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## DEATH REGISTRATION AND MORTALITY STATISTICS IN COLOMBIA

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FOREWORD

This paper is being published in English with the kind permission of the Departamento Administrativo Nacional de Estadística (DANE) of Colombia. It was originally published in Spanish in their Boletín Mensual de Estadística, No. 447. The paper presents a brief history, an evaluation, and recommendations for improvement of death registration.

The views in this report are those of the author and do not necessarily reflect those of the IIVRS.

This paper was translated from Spanish by Mrs. Ellen Jamison.

# Death Registration and Mortality Statistics in Colombia

by

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## Foreword

Beginning with a quick summary of the origin of death registration in Colombia, this report attempts to make a general evaluation (coverage, consistency, limitations, quality) of such registration in the country, arriving at a clear notion of the importance of the death certificate as a basic instrument for producing mortality statistics. Finally, it makes some suggestions for improving the quality and coverage of death registration and presents a model of the form used for producing the individual death certificate.

## 1. Introduction

In 1916, by means of law No. 16, the burial permit was created, through which there began a strict accounting of deaths. Thus, that law formed the legal basis for mortality statistics.

In 1928, demographic information for each municipio was the responsibility of the parish priests, who had to send it to the department directors or the statistical administrations. By decree No. 540 of 1934, the national government tried to put into effect the provisions of the civil code regarding registration, ordering that the notaries or, failing that, the town council secretaries, should record marriages, births, and deaths.

In 1944, the Comptroller General of the Republic issued statutory resolution No. 633, reorganizing the national statistics.

In 1970, article 74 of law decree No. 1260 appeared, according to which all deaths had to be reported by the surviving spouse, or by the adult relatives closest to a murder victim, the persons living in the house where the death occurred, the doctor who treated the deceased during his last illness, or the funeral parlor that attended to the burial.

The first provisions relating to vital statistics appeared with law No. 34 of 1982, in which measures concerning demography and church registers were indicated.

Analyses of mortality, fertility, nuptiality, and migration are fundamental for portraying the dynamics of the growth and development of a population.

Vital registers are ongoing statistics that gather information on deaths, births, and marriages. For a long time, they were considered of only legal importance; but in recent years, particularly since the Second World War, they have been recognized to have value as a source of statistical data, for social and economic planning, design and evaluation of health programs, population growth policies, family planning programs, and finally, anything related to population policies.

The partial use of the registers reflected unfavorably on their quality and coverage in the majority of developing countries. The biases and limitations that these problems generate have rendered the registers useless. To make up for this deficiency, alternatives have arisen to estimate demographic indicators through retrospective questions on mortality and fertility included in censuses and surveys.

However, the theoretical assumptions upon which these methods are based are not met in some countries, as is the case in Colombia, so they may turn out to be inadequate.

The objective of this article is to point out the importance of death registration as an epidemiological tool, its advantages and limitations, the current status of registration in Colombia, and to make some recommendations for improving its quality.

## **2. Background of death registration in Colombia**

Within the production of ongoing statistics, DANE has established a program for producing data on deaths. But in spite of the importance that variable has as an instrument for analyzing the various phenomena and demographic characteristics of the country, for various reasons it has not been possible to grant such research the priority that would be desirable. One of the principal causes of this is the lack of trained personnel in the health field and hence the lack of knowledge about the handling of mortality statistics. And so the resulting figures have been of average quality, giving rise to problems in the information that cause delays in providing the data.

Mortality statistics serve as indispensable indicators in the evaluation of the health status of the population, which reflects the social, economic, cultural, and environmental conditions in which the population finds itself, and also the quality, efficiency, and impact of related services, programs, activities, and policies.

Because of these considerations, knowledge of the levels and characteristics of mortality in the country becomes relevant to the process of development planning. Based on such knowledge, policies and priorities can be defined, and investments in infrastructure and programs and activities that better address the health needs of the community can be determined.

Until 1968, death registration in Colombia was in the form of a church register, that is, deaths were recorded in the parishes at the time of burial. Beginning in 1969, the civil registration of deaths was created. The collection instrument is the individual death certificate designed according to international standards, especially with reference to cause of death. The latter variable must be certified by the doctor. When there is no doctor, the probable cause of death and other variables such as age, sex, place of death, etc., must be recorded. Such data can be registered by a competent authority (notaries, mayor's office, police and magistrate inspectors). The collection of death information in the country is accomplished primarily by the notaries and the mayor's office; and in exceptional cases, by inspectors and magistrates authorized by the Supervision of Notaries and Registration. Copies are collected monthly by DANE in each of the regions, except in some large cities such as Bogotá and Cali, where there is an agreement between DANE and the Health Departments, under which the latter collect the forms and, before sending them to DANE, they review, code, and record them on tape. Once these steps are completed, they send them to DANE for a second round of review and coding. In the case of Bogotá, an attempt has been made to unify the criteria and procedures relating to these processes, with a view to avoiding duplication of work. Outside of these two particular cases, the processes of collection, review, coding, recording on tape, and eliminating inconsistencies is done totally by DANE.

The National Institute of Health has collaborated with DANE in carrying out some of these tasks with a view to speeding up the availability of the information.

It should be noted that in Colombia there does not exist at this time any training process for the persons who prepare the form, nor even for the medical personnel. Even though this form is identified as a legal document, improper handling does not carry any sanction whatsoever, so the basic data for epidemiological or health analysis are the least reliable.

### 3. Objectives

- 3.1 Demonstrate the importance of research about deaths, in relation to vital statistics, with regard to their applications in the economic and social field and principally in the area of health, in order to understand

public health needs, adopt administrative measures and undertake research with the objectives of organization, planning, and evaluation of medical and health programs. Knowledge of general and specific mortality rates is essential for the execution of programs that fight against disease.

- 3.2 Improve the timeliness and quality of information that is produced.
- 3.3 Initiate a process of consciousness-raising among the organizations or persons who have to do with research, so they will assume responsibilities in face of the situation that reveals itself.
- 3.4 Present the needs of the project, with respect to the phases of training, staffing, evaluation, and supervision.

#### **4. Importance of death registration**

The precursor of current civil registers was the church register. Certificates of marriage, baptism, and burial were filed, and the parishes periodically produced a report of such events. On death certificates, in addition to data about the deceased, the cause of death was noted. When the registers were made official, their legal bases were established and they were decreed obligatory.

In many countries, information for legal purposes is brief and is contained in record books. For statistical purposes, additional data are gathered from an informant and then passed on to the office of vital statistics. In other countries, the legal and statistical forms are combined into a single death certificate, a copy of which is sent to the statistical office.

As a legal instrument, the individual death certificate constitutes proof of death for purposes of burial, cremation, or other method of disposing of the body, and the register for determining life insurance and social benefit claims, inheritance procedures, and adjudication of property ownership. They also provide legal evidence of the right of a surviving spouse to remarry and allow for the updating of such files as social security, voting registers, bank accounts, and lists of persons who have passed away.

As a public health instrument, the death register serves to identify cases of diseases that are the object of (health) surveillance, to measure the magnitude of health problems, to evaluate the programs developed, and to study mortality risk factors. Analyses of death statistics permit the formulation of basic hypotheses to develop specific studies with appropriate methodologies.

## **5. Advantages of death registration**

- 5.1 The greatest advantage of death registration from a public health point of view is that it provides a constant flow of information that makes it possible to identify changes in mortality patterns. Moreover, the availability of a relatively long historical series also allows the identification of recent short-term problems that alter the trend of mortality, since changes are usually gradual.
- 5.2 Registration, given its nationwide scale relating to the entire population, allows for the description of mortality in the country in terms of variables such as age, sex, and race; and even for small geographic subdivisions, thus responding to local planning needs. In countries with high-quality registration, the results are comparable from one region of the country to another, and from one period to another.
- 5.3 The use of international definitions and classifications permits comparisons with other countries.
- 5.4 In many countries, death registration is the only source of information on cause of death. Even in countries with good information on morbidity, data on mortality by cause are frequently used.
- 5.5 The constant flow of data is a permanent base that avoids/eliminates the need to take periodic surveys with their concomitant high costs, possible changes in methodology, and limitations in their levels of disaggregation.

## **6. Limitations of registration**

- 6.1 Low coverage. In most developing countries, access to registration offices is difficult for rural inhabitants. Moreover, there is little motivation and sometimes ignorance about the need for and obligation of registering a death.
- 6.2 Low educational level of the persons who maintain the local register. In addition, such persons receive no training for carrying out their job.
- 6.3 Low educational level of the persons who provide the information. In fact, information is often received from persons who have no education at all, which causes problems with seemingly simple data such as age. In addition, a large amount of required data is left blank on the forms, which limits the possibilities for analysis of the mortality variables.

## 7. Quality of death registration in Colombia

Colombia, as a developing country, is not exempt from the problems noted. Numerous evaluations have shown deficiencies in the various phases of the registration process. The results of these studies have permitted easy checking to be done in certain phases of the process, achieving some improvement in the quality of registration. On the other hand, other phases have been difficult to control, as they require coordination among several institutions, which makes the procedures more complex. The evaluations have been directed at measuring registration coverage and the internal quality and consistency of the registers. The principal results are:

### 7.1 Coverage

There are large differences in the degree of coverage of registration, ranging from departments with extremely deficient registration, such as the Atlantic Region (departments of Atlántico, Bolívar, César, La Guajira, Magdalena, Sucre, and the intendencias of San Andrés and Providencia), where only about 40 of every 100 deaths are registered, to departments with acceptable levels of registration, such as Quindío Risaralda, Caldas, Antioquia, Valle, and the city of Bogotá, with average coverage of 93 percent. However, even in departments where registration is considered to be good, fluctuations are found that are inexplicable from a demographic point of view. The frequency of the phenomenon in all the departments that make up each of the regions demonstrates that registration and collection problems exist, possibly administrative ones, that may affect the analysis of mortality trends.

Probing a bit deeper, it has been found that the zones most affected by poor coverage are the rural areas of Costa Atlántica. It is estimated that only 8 of every 100 deaths there are registered, which means that registration practically does not exist in these areas of the country. This difference between coverage in urban and rural areas limits the analysis, as it turns out that only urban mortality is being described. And even within urban areas, surely mortality that occurs in health-service institutions is different from mortality in general.

The low coverage and lack of timeliness of information from the individual death certificate may be attributed to:

- 7.1.1 Little or no interest on the part of residents of certain regions in complying with registration laws. (In the national morbidity study, it was found that 12 percent of deaths of children under 5 years of age lacked burial permits.)



7.1.2 Possibly, the number of persons, particularly children, who are buried outside of cemeteries, especially in rural areas. (In the national morbidity study, it was found that 23 percent of children under 5 years of age were buried outside a cemetery.)

7.1.3 Internal errors in the process of gathering statistics, among which the following can be mentioned:

- (a) Retention of the forms on the part of the notaries.
- (b) Increased collection costs in remote areas where collection visits have been decreased or suspended.
- (c) It is possible that the majority of deaths occurring but not recorded as a consequence of the above, pertain to rural areas, resulting in an erroneous mortality trend in that area.
- (d) The problem of quality due to the fact that the majority of deaths occur out of hospital or without medical certification of cause of death should also be mentioned.

## 7.2 Internal consistency in the death certificate

The quality and internal consistency in the death certificate have been analyzed in terms of the procedural and coding phases involved, by means of a sample of certificates selected at random. For the procedural steps, the study observed whether or not the information had been recorded, whether it was legible, whether it was incomplete or contradictory. If the information had been recorded, the coding study analyzed whether it had been coded and whether the selected code was in error.

The efficiency of the process was measured by the proportion of certificates that were completed and had no errors of preparation or coding. Review of certificates for 1981 and 1985 indicates that approximately one out of every four forms (25 percent) were prepared and coded correctly. Just as in the case of coverage, the quality varies by region.

Lowest efficiency is in the Atlántica Region, which includes the departments of Costa Atlántica, except for Córdoba, where only 5 percent of forms are correct. Highest efficiency is in the Central Region, which includes Bogotá, Boyacá, Cundinamarca, Huila, Tolima, los Santanderes, Meta, Caquetá, and the Intendencias and Comisariás, where 38 percent are correct. However, even this does not reveal good quality. The most frequent problem in preparation of the form is the omission of information or incomplete information. In coding, it is selecting the wrong code.

The variables most affected in the phases of preparation and coding are cause of death, medical certification, and length of stay in the municipio where the death occurred.

One would think that variables such as year, department, and municipio of death would not be subject to error because they would be obvious to the person preparing the form. Nevertheless, the use of abbreviations, illegible handwriting, and failure to fill in an item cause these variables to have errors in preparation of the form. Variables such as "area of residence of the deceased," "length of stay in the municipio where the death occurred," and "department of usual residence" are often left blank. This problem also affects the "place of death" variable, which refers to whether it occurred in a hospital, clinic, house, or other place. Marital status is usually affected by double entry. This often happens when the deceased was married and separated or widowed, then remarried, etc., and it is not understood which of the marital categories should be entered.

In the case of children and youth, it often happens that instead of registering them as single, which is obvious, they are listed under "other" or the item is left blank.

"Cause of death" is the variable most affected by problems in preparing the form. The complexity of this variable must be recognized, both in recording the item and in coding it. Strictly speaking, according to international standards, it is recommended to enter the illness or pathological condition that directly caused the death, the underlying causes or morbid states, if any, that produced the recorded cause, listing last the basic or fundamental cause. Finally, other significant pathological conditions that contributed to death. For each cause, its duration should be noted. The evaluation covered only the cause (without evaluating its duration), finding that 43 percent of errors in this variable are due to incomplete information and 30 percent to other errors, such as failure to follow the rules for entering the required information or entering contradictory information. Eighteen percent of the errors correspond to items left blank. Illegible handwriting and use of abbreviations account for 9 percent of all errors relating to the "cause of death" variable.

Given the importance of the "cause of death" variable, a follow-up was made of forms with coding errors. The follow-up consisted of selecting the correct cause-of-death code and comparing it to the original one to determine whether the error produced a change of category or change in second, third, or fourth digit (international classification of diseases, basic tabulation list, 1975).

In the analysis of mortality by groups of causes of death, being groups of 56 and 150 causes, errors of category and of second

digit are the most affected. For the analysis of specific causes, any error is serious.

In 1981 it was observed that, for the whole country, almost half of the errors involved change of category, while in 1985 this proportion was only 27 percent, thus showing a large improvement. In the second and third digits, the proportions practically did not change, but in the fourth digit the percent increase compensates for the smaller error at the category level. In summary, in 1981, for the whole country, 72 percent of coding errors for causes were of a serious nature (change of category or of second digit). By 1985, 53 percent of errors were serious, a proportion that is still high but shows an improvement.

The evaluation completed on the basis of certificates for 1981 permitted the identification of a series of problems, some of which fell under the responsibility of DANE, an institution which, with the support of the National Institute of Health, resolved these anomalies. In particular, courses on verification and coding were taught to the DANE officials in charge of these activities. In addition, supervision was increased, which resulted in an improvement, as shown by the figures for 1985.

### 7.3 Entry of data on tape

The process of entering data on tape has not been evaluated systematically, but some irregularities have been found, such as registers being entered twice, a large volume of information that passed the processes of verification and coding but was not entered completely, and errors specific to the process of entering data on tape. The problem lies in the fact that the debugging program does not always detect these errors, and the verification process is costly and, in some cases, should be suspended.

### 7.4 Frequency of deaths whose cause refers to ill-defined symptoms, signs, or morbid states

Every year some deaths have an ill-defined cause, that is, signs or symptoms of illness are mentioned, or the cause is not specified.

The frequency of deaths whose cause is ill-defined is an indicator of the quality of death registration and is associated with the level of development of a country or region, with technological advancements, and with the health care that a population experiences.

The analysis of mortality by cause, through time series data, can be affected by the change in frequency, according to the ill-defined signs, symptoms, and morbid states, which are the abnormal results of laboratory or other investigative procedures

and ill-defined pathological conditions in which a diagnosis was not made that could be classified in any of the other sections. That is, due to progress in the quality of diagnoses, some ill-defined causes can seem to be increasing when actually they are not. The proportion of deaths by ill-defined causes decreased in the country between 1979 (7.3 percent) and 1986 (5.2 percent). The age groups most affected by this problem are 1 to 4 years, 5 to 14 years, and 65 years and over.

#### 7.5 Frequency of deaths with medical certification

Another indicator of the quality of registration is the proportion of deaths that have medical certification, since qualified personnel can describe the cause of death with greater precision. In Colombia, the proportion of deaths with medical certification is around 45 percent, which can be considered rather low. This problem is made worse by the lack of interest on the part of doctors in becoming aware of the necessity of doing this job properly. Moreover, the medical personnel lack training for this specific task; since they are not familiar with the certificate, its details, and the criteria for selecting the proper code, they may omit information of utmost importance. An analysis carried out by the National Institute of Health compared certificates of deaths of women in fertile ages that occurred in institutions with a summary of the corresponding clinical records. The study found that maternal mortality is underestimated by 42 percent due to the failure to mention on the death certificate the complications of pregnancy or delivery or puerperium that underlay the cause that resulted in death. Thus it is imperative to provide instruction to the doctors and other personnel who prepare the certificate with a view to improving the quality.

### 8. Proposals

- 8.1 To improve the quality of registration of the individual death certificate as a statistical instrument, the following actions are proposed:
  - 8.1.1 Through suitable training, sensitize the medical corps, health units, and all other persons who have anything to do with preparing the individual death certificate to the importance of the information requested on the form.
  - 8.1.2 Delegate the responsibility for collecting the information to a single competent organization.
  - 8.1.3 In the face of the shortage of trained personnel in this area, offer training to all the research personnel at all regional levels of DANE, providing courses for reviewing and coding of diseases and causes of death.

- 8.1.4 Maintain continuity of trained personnel for this function.
- 8.1.5 Implement specific controls that guarantee the smooth operation of the project to avoid the loss of material or information.

That is, improve the phases of training, supervision, staffing, and evaluation. All the previously mentioned items would guarantee the obtaining of up-to-date statistics and the improvement of coverage and quality of information. Substantial improvement in the previously mentioned phases would facilitate a better design for the plans regarding public health needs, administrative measures that would permit the undertaking of research with a view to the organization, planning, and evaluation of medical and health programs.

- 8.2 To improve the coverage of death registration: Establish some type of legal sanction for persons and organizations that are obliged to prepare and register the individual death certificate but fail to do so. This sanction should be enforced particularly in rural areas, where it is evident that underregistration of deaths is an acute problem.

## 9. Conclusion

In spite of the problems described and given the undisputed advantages of utilizing the individual death certificate, in contrast with other possible sources of information, one can resort to appropriate adjustment techniques, since registered deaths constitute a large and more or less stable proportion of all deaths, thus deriving a good indicator of the actual behavior of mortality with regard to its demographic and geographic characteristics.

As Colombia is a country experiencing rapid demographic changes, indirect methods for estimating mortality and fertility often are inappropriate. In the specific case of mortality, these methods provide estimates of its level but do not furnish information on cause of death and structure by age and sex. For this reason, death registration is a valuable instrument for the design and evaluation of health programs.

To preserve it and improve it is a task to which the health sector should commit itself, lending support to the institution responsible for providing this type of data to the country. But the health sector should also make direct intervention so that its responsibilities, such as training doctors and sensitizing the health institutions, will be accomplished in ever better fashion and will result in an instrument of high quality.

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