

# External-cause mortality in Medellin, 1999-2006

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## *Resumen*

Caracterizar el comportamiento de la mortalidad por causas externas en la ciudad de Medellín, Colombia, entre 1999-2006, según sexo, edad y causa básica de muerte fue el objetivo de este estudio descriptivo longitudinal, con fuente de información secundaria de 22 128 registros de defunción por causas externas. El análisis realizado es univariado y bivariado por sexo, grupos de edad y causa de muerte. Las causas externas registradas en el periodo fueron: 72.9 por ciento por homicidio; 15.3 por ciento, accidente de transporte; 7.3 por ciento, traumatismos; 4.2 por ciento, por suicidio, y por otras causas, 0.4 por ciento. La mayor tasa de mortalidad se presentó en el grupo de edad de 20 a 24 años (27.6 por cien mil habitantes), hecho que merece especial consideración por las implicaciones sociales, familiares y laborales que representa el fallecimiento de una persona en su etapa productiva.

*Palabras clave:* mortalidad, riesgo de muerte, homicidios, Medellín.

## *Abstract*

*External-cause mortality in Medellin, 1999-2006*

Characterizing the behavior of mortality by external causes in the City of Medellin, Colombia, between 1999-2006, according to gender, age and basic cause of death was the objective of this longitudinal descriptive study, with secondary information source from 22128 registrations of external-cause casualties. The performed analysis is uni-varied and bi-varied by gender, age groups and causes of death. The external causes registered in the period were: 72.9 percent homicide; 15.3 percent, transportation accident; 7.3 percent, traumatismos; 4.2 percent, suicide; and 0.4 percent, other causes. The highest mortality rate was found in the 20-24 years of age group (27.6 per thousand inhabitants), a fact that deserves especial attention because of the social, familial and labor implications a casualty has in productive stages.

*Key words:* mortality, death risk, homicides, Medellin.

## Introduction

**H**ealth cannot be understood as the absence of illnesses. There is not a person and less probably a population that, except from those in exceptional, transitory and hardly imaginable circumstances, can be considered as absolutely free from all pathologic processes. Each individual, family and community, in general, in every moment of their existence, has needs and risks that are characteristic to their age, sex and education level, or even their

economic and social position. This results in a profile of health problems that, to a greater or lesser extent, affect their possibilities of personal and collective realization. From a practical point of view, it is not possible to live without "illnesses" (in the broadest sense of the term); only death means the absolute negation of health and illness (OPS, 1999).

Mortality, the action of death on the population, is a direct indicator of the health conditions of a population, its levels, tendencies, differences and causes constitute basic elements to plan health services (Health Department, 1994). Not only is mortality an indicator of the magnitude of dying, but also of the absolute risk that reflects the conditions of the population life, use of health services, technological advances, education levels, planned urbanization, provision of health services, development of the region, work of the different sectors and illnesses the population endures and which cause death in it (Health Board, 2000).

Those socioeconomic and biologic determining factors are considered as risk of death and they, at some time, make morbid processes to create a situation of illness so that they result in the irreparable deterioration of health or even death. In this sense it is necessary to overcome the "population exposed to risk" vision, since the objective is not to find a rate or probability of dying or falling ill, but to go through a causal chain in which the morbid processes that configure an epidemiologic profile determine the specific mortality characteristics of the population. This profile is the adequate indicator to identify the most significant problems and changes through time (Welti, 1996).

According to the 2003 World Health Report, from the 45 million deaths of 15 year-olders and adults recorded in the world in 2002, 32 million were caused by non-transmissible illnesses, 4.5 million by traumatisms, and from them, about 70 percent from the total were men, who are more exposed to suffer traumatisms in traffic accidents and to be victims of violent deeds or war. Men have a risk three times higher in the first case and a four times higher in the second (WHO, 2003).

Traumatisms, both accidental and intentional, mainly affect young adults (from 15 to 44 years of age) and frequently have serious handicapping consequences, they constituted 14 percent of the world charge of adult morbidity and in some parts more than 30 percent, as in the case of the American continent. Intentional traumatisms, that also include self-injuries, suicide and violent deeds and those of war, represent an increasing number, especially among young adults that are economically productive. In developed countries, suicides have the most

significant proportion of the number of intentional traumatisms, while in developing regions violence and war are the ones that have the first place (OMS, 2003).

According to this report, Colombia is classified, in the developing countries, with low mortality, higher proportion in people older than 60 years, followed by adults between 15 and 59 years of age, and lastly, the population under five. The relative high number of deaths among women that was recorded in developing countries and for people between 15 and 59 years of age is striking. In it, more than 30 percent of the total number of demises occurred in those ages, while in the richest regions said percentage is 20 percent. This high mortality rate among adults in developing countries is a public health problem (OMS, 2003).

Events known as externally caused, related to violence and traffic accidents, have had a remarkable increase, becoming one of the main problems nowadays. Among all American countries, Colombia has one of the highest violence indexes, it is estimated that 15 percent is caused by political reasons and 85 percent by daily conflicts (Health Department, 2000). In Medellin, Antioquia, the evolution of the mortality structure shows both, the typical problems of the inadequate living conditions and the conflicts that are common in underdeveloped countries. Up to the period 1947-1951 infectious and respiratory illnesses prevailed as main causes of mortality, later on, from 1962 to 1985 cardiovascular conditions increased, and despite the fact that transit accidents, poisonings and violence had the third place in importance since 1972, from 1986 on they took the first place and hold it up to this moment (Health Department, 1994).

Medellin has high indexes of violence and it has become the first cause of death in the last 20 years, it is also one of the most common causes of hospitalization and disability, and created around 25 percent of the number of illnesses (Health Department, 1994). This fact stirs up the interest in describing the different signs of this phenomenon in youth population, given the fact that they are the most affected by violent acts, since the decease of a young person represents an heavy burden for society, considering that to the emotional cost of the loss, important social and economic costs have to be added.

In the study on mortality in population between 10 and 19 years of age that had emphasis in violent mortality and that was caused by injuries in Medellin, 1998-99, it was found that this population group contributes with eight percent of the total of the deceases of the city, as well as the fact that 90 percent of the masculine deceases and 50 percent of the feminine one come from external causes (Zapata, 2003). Just as infectious illnesses are controlled by public health measures and by new medicines, technological development has brought about

changes in the life patterns that make transit accidents one of the most important causes of morbidity and disability given the effects they leave in the survivors (Flórez, 2002).

During the 1994-2003 six-year period, masculine population from 20 to 44 years contributed more to the external causes caused by aggressions with firearms (rate 464 per one hundred thousand inhabitants), aggressions with sharp instruments used as weapons (44 per one hundred thousand inhabitants), and traumatisms in transport accidents (34 per one hundred thousand inhabitants). For women of the same population group, the causes of death were related to external causes thus: Aggression with firearm (22 per one hundred thousand inhabitants), death caused by acute myocardium heart attack (rate five per one hundred thousand inhabitants), malignant neoplasm of cervix uteri (four per hundred thousand inhabitants), malignant neoplasm of breast (4.3 per hundred thousand inhabitants) and transport accidents with a mortality rate of four per hundred thousand young adult women (Cardona, 2006).

Mortality from external causes makes Medellin one of the municipalities with higher rates of death in the country until 2003 (Health Department, 2003), but from that date on, one notices a significant fall in the causes of death from extrinsic origin. In 2006, 736 deaths occurred due to aggressions (mortality rate of 70 per hundred thousand inhabitants) and 381 due to transport accidents, which constituted a rate of 36.2 per hundred thousand inhabitants (Health Department, 2006).

Along with the previous scene, one can say that Medellin is the second economic center of Colombia. The city represents more than eight percent of the Gross Domestic Product (GDP), and altogether with *Valle de Aburrá* contributes to it with about 11 percent, being one of the most productive regions of the country with a per capita GDP of 3,794 USD that is superior to that of other important cities of the country. 95.5 percent of its inhabitants live in its urban zone; they are distributed in 16 municipalities or geographical sub-areas. The tendency to urbanization of large cities, with internal displacements from rural to urban zones has made cities such as Medellin become recipients of a large amount of migrants and to consider it as final destination for many families as a result of the internal conflict, forced displacement, social and political crisis of the State, agricultural modernization, search of new ways to work, diversification of the exportations, crop substitution, soil exhaustion, among other.

The floating population in the city has put pressure on different sectors, since they require the provision of basic services such as health, education, employment,

housing and the creation of subnormal neighborhoods in the hillsides of the mountain, prone to natural threats, unhealthy and with scarce public services.

Medellin is the capital of the Antioquia department, located in Colombia, it has an area of 380.64 km<sup>2</sup> (105 km<sup>2</sup> urban and 270 km<sup>2</sup> rural). Its average temperature is 24° C. It is located 1479 meters above the sea level. The population density is of 5,820 inhabitants per square kilometer. According to the census performed in 2005, the rate of annual growth is of 14.4 per thousand, the total population for that year was of 2,219,861 inhabitants, 46.7 percent were males and 53.7 percent females. Its population structure shows that 24.9 percent are younger than 15 years of age; 9.1 percent, adolescent population from 15 to 18 years, 29.5 percent women in fertile ages and 10.4 percent, are 60 or older (DANE, 2005).

This social and health context recorded in Medellin is appropriate to study the behavior of mortality from external causes in this city between 1999 and 2006, according to sex, age and basic cause, taking as references the codes V01-Y89 of the international classification of illnesses, tenth revision (CIE-10) (OMS, 1995), detailed in group 5, called "external causes" of the short list OPS 6/67 for the tabulation of mortality data (OPS, 1999). By basic cause of death one shall understand "The illness or injury that started the chain of pathological events that directly led to death, or the circumstances of the accident or violence that caused the fatal injury" (OPS, 2002).

## **Materials and methods**

Through a descriptive longitudinal study, mortality from external causes in Medellin was characterized with a univariate and bivariate analysis classified by sex, age or cause of death, supported on the statistical chi-square test ( $\chi^2$ ). The reference population was 2,281,785 inhabitants in Medellin in 2007, according to projections of the Administrative Department of Municipal Planning, Sub directorate Metroinformation, based on the distribution by age and sex of the 2005 census (Municipal Planning, 2007).

The mortality of the population was analyzed taking Medellin as municipality of residence of the deceased person, according to the information of the National Administrative Department of Statistics (DANE), 1999-2003, and the Municipal Health Department of Medellin 2004-2006, which took death certificates of 96,748 deceased in the city from 1999 to 2006, and from them, 76.8 percent (74,278) had a natural cause as probable cause of death, 22.9 percent (22,128)

of the deceased had a violent cause as the probable source of death and for 0.3 percent (328) of the deceases the cause had not been determined.

These 22,128 deaths recorded as probable violent deceases represent the population of study since they are categorized as one cause of death of the group five of the OPS 6/67 list, grouped as follows: 72.9 percent (16,132) were homicides, 15.3 percent (3,377), transit accidents, 7.3 percent (1,605), traumatisms; 4.2 percent (925) suicides, and 0.4 percent (89) had other causes. In other words, about three out of four deceases by external causes in Medellin had aggressions and other non-determined events as causes (Table 1).

The source of information was secondary from primary data, based on the death certificates, the population censuses and the population projections that were used. The National Administrative Department of Statistics, the Municipal Department of Health and the Administrative Department of Municipal Planning were consulted aiming at controlling errors. But it is known that the statistics coming from the mortality recorded could be changed at any time during their production: data collection, codification, processing of the questionnaire, data processing and later count (OPS, 2003).

The National Administrative Department of Statistics states that:

The record is much smaller in the deaths by external causes specifically created in accidents and aggressions, given the fact that several authorities take part in its investigation. Also, due to the fact that the system of life statistics collects a number of these deceases, which are not registered by the authorities, but certified by a different medical personnel. Therefore, the omission in the certification takes place mainly at the expense of the deaths owed to natural causes (DANE, 2000).

## **Results**

### *Sex*

The total deceased population from external causes in the period of study, with residence in the city, was distributed between 89 percent (19,698) deceases of masculine sex and 11 percent (2,430) of feminine. The gross mortality rate in the period of study was of 1.3 per each thousand inhabitants of the city, for men it was of 2.5 per each thousand masculine inhabitants and for women of 0.3 per each thousand feminine inhabitants. This indicates that the risk for men of dying from external causes in Medellin between 1999 and 2006, represented to be 9.3 times the risk of women to die from any of these causes.

TABLE I  
CASUALTIES BY EXTERNAL CAUSES IN MEDELLIN, 1999-2006

Group	External causes	n	%	N	%
Homicide	Aggressions (homicides)	16 132	72.9	15 769	71.2
	Non-determined intention events			363	1.6
Traffic accident	Terrestrial transport accidents	3 377	15.3	3 338	15.1
	Other transport accidents			39	0.2
Traumatism	Falls	1 605	7.3	805	3.6
	Other accidents			481	2.2
	Accidental drowning and submersion			153	0.7
	Smoke, fire and flames exposition			59	0.3
	Accidental poisoning and exposition to noxious substances			57	0.3
	Accidents by firearms shooting			30	0.1
	Accidents by machines and cutting-edge or sharp instruments			20	0.1
	Self-inflicted wounds (suicides)	925	4.2	925	4.2
Suicide	Legal interventions and war operations	89	0.4	70	0.3
Other	Complications of medical and surgery attention			19	0.1
				22 128	100.0
<b>Total</b>				22 128	100.0

Source: National Department of Statistics, Secretariat of Municipal Health and Administrative Department of Municipal Planning.

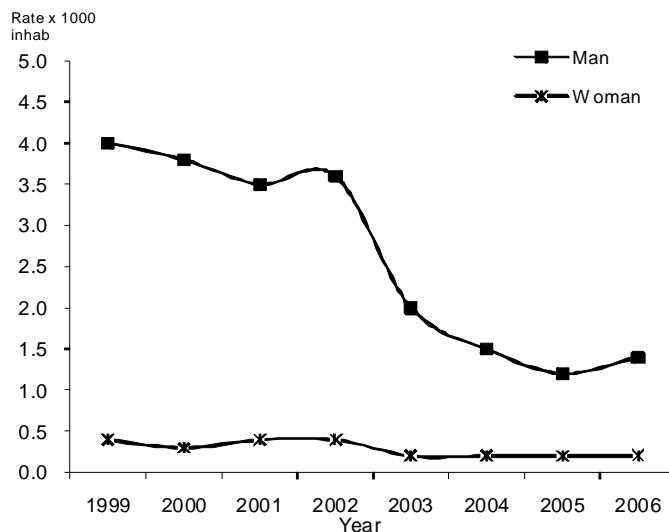
The risk has followed a decrease through time, from representing 2.0 deceases per each thousand inhabitants in 1999 to 0.7 per each thousand inhabitants, eight years later. This decrease has resulted mainly in the masculine sex, changing from four deceased men per each thousand masculine effectives at the beginning of the period to 1.4 deceases in 2006; women did not have a tendency towards a decrease in the mortality rate, they recorded 0.4 per each thousand in 1999 and 0.2 per each thousand in 2006. There was a significant statistical association in males and year of decease, according to the chi-square test ( $\chi^2 = 68.092$ ;  $p = 0.000$ ) (graph 1).

### *Age*

Deceases from external causes were predominantly in population under 40 years of age, recording 71.9 percent of the deceases in people between 15 and 39 years. The age group that most contributed was that between 20 and 24 years, having 20.7 percent (4,570) and created a mortality rate of 27.6 per hundred thousand inhabitants in that same age group. Followed by the deceased between 15 and 19 years with 16.8 percent (3,723) and a rate of 22.5 per each hundred thousand inhabitants, then we have the contribution of those between 25 and 29 years with 15.2 percent (3,358) and a rate of 20.3 per hundred thousand inhabitants. The age group that recorded less deceases from external causes were those younger than one year and older than 90 years with 0.3 percent each.

Masculine population died in younger ages than feminine, recording an increase in the number of masculine deceases in ages between 15 and 39 years, with a higher level in the group between 20 and 24 years (21.6 percent) followed by that between 15 and 19 years (17.1 percent) and those between 25 and 29 years (15.8 percent); in these three age groups a 54.5 percent was recorded, that is, for two deceases from violent causes at least one of them was a person aged between 15 and 29 years. On the other side, feminine deceases from external causes were located in the group of ages between 15 and 19 years (14.5 percent), followed from those between 20 to 24 years (12.9 percent) and from 25 to 29 years (10.3 percent), these three groups concentrate 37.7 percent of feminine deceases recorded during the period of study. According to the statistical test, there is a relationship between belonging to the masculine sex and the age group that one belongs to in order to die from external causes in Medellin, having a higher risk in ages between 15 and 39 years ( $\chi^2 = 928.297$ ;  $p = 0.000$ ).

GRAPH 1  
EXTERNAL-CASEMORTALITY BY YEAR, ACCORDING TO GENDER  
(RATE BY THOUSAND INHABITANTS); MEDELLIN, 1999-2006

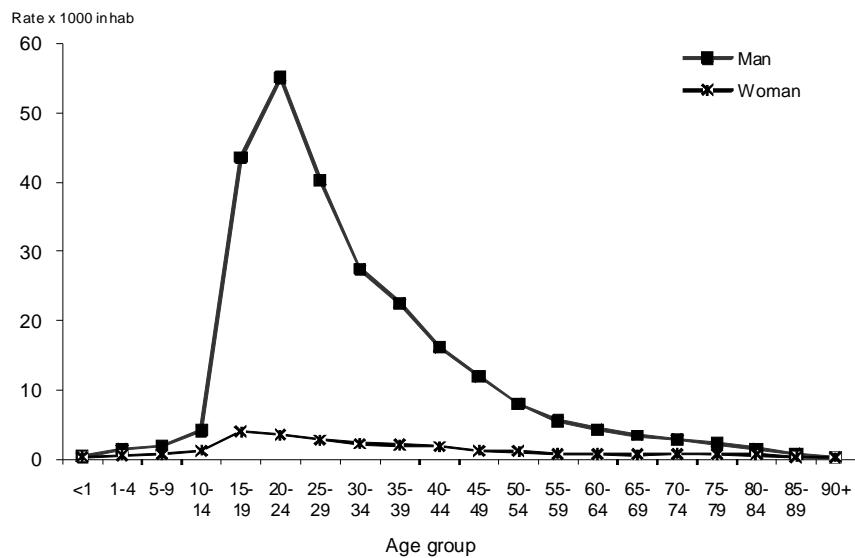


Source: DANE. Death certificate. Medellin, 1999-2003. Medellin, Secretariat of Health. Death certificates. Medellin, 2004-2006. Author's calculations.

The average mortality rate according to age group shows a risk of the masculine population from 20 to 24 years of dying from external causes in the period of study (masculine overmortality) 15.5 times higher to that of women in that same age rank. In the same way, overmortality of men between 25 and 29 years is of 14.2 and from 15 to 19 years the risk is equal to ten times the feminine risk. The lowest mortality rate recorded is that of extreme groups, younger than one year and older than 90 years (graph 2).

The most predominant place of a decease in the period of study was the thoroughfare having 42.4 percent (9,376); in a hospital, clinic center or health place died 41.8 percent (9,244) of the population, after this we find the house or residence, with 7.7 percent (1,697); in other place different to the previously mentioned there was a record of 6.7 percent (1,478) and there was no information in 1.5 percent (333) of the records. It is worth mentioning that masculine deceases were to a greater extent in the thoroughfare (44 percent) and after that in the health institution (40.9 percent); while feminine deceases

GRAPH2  
EXTERNAL-CASEMORTALITY BY AGE GROUP, ACCODING  
TO GENDER (RATE BY THOUSAND INHABITANTS). MEDELLIN, 1999-2006



Source: DANE. Death certificate. Medellin, 1999-2003. Medellin, Secretariat of Health. Death certificates. Medellin, 2004-2006. Author's calculations.

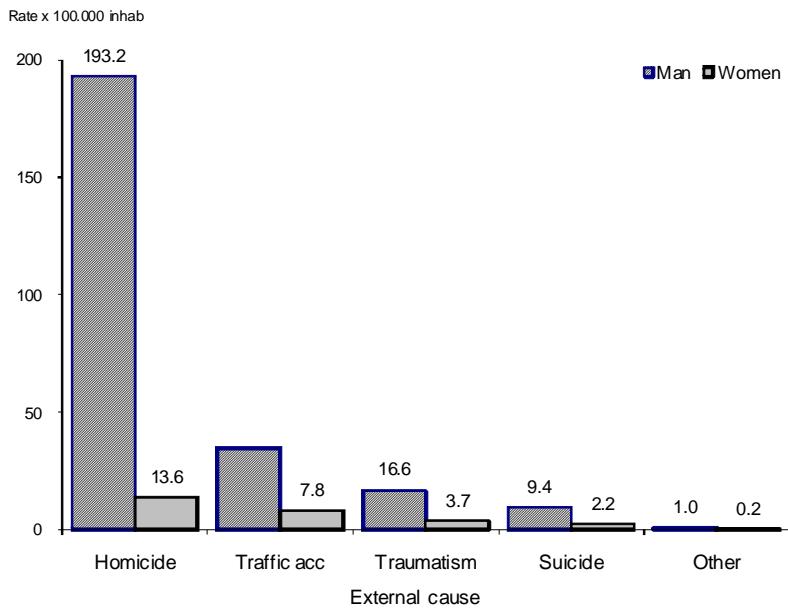
were in first instance in the health institution (48.7 percent), followed by those recorded in the thoroughfare (29.4 percent). There was a statistically significant association between the place of death and sex of the dead, according to the chi-square test ( $\chi^2 = 313.420$ ;  $p = 0.0000$ ).

Causes of death according to the OPS 6/67 list; the deceases recorded were grouped in homicides, suicides, transit accidents, traumatisms and other causes, show that 75.8 percent (14,925) of masculine deceases and 49.6 percent (1,205) of the feminine were caused by homicides; in a transit accident died 13.7 percent (2,689) in the case of men and 28.3 percent (687) women. Due to suicide died 3.7 percent (727) in the case of men and 8.1 percent (197) percent in the case of women. Traumatisms caused 6.5 percent (1,280) of the deceases for males and 13.4 percent (325) in feminine population and the rest 0.4 percent (77) men and 0.7 percent (16) women died from another external cause. Hence, for each 14 masculine homicides only one feminine homicide occurred; equally, for each

four masculine deceases in transit accidents, a feminine decease was recorded due to this cause.

According to the five categories of external causes that were analyzed, the rate per hundred thousand inhabitants was of 97.4 due to homicides, due to transit accidents 20.4, due to traumatisms 9.7, due to suicides 5.6, and due to other causes, 0.6. Men who died due to homicides had an average rate of 193.2 per each hundred thousand inhabitants, and due to transit accidents, 34.8 per hundred thousand masculine inhabitants. Feminine deceases from external causes were mostly due to homicides: 13.6 per each hundred thousand feminine inhabitants of the city, and due to transit accident the rate was of 7.8 (graph 3).

GRAPH3  
EXTERNAL CAUSE MORTALITY, ACCORDING TO GROUPS BY THE OPS 6/67  
LIST BY GENDER (RATE BY 100 THOUSAND INHABITANTS).  
MEDELLIN, 1999-2006



Source: DANE. Death certificate. Medellin, 1999-2003. Medellin, Secretariat of Health. Death certificates. Medellin, 2004-2006. Author's calculations.

The general pattern of mortality was similar to the behavior presented in the masculine pattern of mortality, where the tendency along the years of study showed a decrease in the deceases recorded from external causes, that could be affected by the increase of the denominator and not precisely because homicides, suicides and the rest of the violent deceases in the city had decreased, since in 2002 deceases increased 4.3 percent, and in 2006 they increased in 13.1 percent in comparison to 2005, but the highest decrease was clear in 2003, with 41.3 percent less than in the previous year.

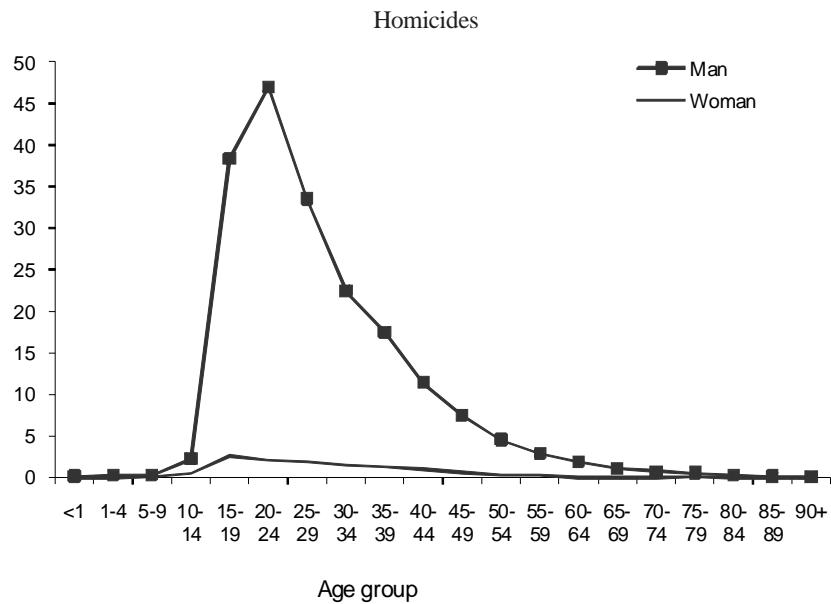
This information shows that the main external cause of death in men for the period of study in Medellin were homicides, but the rate diminished in time, from 319.6 per each hundred thousand inhabitants in 1999 to 71.1 in 2006. Likewise transit accidents decreased in this population group from an average rate of 45.7 per hundred thousand inhabitants in 1999 to 28.9 per hundred thousand inhabitants in 2006. Traumatisms and suicides have fluctuated through the period, and its decrease is not as clear as the two previous causes; traumatisms changed from 20.1 per each hundred thousand inhabitants in 1999 to 19.1 in 2006, and suicides changed from 11.8 per each hundred thousand inhabitants in 1999 to 9.2 in 2006 (table 1). This relationship is supported by statistical evidence, since there was a relation between dying from an intentional cause as homicide and belonging to the masculine sex. This shows that men have a risk 13 times higher of dying in a violent event.

In the case of the feminine population, external causes of decease have decreased as in the case of men, possibly as a result of the fall in terms of violence in the region that has affected the city, but deceases caused by traumatisms have increased in women, changing from 3.5 in 1999 to 4.8 per each hundred thousand inhabitants in 2006. Homicides changed from an average rate, per each thousand inhabitants, from 19.3 in 1999 to five in 2006, transit accidents changed from 10.3 in 1999 to 6.5 in the last year of the study and suicides changed from 2.6 in 1999 to 2.3 in 2006 (table 1).

By age group, homicide was the first external cause that affected the population of the city, mainly in the age groups between 15 to 39 years and specifically in young adults from 20 to 24 years, with a rate of 23.1 homicides per each hundred thousand inhabitants in the same age rank. The highest mortality rate per each thousand inhabitants from homicides recorded in the masculine population occurred in the group from 20 to 24 years, having 46.9; followed by the group from 15 to 19 years, having 38.3; from 25 to 29 years, 33.5 and those from 30 to 35 years, 22.5. In the feminine population, the highest mortality rate

due to homicide occurred in the group from 15 to 19 years having 2.6 deceases per each hundred thousand feminine inhabitants from the same rank and age and then we have the mortality of women from 20 to 24 years having 2.2. As it has been mentioned, men had a higher risk of dying from this cause than women in all groups of age, but in the 20 to 24 years group, the risk or the masculine population equals 21 times the risk of the feminine population (graph 4).

GRAPH4  
EXTERNAL-CAUSEMORTALITY, ACCORDING TO GROUPBY OPS 6/67 LIST BY  
AGE GROUP AND GENDER (RATE BY 100 THOUSAND INHABITANTS)  
MEDELLIN, 1999-2006



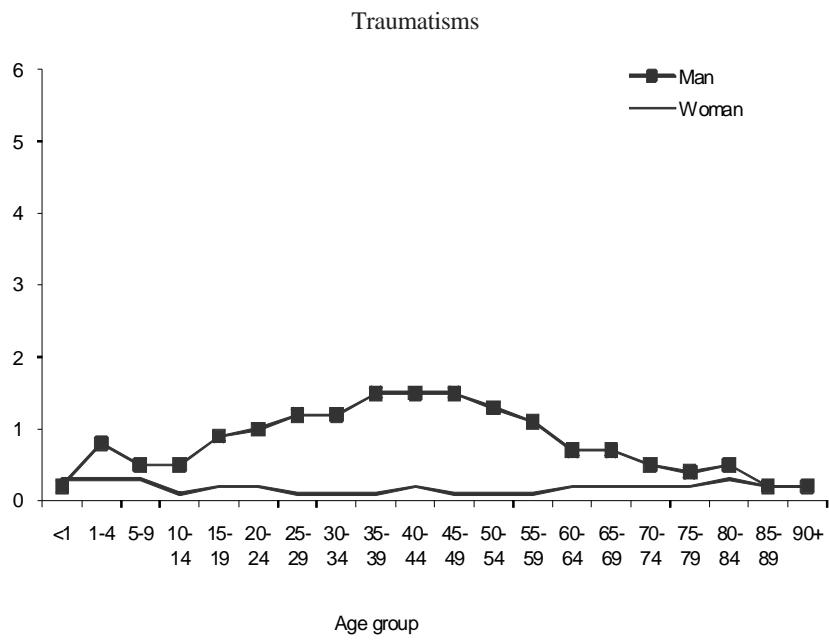
Source: DANE. Death certificate. Medellin, 1999-2003. Medellin, Secretariat of Health. Death certificates. Medellin, 2004-2006. Author's calculations.

The second external cause of death recorded were transit accidents, that affected mainly to the population from 15 to 49 years, the most affected group was that from 20 to 24 years with an average rate of mortality of 2.8 per each hundred thousand inhabitants from the same group of age, followed by those from 25 to 29 years, with a rate of 2.3 and that of groups from 15 to 19, 30 to 34

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and 35 to 39 years having 1.6 per each hundred thousand inhabitants each. Among masculine population, the most affected groups from this external cause were those from 20 to 24 years, with an average mortality rate of 5.2 per each hundred thousand inhabitants; then there are those from 25 to 29 years, with a rate of 4.2 and those from 15 to 19 years with 2.9. In the feminine population that died from this cause, the most affected age group was that from 20 to 24 years, having an average mortality rate of 0.8 per each hundred thousand inhabitants, they are followed by those from 25 to 29 and those from 15 to 19 years, having 0.6 each. The highest risk of dying in a transit accident was in the group between 25 and 29 years, where the risk of men is equal to 7.2 times the feminine risk (graph 5).

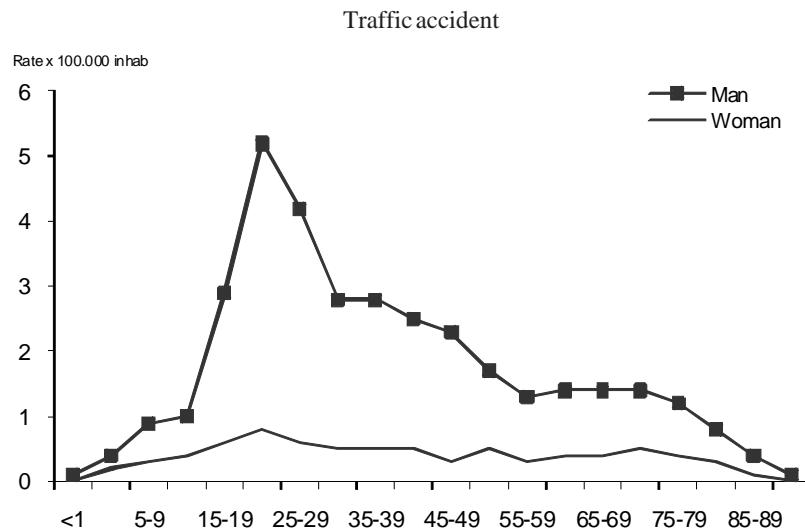
GRAPH 5  
EXTERNAL-CAUSE MORTALITY, ACCORDING TO GROUP BY OPS 6/67 LIST BY  
AGE GROUP AND GENDER (RATE BY 100 THOUSAND INHABITANTS)  
MEDELLIN, 1999-2006 (CONTINUATION)



Source: DANE. Death certificate. Medellin, 1999-2003. Medellin, Secretariat of Health. Death certificates. Medellin, 2004-2006. Author's calculations.

Mortality from traumas, consisting in falls and other non-intentional causes, was the third external cause of death of the population from Medellin. In this sense, the highest average mortality rate recorded was in the groups from 35 to 39 and from 40 to 44 years, having 0.8 per each hundred thousand inhabitants each, after them, there are those groups from 45 to 49 and 50 to 54 years, having a rate of 0.7 per each hundred thousand inhabitants. Among masculine population, the most affected age groups from this cause were those between 35 and 49 years, having a rate of 1.5 per hundred thousand inhabitants; the feminine population with the highest average rate was that under 10 years of age and adults from 80 to 84 years, having 0.3 per each hundred thousand in each of them. In children younger than one year, the feminine population had a risk equal to 1.4 times the risk of the masculine population, but in the other age groups masculine population had a higher risk than that of women, mainly in the group from 25 to 29 years, where the risk was of 13 (graph 6).

GRAPH6  
EXTERNAL-CAUSE MORTALITY, ACCORDING TO GROUP BY OPS 6/67 LIST BY  
AGE GROUP AND GENDER (RATE BY 100 THOUSAND INHABITANTS)  
MEDELLIN, 1999-2006 (CONTINUATION)

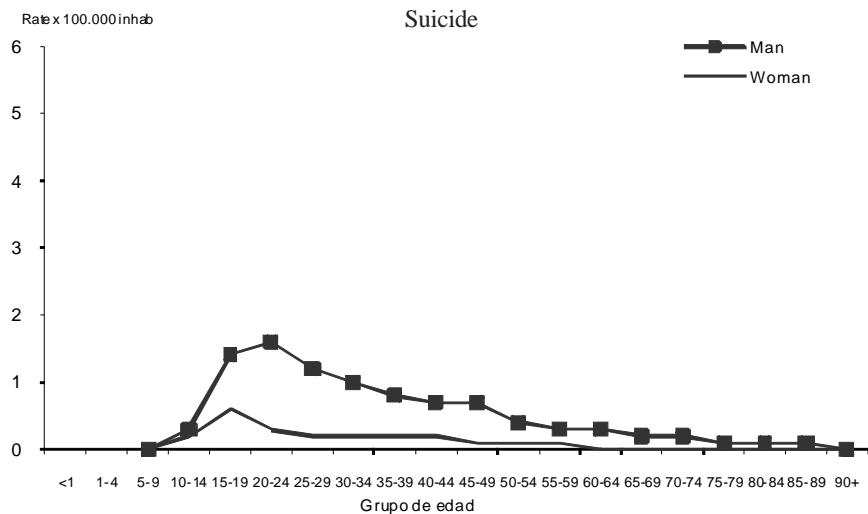


Source: DANE. Death certificate. Medellin, 1999-2003. Medellin, Secretariat of Health. Death certificates. Medellin, 2004-2006. Author's calculations.

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Suicide was the fourth external cause of death for the inhabitants in Medellin, mainly in the age group from 15 to 19 years, where there were 153 self-inflicted deceases that created an average rate of mortality of a decease per each hundred thousand inhabitants of the city, the second age group was that in the age between 20 to 24 years with a rate of 0.9. Suicides recorded in the study period were mostly in masculine population, mainly in the groups from 15 to 25 years, in the same way, suicides in the feminine population were mainly recorded in the same age groups. The recording of suicides in population younger than 15 is striking and despite the fact that both sexes record deceases due to this case, the highest risk is recorded in the masculine population in all the age groups, mainly in those between 75 and 79 years, where risk is 10 times higher than that of the feminine population of the same age group (graph 7).

GRAPH7  
EXTERNAL-CAUSEMORTALITY, ACCORDING TO GROUP BY OPS 6/67 LIST BY  
AGE GROUP AND GENDER (RATE BY 100 THOUSAND INHABITANTS)  
MEDELLIN, 1999-2006 (CONTINUATION)



Source: DANE. Death certificate. Medellin, 1999-2003. Medellin, Secretariat of Health. Death certificates. Medellin, 2004-2006. Author's calculations.

Mortality from external causes, according to the age group that died, changes according to the life cycle in which the person is. From the 69 infants deceased during the period of study, 59.4 percent died from traumatisms, caused by falls, accidents caused by machines, from sharp instruments, or from firearms, from drowning, fire, poisoning or exposure to harmful substances, women recorded more deceases from this cause.

The 170 minors deceased between one and four years, died from traumatisms (55.3 percent), transit accidents (28.2 percent) and the contribution was mainly from the masculine sex. The deceased school children were 214 from five to nine years, from which 47.2 percent died from transit accidents, being a higher percentage individuals from masculine sex, 31.3 percent of the deceases in this age group was from traumatisms. From 10 to 59 years, homicides become the first external cause of death in Medellin.

TABLE2  
EXTERNAL-CAUSEMORTALITY, ACCORDING TO GROUPS BY OPS 6/67 LIST  
BY YEAR AND GENDER (RATE BY 100 THOUSAND INHABITANTS)  
MEDELLIN, 1999-2006

Year	Gender	Homicide	External cause			
			Traffic accident	Traumatism	Suicide	Other
1999	Man	319.6	45.7	20.1	11.8	0.2
	Woman	19.3	10.3	3.5	2.6	0.4
2000	Man	309.6	36.2	17.5	9.3	2.4
	Woman	17.3	9.2	3.5	2.7	0.0
2001	Man	288.2	40.2	13.5	9.7	0.2
	Woman	20.9	9.0	3.9	1.8	0.2
2002	Man	295.9	34.6	17.1	8.5	0.2
	Woman	22.2	8.0	3.9	2.4	0.1
2003	Man	147.3	28.9	14.7	8.5	0.1
	Woman	11.4	7.7	3.1	2.1	0.0
2004	Man	97.5	30.9	16.4	8.3	0.7
	Woman	8.3	7.1	3.7	1.7	0.0
2005	Man	66.6	28.8	14.4	10.1	1.9
	Woman	7.1	5.1	3.0	2.4	0.2
2006	Man	71.1	35.1	19.1	9.2	2.0
	Woman	5.0	6.5	4.8	2.3	0.6

Source: DANE. Death certificate. Medellin, 1999-2003. Medellin, Secretariat of Health. Death certificates. Medellin, 2004-2006. Author's calculations.

## **Conclusions**

As one can see in the characterization of the behavior of the mortality from external causes in Medellin, Colombia, between 1999 and 2006, according to age and basic cause, the main cause of death for almost all population groups were homicides, having as exception extreme groups (younger than 15 years and older than 60), where transit accidents and traumas caused by non-intentional falls or accidents had the first positions in the rank. These findings corroborate what has been explained by the Health Department in the report on the Health Situation of the Medellin Municipality, (Health Department, 2003), which found mortality from aggressions (homicides) as main cause of death between 1992 and 2001.

Mortality was analyzed having Medellin as the residence municipality of the deceased person, the death certificates recorded in the database corresponded to 96,748 people who died from 1999 and 2006, and from them, 22.9 percent (22,128) had as probable cause of death a violent cause, whose variations are grouped in the external causes of the OPS 6/67 list, group 5. These codes were grouped in: homicides (72.9 percent), transit accident (15.3 percent), accidental traumatisms (7.3 percent), suicides (4.2 percent) and other causes (0.4 percent). That is, from each four deceases from external causes, at least three were caused by aggressions (homicides), a piece of information that reflects the violence that the city experiences, but that has decreased in recent years.

The gross average of mortality from external causes was of 1.3 per each hundred thousand inhabitants of the city, masculine population had an average rate of 2.5 per each thousand masculine inhabitants and the feminine population had a rate of 0.3 per each hundred thousand feminine inhabitants; this indicates that the risk of men to die from external causes in Medellin, between 1999 and 2006, was 9.3 times the risk that was calculated for women dying from these causes, according to the mortality of the study period.

According to age group, the rate of mortality from external causes was higher in people from 20 to 24 years, with a rate of 27.6 deceases per each hundred thousand inhabitants, and the lowest in the extreme groups of life. Masculine population had the highest average rate in the group from 20 to 24 years, having 55.1 per each hundred thousand inhabitants of the city, and the lowest, in older than 90 years. Among feminine population, the highest rate of mortality from external origin was in the age group from 15 to 19 years, having four deceased per each hundred thousand inhabitants, and the lowest, in women older than 85 years.

According to sex, 75.8 percent of the masculine deceases caused by an external cause were related to homicides, in contrast to 49.6 percent of feminine deceases from the same cause. Transit accidents caused 13.7 percent of the masculine deceases and 28.3 percent of the feminine. Non-intentional traumatisms caused 6.5 percent of the masculine deceases and 13.4 percent and feminine, and suicides were causes of 3.7 percent of the deceases of males in Medellin in the period of study and of 8.1 percent of feminine deceases.

The average rate of mortality, according to age group, shows the risk of the masculine population (masculine overmortality) from 20 to 24 years from dying from external causes in the period of study is equal to 15.5 times the risk of the feminine population in this same rank of age of dying from external causes.

The most predominant place of decease in the period of study was the thoroughfare (42.4 percent), health institution (41.8 percent) and the place of residence (7.7 percent). Masculine deceases from external causes were mainly recorded in the thoroughfare and feminine deceases took place mostly in a health institution.

From the five groups classified with external causes, according to the 6/67 list, an average rate of mortality of 97.4 deceases per each hundred thousand was recorded on homicides, in the case of transit accidents an average rate of 20.4 deceases per each hundred thousand inhabitants, for traumatisms the rate was of 9.7 deceases per each hundred thousand inhabitants, from suicides died 5.6 people per each hundred thousand inhabitants and from other external causes, 0.6 deaths per each hundred inhabitants of the city were recorded. Men who died from homicides had a rate of 193.2 per each hundred thousand masculine inhabitants and from transit accidents the rate was of 34.8 per each hundred thousand inhabitants. Women deceases from external causes, were mainly caused by homicides, according to a rate of 13.6 per each hundred thousand feminine inhabitants of the city and for transit accidents the rate was of 7.8 per each hundred thousand inhabitants.

Mortality from external causes changes according to the life cycle in which the person is; in children younger than one year of age, deceases are caused by traumatisms (falls, accidents caused by machines, by sharp instruments, by firearm, by drowning, fire, poisoning and exposure to harmful substances). In children from one to four years the external causes of decease are traumatisms and transit accidents, in minor schoolchildren the causes derive from transit accidents, from 10 years to 59, homicides become the first external cause of death in Medellin and in older adults the causes are transit accidents.

The specific analysis of the external causes, homicide, transit accidents, traumatisms and suicides shows some characteristics significant for public health, given the social and familiar costs that the decease in the population creates and much more when the cause of it is extrinsic to the individual sphere, which many times is the product of violence and social intolerance. To this, one should add the costs to the health system in medical care, treatments, procedures, medicines and later labor demand, derived from disabilities.

The tendency of mortality from external causes showed a decrease in the deceases recorded throughout the years that could be affected by the quality of information, although the information was taken from official sources. In the case of 2002, deceases increased 4.3 percent and in 2006 they increased 13.1 percent in comparison to 2005, but the higher decrease was clearer in 2003 having 41.3 percent less than the previous year.

With regard to the quality of information, it is known that the capacity of collection of data of each country has an impact on it, therefore it is common to perform studies on violence using information on mortality that was collected in the recording systems of vital facts that concentrate the data and publish them opportunely (OPS/OMS, 2002).

Even if it is true that mistakes on coverage and content are part of the census information and in vital statistics which were used in this study, it is probable that the most affected source corresponds to the statistics of deceases, which where controlled taking the information from reliable sources, such as the National Administrative Department of Statistics and the Health Department of Medellin, but in the analyses there could be many external deceases that are not well classified or not recorded in the sources that were used, which is difficult to control.

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