





Death certification in Havana 2017-2021. A problem to be solved

La certificación de defunción en la Habana 2017-2021. Un problema a resolver

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ABSTRACT

Introduction: the certification of causes of death is one of the oldest procedures in medical practice. A correct certification is important for the analysis of health programs. **Objective:** to evaluate the quality of death certification, according to quantification of ill-defined and imprecise causes of death in Havana province. **Method:** the study universe consisted of 129 990 death certificates registered in Havana province with ill-defined and imprecise causes of death in the five-year period 2017-2021 according to the four code groups established by the World Health Organization. A fifth group defined by the Directorate of Medical Records of the Ministry of Health in Cuba was added. **Results:** 129 990 deceased with permanent residence in Havana province were registered. Of these, 8.20% medical death certificates were coded in the groups of analysis, where the highest percentage, 3.8%, belonged to group V. 40.46% of the medical certificates of death that were coded with the causes of death of the groups analyzed corresponded to deaths at home. 70.0% of the coding appropriate to the five study groups were issued by on-call physicians. **Conclusions:** the quality of the certification of causes of death in Havana province during the last five years was evaluated. The coding of ill-defined and imprecise causes of death in medical death certificates tends to increase in the province.

Key words: Mortality, Mortality statistics, International Classification of Diseases and Proceedings-10, Causes of death

RESUMEN

Introducción: la certificación de las causas de muerte es uno de los procedimientos más antiguos que existen en la práctica médica. Una correcta certificación reviste importancia, para el análisis de programas de salud. **Objetivo:** evaluar la calidad de la certificación de defunción, según cuantificación de causas de muertes mal definidas e imprecisas en la provincia La Habana. **Método:** el universo de estudio estuvo constituido por 129 990 certificados de

defunción registrados en la provincia La Habana con causas de muerte mal definidas e imprecisas en el quinquenio 2017-2021 según los cuatro grupos de códigos establecidos por la Organización Mundial de la Salud. Se añadió un quinto grupo definido por la Dirección de Registros Médicos del Ministerio de Salud en Cuba. *Resultados:* se registraron 129 990 fallecidos con residencia permanente en la provincia La Habana. De ellos fueron codificados 8,20% certificados médicos de defunción en los grupos de análisis, donde el mayor porcentaje 3,8% perteneció al grupo V. El 40,46% de los certificados médicos de defunción que se codificaron con las causas de muerte de los grupos analizados, se corresponden con fallecimientos en el domicilio. El 70,0% de la codificación adecuada a los cinco grupos de estudios son emitidos por médicos de guardia. *Conclusiones:* se evaluó la calidad de la certificación de las causas de muerte en la provincia La Habana durante el último quinquenio. La codificación de causas de muerte mal definidas e imprecisas en los certificados médicos de defunción tiende al ascenso en la provincia.

Palabras clave: Mortalidad, Estadísticas de mortalidad, Clasificación Internacional de Enfermedades y Procederes-10, Causas de defunción

INTRODUCTION

The certification of causes of death is one of the oldest practices in the field of medicine. Accurate certification holds great significance, as it serves as the foundation for actions spanning from regional to international levels, aimed at enhancing the quality of life for the population.¹

Mortality statistics play a pivotal role in governance and decision-making, with the indicators developed serving as robust measures of a nation's social, economic, and health progress.² Generally, the quality of these statistics depends on the proper completion of the medical certificate of death (MCD).

Recognizing the significance of this matter, the World Health Organization (WHO) conducts quality studies. The process of certification is evaluated by analyzing the coding of causes of death using the Tenth Revision of the International Classification of Diseases and Related Health Problems (ICD-10).

In a study conducted by Mathers-Colin et al.,³ they establish code groups to assess the quality of certification. This study also includes a global assessment as of the close of official information in the year 2003.

In Europe, Spain stands out in conducting analyses related to the quality of certification and the proper completion of the MCD. The study by Cirera et al.⁴ similarly emphasizes the necessity for the complete filling of all defined fields in the certificate.

In the Americas region, several reference centers for ICD, including Colombia and Peru, study this topic.⁵⁻⁸ In the case of Peru, the study by Soto Cáceres VA⁸ focuses on evaluating the causes of poor certification in the country.

In Cuba, the National Medical Records and Health Statistics Bureau (NMRHSB) of the Ministry of Public Health (MINSAP, by its acronym in Spanish) has assessed the impact on the quality of information.⁹ It is assumed that inadequate certification leads to a misinterpretation of the reality within the healthcare system, potentially resulting in poor healthcare quality.

In December 2022, the NMRHSB conducted a Workshop to update coders in mortality using ICD-10/ICD-11. During this event, an analysis of the quality of certification through the certification of poorly defined causes of death in the MCD, which were not clarified during information processing, was presented.

Studies conducted in Ciego de Ávila,¹⁰ Cienfuegos,¹¹ and Camagüey,¹² indicate a trend in the past twenty years towards an increase in MCDs with coding for the underlying cause of death (UCD). While the percentage increase may not be notably high (0.5%) compared to the baseline year (2001), it has already exceeded 1% in the last five years.⁹

In the province of Havana, there is no published research on this matter. Therefore, the authors propose to assess the quality of death certification, quantifying poorly defined and imprecise causes of death in the province of Havana, over the five-year period from 2017 to 2021.

METHOD

A retrospective longitudinal study was conducted. The study population comprised 129,990 death certificates recorded in the province of Havana for poorly defined and imprecise causes of death during the period from 2017 to 2021.

The codes established by the WHO³ which classifies poorly defined and imprecise causes into four groups were considered. A fifth group was added based on the experience of specialists from the Cuban Center for the Classification of Diseases (CECUCE, by its acronym in Spanish) as defined by the NMRHSB of MINSAP.

Groups of poorly defined and imprecise causes:

- Group I poorly defined: symptoms, signs, and abnormal clinical and laboratory findings not classified elsewhere (R00-R99). The proportion of deaths assigned to ICD codes for "poorly defined symptoms, signs, and conditions" serves as an indicator of coding quality within the registration system.

There are certain ICD codes that do not represent useful underlying causes from a policy perspective. Excessive and inappropriate use compromises the utility of information on the cause of death.

The "garbage codes" include deaths from injuries where:

- Group II external causes: events of undetermined intent and their sequelae (Y10-Y34, Y87.2.)
- Group III cardiovascular disease categories lacking diagnostic significance: I47.2 (Tachycardia), I49.0 (Atrial fibrillation and flutter), I46 (Cardiac arrest), I50 (Heart failure), I51.4 (Unspecified myocarditis), I51.5 (Cardiac degeneration), I51.6 (Unspecified cardiovascular disease), I51.9 (Unspecified heart disease), I70.9 (Generalized and unspecified atherosclerosis).
- Group IV deaths from cancer coded for secondary or unspecified sites: C76 (Malignant neoplasm of other and unspecified sites), C80 (Malignant neoplasm of unspecified site), C97 (Malignant neoplasms of independent (primary) multiple sites).
- Group V, consisting of 26 silent causes, while defining a morbid entity, constitute incomplete causes as they are secondary or primary, and their complications can be considered basic causes of death when used appropriately.

Of these, the seven most frequent in Cuba were analyzed: J182 (Hypostatic bronchopneumonia), L89 (Septic decubitus ulcers), A41 (Generalized sepsis), N17-N19 (Renal failure), I26 (Pulmonary embolism), K920-K922 (Gastrointestinal bleeding), I10X (Arterial hypertension).

Data were obtained from the Mortality Databases of the province of Havana for the years 2017 to 2020 in the definitive version and for the year 2021 in the preliminary version. Statistical processing of the information was performed using Microsoft Excel 2007. The data were summarized in absolute frequencies, indices, and percentages. Tables and graphs were created for data summary and presentation.

Given the ethical implications of analyzing all the information recorded in mortality databases, principles were assumed to guarantee the confidentiality, integrity, and security of the personal information collected. Fields related to the deceased's identity elements, such as identity card number, names, surnames, and exact address, were omitted.

ANALYSIS AND DISCUSSION OF RESULTS

In the past quinquennium, there were 129,990 deceased individuals with permanent residence in the province of Havana.^[13] Upon evaluating the causes of death, it becomes evident that 10,609 of the MCDs were classified within the groups under analysis, accounting for 8.20% of the total. It is worth noting that 9,263 (7.16%) were coded with imprecise or undesirable causes of death (Groups II to V), followed by 1,346 (1.04%) of the MCDs, which were coded with poorly defined causes of death (Group I). See Figure 1.

Notably, there is a significant incidence of causes coded in Group V (26 silent causes), constituting the highest percentage at 3.8% within the years under investigation. This is followed by Group III at 2.5% (categories of cardiovascular diseases lacking diagnostic significance). See Figure 1.

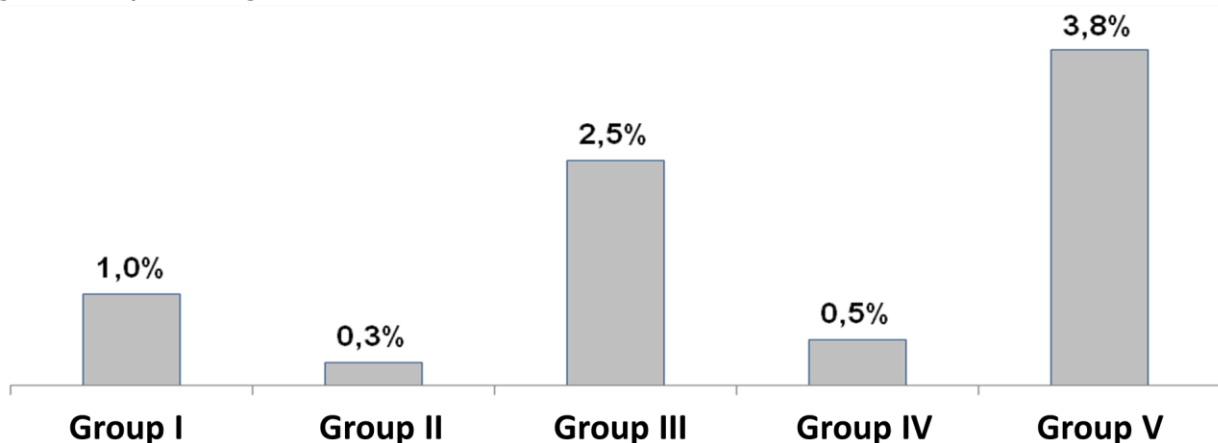


Figure 1. MCDs with Poorly Defined and Imprecise UCDs by Groups. Havana. 2017-2021
Source: Mortality Databases Definitive 2017-2020 and Preliminary 2021

Upon scrutinizing the results of MCDs coded in Group I, the province of Havana yielded a 1.0% prevalence in this category. This figure falls below the national average of 1.4% for deaths coded within this group, as reported by the NMRHSB.⁹

In comparison to studies conducted in other provinces of the country,^{10,11} Cienfuegos had a lower prevalence than Havana, with 0.9% of MCDs coded in Group I, while Ciego de Ávila surpassed the capital by coding 1.6% of MCDs within the specified group.

When assessing the total number of MCDs coded across the five analyzed code groups, a discernible upward trend emerges, signifying an increase in the improper certification of underlying causes of death in Havana. It is important to note that the percentage reported for the year 2021 may be lower due to the database being reported in the definitive version for that year. See Figure 2.

This trend aligns with the findings reported by the NMRHSB.⁹ The analysis presented during the Workshop for the Update of Mortality Coders for ICD-10/ICD-11 revealed a growing trend in the improper certification of underlying causes of death across the entire country.

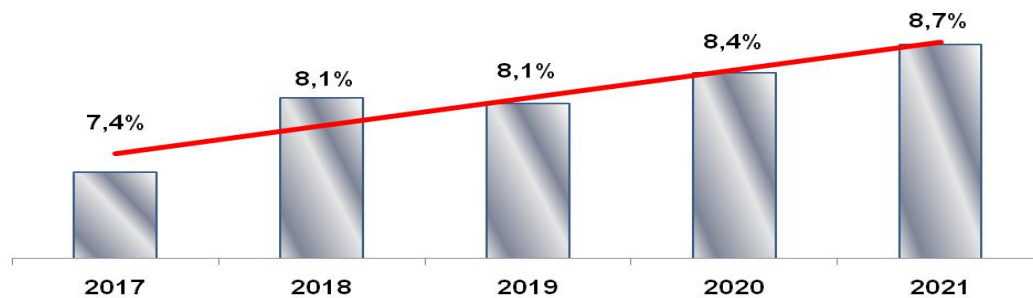


Figure 2. MCDs with Poorly Defined and Imprecise UCDs by Years. Havana. 2017-2021
Source: Mortality Databases Definitive 2017-2020 and Preliminary 2021

When compared to Muedra et al.,¹⁴ at the Italian Hospital of Buenos Aires, this study reflects better outcomes. In the Argentine hospital, it was demonstrated that 19.8% of total deaths were coded with codes associated with poorly defined or imprecise causes of death. Particularly concerning poorly defined causes, the value found in the Argentine hospital is twice the results found in the province of Havana.

Moreover, when analyzing the four groups, it is observed that the trend over the last quinquennium is decreasing. This underscores the negative influence exerted by Group V proposed by CECUCE, contributing an average of 4.5% to the other four groups. Excluding Group V from the analysis alone modifies the trend within the studied timeframe.

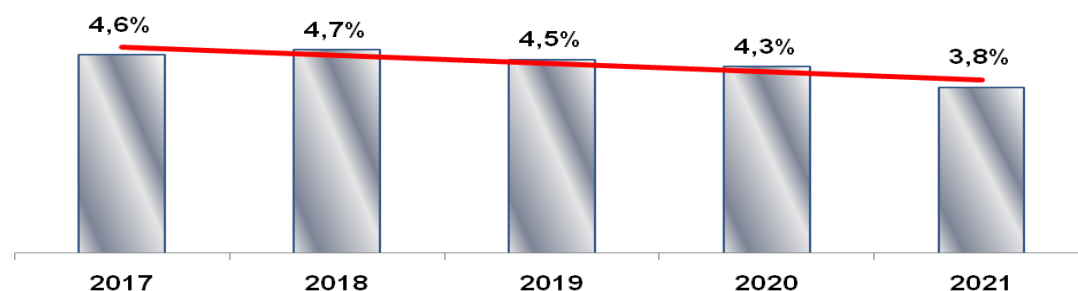


Figure 3. MCDs with Poorly Defined and Imprecise UCDs Coded in Groups I-IV by Years. Havana. 2017-2021
Source: Mortality Databases Definitive 2017-2020 and Preliminary 2021

Table 1 displays MCDs with poorly defined or undesirable UCDs from groups I to IV. The table presents the rate of change concerning the first studied year, selecting it as the reference point (baseline year), and the percentage increase during the analyzed period.

Upon evaluating the results, it is determined that the number of certificates coded with poorly defined or undesirable UCDs increased by 20% in 2021 compared to the baseline year 2017. However, the percentage value of this certification relative to the total number of deaths decreased by 0.8% in 2021.

This result is lower in comparison to the one presented in Chile by Antini¹⁵. In a conference held in 2020 at the School of Public Health of the University of Chile, Antini demonstrated the results achieved in the country by the end of 2016, showing that:

- Poorly Defined Causes: 2,734 (2.6%) deaths correspond to poorly defined causes.
- Imprecise Causes ("garbage codes"): 12,653 (12.3%).

- There are 15,387 (14.8%) deaths where the cause is unknown, and therefore, it is not possible to implement any preventive measures, nor will they be considered in the allocation of healthcare resources.

Table 1. MCDs Coded with Poorly Defined or Undesirable UCDs Belonging to Groups I-IV. Havana. 2017-2021

| Years | Grupo I-IV | | | |
|-------|------------|-------|-----|-------------------------|
| | MCD | No. | % | Rate of change vs. Year |
| 2017 | 23 766 | 1 093 | 4,6 | |
| 2018 | 23 347 | 1 104 | 4,7 | 1,0 |
| 2019 | 23 799 | 1 070 | 4,5 | 1,0 |
| 2020 | 24 914 | 1 079 | 4,3 | 1,0 |
| 2021 | 34 164 | 1 314 | 3,8 | 2,0 |
| Total | 129 990 | 5 660 | 4,4 | |

Source: Mortality Databases Definitive 2017-2020 and Preliminary 2021

When correlating the variable of poorly defined or imprecise causes of death with the place of death, it was found that 40.46% of the MCDs coded with causes of death from the analyzed groups occurred at home, followed by deceased individuals who had been admitted to the hospital. See Figure 4.

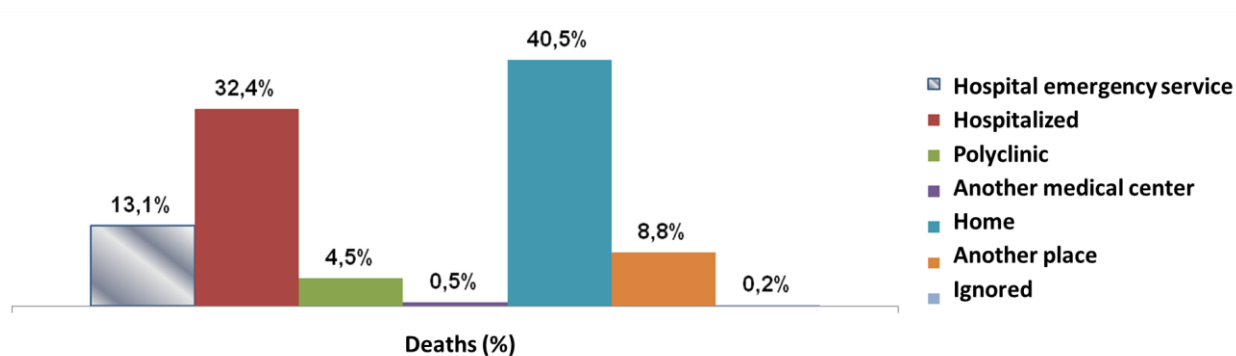


Figure 4. MCDs with Poorly Defined or Undesirable UCDs by Place of Death. Havana. 2017-2021

Source: Mortality Databases Definitive 2017-2020 and Preliminary 2021

It is noteworthy to observe a significant number of deaths in the "hospitalized" category, with their MCDs certified within these code groups. This implies that, despite receiving specialized medical attention, the cause that triggered the sequence of events leading to death could not be determined.

This element serves as an alert for evaluating the quality of medical care provided. In this regard, the value achieved by the province of Havana falls below the national average in Cuba, which, according to the report presented by the NMRHSB,⁹ stands at 51.0%.

Furthermore, 70.0% of the total MCDs coded with groups of poorly defined or imprecise causes of death are issued by on-call physicians, followed by those issued by family physicians, representing 18.5%. See Figure 5.

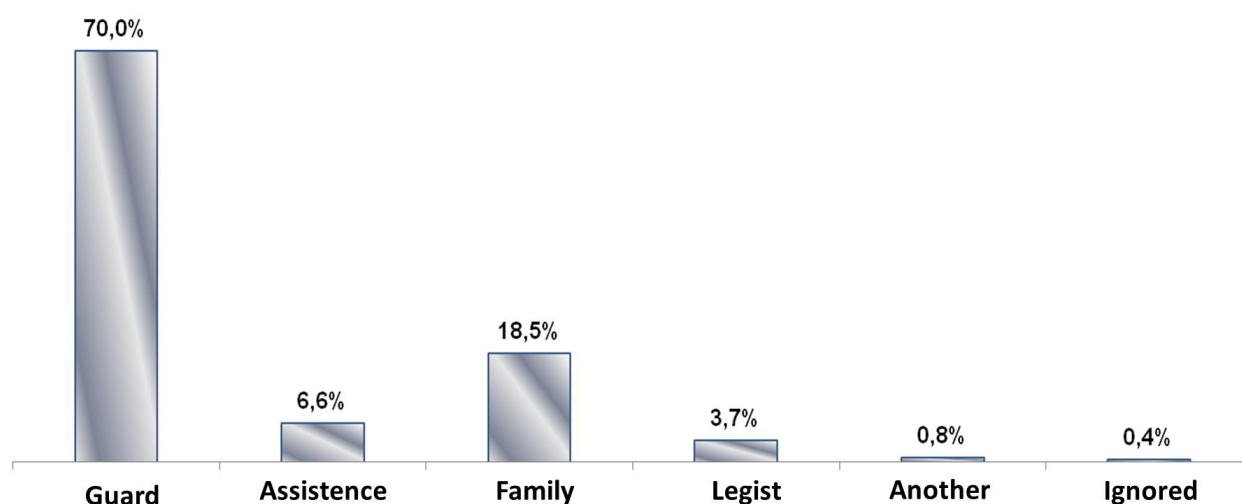


Figure 5. MCDs with Poorly Defined or Undesirable UCDs by Place of Death. Havana. 2017-2021

Source: Mortality Databases Definitive 2017-2020 and Preliminary 2021

In Havana, the results closely resemble those obtained at the national level, where an average of 70.5% of MCDs were certified by on-call physicians and coded with codes from the studied groups.

This contrasts with the findings of Soto Cáceres⁸ in Peru, who concluded that a high percentage of death certificates had poor and inadequate completion quality, particularly for patients treated in Intensive Care Units (ICUs), neonatology, pediatrics, and surgery. Furthermore, the level of knowledge regarding correct death certificate completion was found to be very low, with a lack of understanding of determining the underlying cause of death.

Rodríguez García et al.,⁵ in their research at the San Ignacio University Hospital (HUSI) in Colombia, presented opposing results by demonstrating a very good quality in identifying the underlying cause of death. This was evidenced by the low percentage of useless or "garbage" codes recorded in these two databases.

Other studies do not align with these findings.^{4, 14, 15} Cirera et al.⁴ in Spain concluded that medical certification of death improved in form and suitability. The regulated retrieval of causes and circumstances of death corrected medical and judicial information. The Murcia region had lower rates adjusted for nonspecific causes and poorly defined entities than the national average.

Regarding the quality of certification, there is a consensus on directing efforts within the healthcare team to meet quality indicators. Emphasis is placed on completing the death certificate accurately and following the instructions on the reverse side. Timely requests for clarification are made when poorly defined or imprecise causes of death are detected. Responses to objections or clarification requests from medical records personnel to certifying physicians are provided.

Another significant aspect that will contribute to the quality of death certification is the training of medical records specialists in mortality coding. Nevertheless, the report presented by the WHO³ places Cuba among the 23 countries with complete data in over 90% of MCDs. It determined that poorly defined causes represent less than 10% of the total causes of death.

CONCLUSIONS

The quality of death certification was assessed based on the quantification of poorly defined and imprecise causes of death in the province of Havana. The coding of poorly defined and imprecise causes of death on death certificates tends to increase in the province.

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Daniel José Olazabal Guerra: Conceptualization, Methodology, Software, Writing, Formal Analysis, Supervision, Writing-Review-Editing.

Dayné Leyva Duthil: Research, Data Curation, Validation.

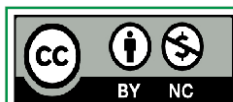
All authors approve the final version of the manuscript.

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CONFLICTS OF INTEREST

No conflicts of interest are declared.



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