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# Latin American Clinical Epidemiology Network Series − Paper 5: Years of life lost due to premature death in traffic accidents in Bogota, Colombia

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**Abstract**

**Objective:** This study aimed to quantify the number of years of life lost in traffic accidents in Bogota, Colombia.

**Study Design and Setting:** The years of life lost were calculated using the 'age-standardized expected years of life lost' method, the table of Japanese adjusted life expectancy and the database of the Institute of Legal Medicine and Forensic Science between September 2012 and August 2013.

**Results:** During a period of 1 year, 430 people died and 10,056.3 years of life were lost in Bogota due to traffic accidents.

**Conclusion:** The mortality burden of traffic accidents in Bogota is high. Further studies are required in order to characterize the accidents and develop effective policy decisions. 

*Keywords:* Traffic accidents; Years of potential life lost; Premature death; Premature mortality; Life extension; Death cause

## 1. Introduction

Traffic accidents are the eighth leading cause of death in the world [1]. However, the number of associated deaths has been stable, around 1.25 million per year, despite the increase in population and motorization, suggesting a relative success of programs in road safety matters [2].

In Colombia, traffic accidents represent the second leading cause of death [3] among men under 35 years. Consequently, road safety is usually the main concern in studies that evaluate the number of deaths [4,5] and those that estimate the amount of years of life lost (YLL) [6−8].

There is a clear relationship between sociodemographic variables such as income or age and mortality from traffic accidents. Regarding the level of income, middle-income countries like Colombia [9], have the highest death rates from traffic accidents, 20.1 for every 1,00,000 inhabitants, and account for 80% of the deaths from this cause in the world [1]. In relation to age, road accidents are the most frequent cause of death among people aged between 15 and 29 years [1,10], which makes their burden, measured as the number of YLL high. For this reason, the burden of the mortality from traffic accidents can be very different not only between nations but also between regions or cities located in the same country.

In Colombia, the Center of Development Projects (CENDEX) from the Javeriana University, estimated that in 2005 [11], road accidents were the 12th leading cause of death with the greatest number of total YLL; and ranked third taking into account exclusively the years lost due to premature death (excluding those lost on account of disability).

Because of this, the Colombian government has created institutions like the Agencia Nacional de Seguridad Vial

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**What is new?**

**Key findings**

- Road accidents are becoming a major health problem in many low- and middle-income countries.
- Estimation of the burden of disease from this condition is important, but needed data are often unavailable.
- For road accidents, because of the insurance structure existing in some LMICs, there is an opportunity to make calculations directly from registers.

**What should change now?**

- Studies on the burden of transit accidents and its various causes can contribute important information to educational programs for the public.

and asked for a loan from multilateral bank of 10 million dollars to implement politics of safe roads, the main objective of which is to achieve a 21% reduction in deaths caused by transit accidents.

The decision making for public policy requires first that the magnitude of each problem be determined, to appropriately prioritize and allocate resources. There are no studies that estimate the YLL as a result of mortality in traffic accidents in Bogota, a city that is home to 16% [12] of the total Colombian population and whose sociodemographic configuration makes it prone to high numbers of YLL due to traffic accidents. Forty-eight percent [13] of the people in Bogota belong to the middle-income level, 25% [12] are aged between 15 and 29 years, and the vehicle fleet grows an average of 10% each year according to the Secretariat for Mobility of Bogota [14].

This article estimates the YLL due to premature deaths resulting from traffic accidents in Bogota and compares the results with the national data to provide an idea of the magnitude of the problem. It is part of a collaborative study between Universidad Javeriana, Corporación Fondo de Prevención Vial, and Instituto de Medicina Legal y Ciencias Forences on the relation between transit accidents and alcohol consumption, a study participated in by INCLEN members. They used epidemiological methods because the information about the burden of transit accidents could be useful for clinical epidemiology purposes, diagnoses, and treatment, or for public health, prevention, and health promotion. In cases of diagnoses and treatment, the differentiation of severities of injury by age is relevant to properly handle clinical management.

## 2. Materials and methods

The methodology used is called ‘‘age-standardized expected years of life lost’’ where the deaths at all ages contribute to the lost years and a standard life table is used to compare results between nations [15].

The number of years lost due to premature death is calculated as the sum of the product between the number of deaths and life expectancy, according to the selected ideal standard, at every age.

$$YLL = \sum_{i=0}^{l} (M_i \times E_i)$$

In the previous equation i is the age of death, l is the last age where there are survivors, $M_i$ and $E_i$ are the number of deaths and the life expectancy at age i, respectively.

The standard life table used was the same used by CENDEX for the national study [11]. The table was published by C. Murray [16] based on Japanese life expectancy with a discount rate of 3% and unequal weighting by age.

The National Institute of Legal Medicine and Forensic Sciences provided the database of deaths from traffic accidents in Bogota between September 2012 and August 2013. To protect the identity of the deceased, the database only included the fields of age, gender, date, and place of the accident.

## 3. Results

During the analyzed period, 430 deaths caused by traffic accidents were reported, 79% of them were men. The average age of death for men was 42 (±19.5) years and 45 (±19.1) years for women. The descriptive statistics of the age at the time of death are summarized in Table 1.

Fig. 1 shows the distribution of deaths by age range.

The burden of premature death from traffic accidents was estimated for Bogota during the year from September 2012 to August 2013: 2,006.0 years for women and men in 8,050.3. Table 2 summarizes the detailed results by age group and gender.

## 4. Discussion

There are several methodologies used to measure YLL in relation with the expected lifetime by age range. DALYs suppose healthy years lost and, because better health means more longevity, several studies use tables based on Japanese data to establish how many years a person would have lived, had she/he not suffered an accident, and had been in good health. Japanese data are used because that country reports the highest average life expectancy.

In this study, to be able to compare the results with other local studies, especially with the two versions of the Colombian burden of disease study [11,17], the same methodology was used with the Japanese life expectancy and a discounting rate of 3%.

During the analyzed period, an average of 8 deaths per week caused by traffic accidents occurred in Bogota. The