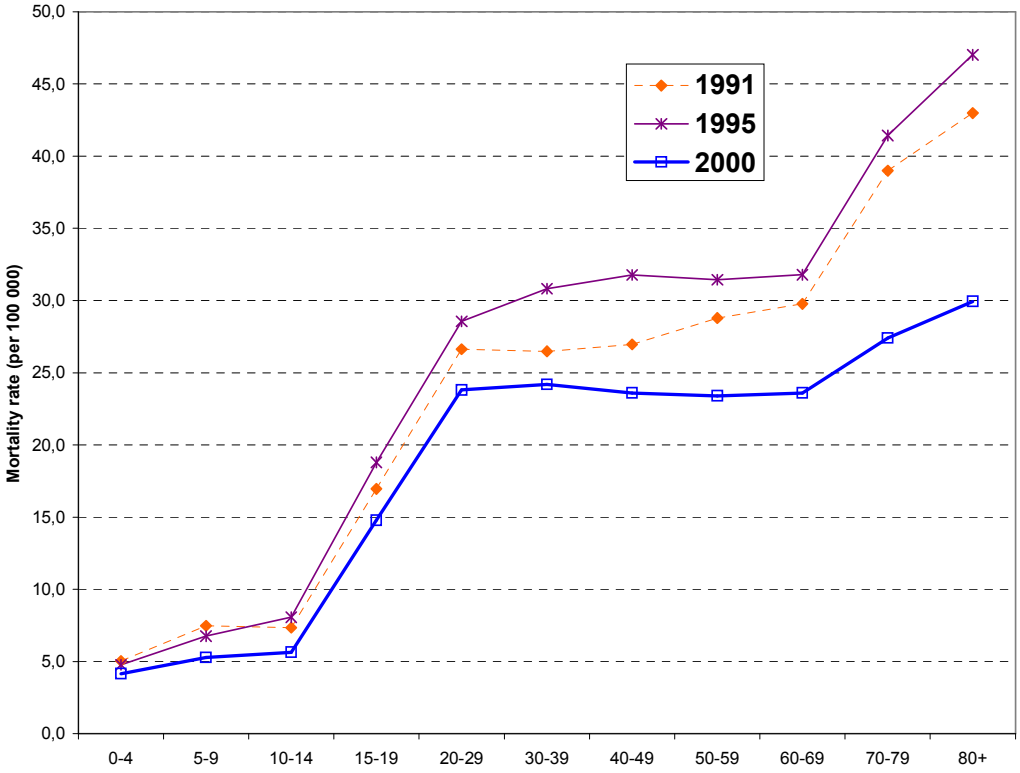


Figure 5 – Traffic injuries mortality standardized rates (per 100 000) by age and sex, Brazil, 1991, 1995 and 2000

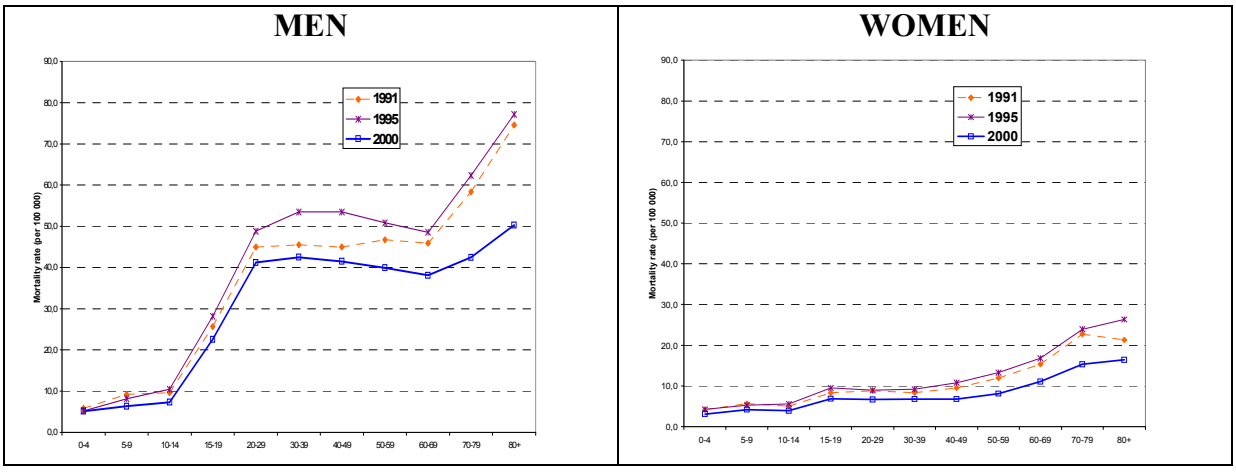
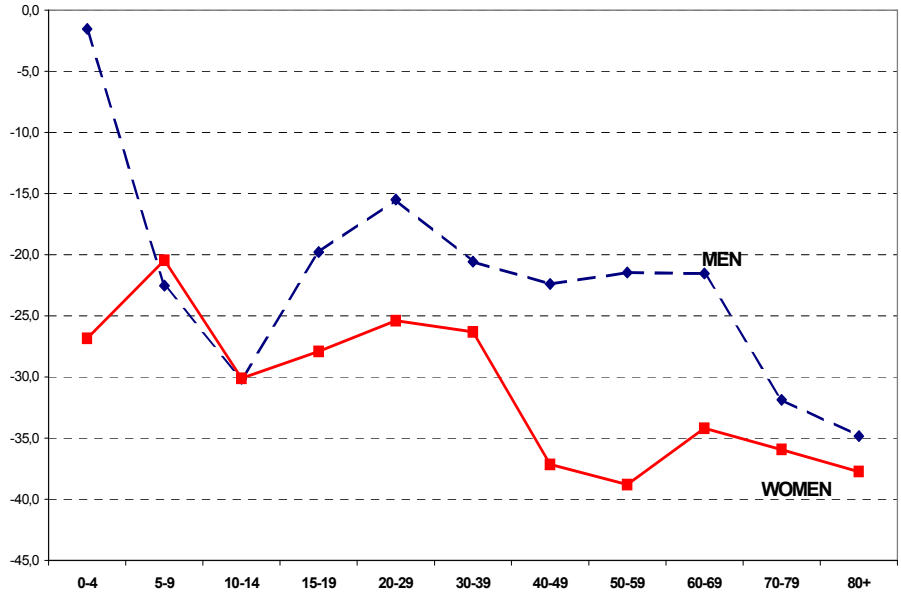


Figure 6 – Changes in traffic mortality rates by age and sex. Brazil. 1995 - 2000



✓ *Types of user*

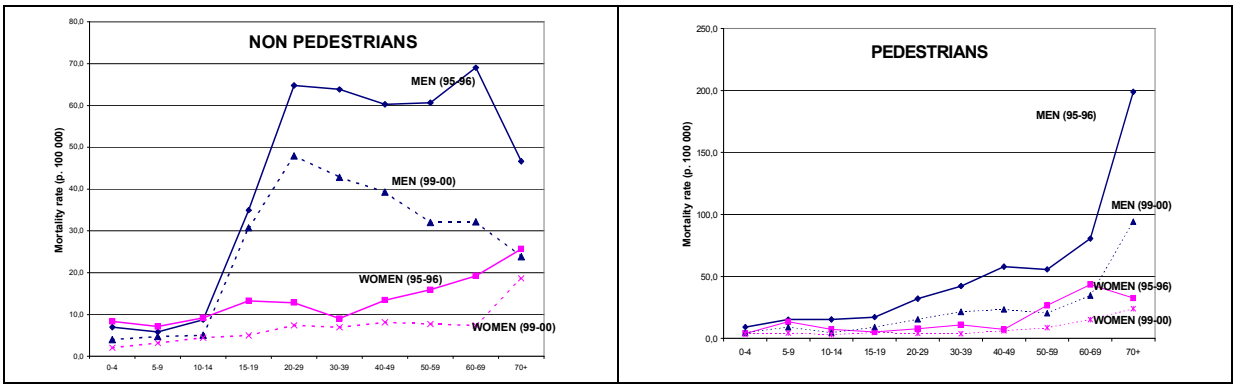
One of the aspects very important to consider is the profile of the victim of traffic injury. Mortality data provide information about the type of road user (here classified as pedestrian and non-pedestrian), which is fundamental to evaluate the strategies introduced by the new Code. As the quality of mortality data for the whole country is deficient, we present the analysis for Federal Capital of Brasília (Distrito Federal). Even tough, we can not extend for the whole country; the results for Federal Capital of Brasília show the different impacts of the strategies introduced by the new Traffic Code.

First, among males, the structure of mortality rate by age is considerably different by type of user (pedestrian and non-pedestrian). While, among non-pedestrians, mortality rates increase fast between ages 20 and 29 years, among pedestrians, these rates increase slowly and reach the peak among older people (Figure 7). In contrast, among females, the types of user do not determine the age structure of the mortality.

In relation with trend, between 1995 and 2000, mortality rates decline among both type of users, pedestrians and non-pedestrians. But, mortality rates declined more among pedestrians

than among non-pedestrians (25.8 to 18.2 deaths per 100 000 among non-pedestrians against 21.3 to 13.7 deaths per 100 000 among pedestrians – reduction of 29% and 36%, respectively). Largest reductions were among older ages, mainly male pedestrians. The new strategies of speed control can be associated to the decrease of mortality rates among male adults aged between 20 and 49 years non-pedestrians. On the other hand, the modest reduction of the mortality levels among the young adult males aged between 15 and 19 years (35 to 30 deaths per 100 000) suggests that specific measures should be implemented for this age group.

Figure 7 – Traffic injuries mortality rate by age, sex and type of user, Distrito Federal (Brazil). 1995-1996 and 1999-2000



CONCLUSION

The reduction of the mortality level from traffic injuries was very significant after the introduction of the new Code. But to achieve a large reduction, policy-makers must consider three aspects: efficient enforcement, engineering and education. Reducing pedestrian mortality should be the first goal. They need more investment in education and engineering for the safety spaces.

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