Verbal autopsy and the Regional Action Framework on Civil Registration and Vital Statistics in Asia and the Pacific: operational procedures, practices and innovations

Summary

The present information document provides a concise explanation of verbal autopsy and its relevance for Asia and the Pacific. Furthermore, the document presents principles and emerging practices for countries and development partners to consider as they embark on strategies for integrating verbal autopsy into civil registration and vital statistics systems.

The document also suggests options to be taken into consideration by countries as they work to implement the recommendations of the Regional Action Framework on Civil Registration and Vital Statistics in Asia and the Pacific, including on how to set target 3E of the Regional Action Framework stating that “By 2024, at least … per cent of deaths taking place outside of a health facility and without the attention of a medical practitioner have their underlying cause of death code determined through verbal autopsy in line with international standards”.

Finally, the document illustrates the implementation of verbal autopsy on a routine basis within civil registration and vital statistics systems to provide perspectives to the countries which aim to use verbal autopsy by 2024.

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I. Demand for cause of death statistics

1. The coronavirus disease (COVID-19) pandemic has underlined the importance of accurate information on all-cause mortality and causes of death. This information is fundamental in monitoring and mitigating critical health challenges. For example, information on excess all-cause mortality is fundamental to measure the impact of COVID-19 pandemic. Information on causes of death is also central to design and monitor public health policies. Further, the Sustainable Development Goals targets are demanding in terms of causes of death data, requiring countries to generate statistics across multiple causes of death and also disaggregated by factors such as socioeconomic status and geographic area. Health-related Sustainable Development Goals indicators that require cause-specific mortality data include maternal, child and neonatal mortality, mortality from infectious diseases such as HIV/AIDS, tuberculosis, malaria, and neglected tropical diseases, premature mortality due to non-communicable diseases (for example, cancers, cardiovascular diseases, diabetes, mental ill-health), unnatural causes of deaths, including road traffic accidents, occupational accidents, suicide and violence, mortality due to chemical and environmental hazards, and deaths associated with disasters.\(^2\)

II. Information needed to determine causes of death

2. In order to respond to such challenges, every country needs to be able to produce, on a continuing basis and for the whole population and administrations, information on:

   (a) Number of deaths by age, sex, date and place of death;
   
   (b) Causes of death by sex and age group:
       - Deaths due to natural causes;
       - Deaths due to external causes (accidents, violence, self-harm, conflict).

3. There are three approaches to determining causes of death:

   (a) Cause of death is assigned by a physician completing the international form of the medical certificate of cause of death and showing both the immediate cause of death and the sequence of precipitating conditions, including the underlying cause of death. The underlying cause of death is the cause that initiated the sequence of events leading to death. It may have its origins months or years prior to death; for example, a person may have cancer for several years before the death occurs. The underlying cause of death is of particular importance from a public health perspective because it is amenable to specific preventive action and clinical management. If the underlying cause of death cannot be determined from the medical certificate of cause of death alone, it may be necessary for a pathologist or medical examiner to perform a clinical autopsy. The information contained in the medical certificate of cause of death is subsequently coded to a statistical category in line with the International Classification of Diseases, currently in its 10th revision. In May 2019, the 11th revision of the International Classification of Diseases was adopted by the seventy-second World Health Assembly; the 11th revision comes into effect on 1 January 2022.

(b) In cases where an initial assessment concludes that a death was likely due to external causes, such as accident or intentional injury (homicide, suicide), the accurate determination of cause of death may require a medico-legal enquiry and the coroner may request a forensic autopsy to help identify the manner and cause of death and also to determine responsibility and intent.

(c) **Verbal autopsy** is needed when death occurs outside of a health facility and without the attention of a medical practitioner. This is the only method for ascertaining cause of death when a medical expert is not available to medically certify the cause of death. Cause of death derived from verbal autopsy is used to generate statistics on cause of death distributions in the community, not to ascribe a cause at the individual level.

### III. What is verbal autopsy?

4. The impetus for the development of verbal autopsy is the fact that a majority of the 60 million annual global deaths take place outside of a health facility and without the attention of a medical practitioner. Drawing on information collected from family members or caregivers of the deceased, the verbal autopsy method can generate information on causes of deaths for non-facility deaths and enable government stakeholders and scientists to analyse disease patterns and direct public health policy decisions.

5. Verbal autopsy is a non-clinical method of gathering information about symptoms and circumstances of a death to determine cause. It consists of conversations or interviews, using a structured questionnaire, with family members or caregivers for the deceased to elicit a description of the events, signs and symptoms prior to death. Verbal autopsy interviews are commonly conducted by frontline health or community-based workers. Interview responses are analysed by health professionals (physician certified verbal autopsy) or, increasingly, using automated algorithms (automated verbal autopsy) to assign probable cause(s) of death.

6. Verbal autopsy implementation consists of:

   (a) A process for the civil registration of community deaths with the option of adding verbal autopsy to generate cause of death statistics;

   (b) Efficient business processes, including the roles and responsibilities of all verbal autopsy system actors, that are fully integrated into the operational architecture of both the health and civil registration and vital statistics systems;

   (c) A verbal autopsy interview;  

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4 A verbal autopsy interview is a series of structured questions on the key demographic characteristics of the deceased, as well as at the signs and symptoms experienced by the deceased (and their duration) in the period before death. Some instruments also contain an open-ended question for the respondent to elaborate on what happened to the deceased in their own words.
(d) A validated (automated) coding algorithm for assigning the most probable cause to each individual death;\(^5\)

(e) A target cause-of-death list allowing for the verbal autopsy-determined cause to be classified according to the International Classification of Diseases;

(f) A means for compiling both summary and disaggregated cause-specific mortality fractions at the population level.

7. Verbal autopsy generates useful cause-of-death information at the population level, i.e. cause-specific mortality fractions. However, verbal autopsy cannot generate the level of detail of cause of death information that is produced when a physician medically certifies the cause of death for an individual. Thus, verbal autopsy can produce cause of death distributions for the leading causes of death by sex and broad age-group in a given setting, generally the 20–30 leading causes.

8. Moreover, verbal autopsy is less reliable than medical certification for ascertaining cause of death on an individual basis. It is not, therefore, recommended that the individual cause of death generated from verbal autopsy be included in a death certificate. Causes of death ascertained using verbal autopsy cannot be used for legal purposes, which require more rigorous medical certification of cause of death.

IV. Importance of verbal autopsy in Asia and the Pacific

9. In Asia and the Pacific, as part of the midterm review for the Asia and Pacific Civil Registration and Vital Statistics Decade (2015–2024), 22 countries declared recording a medically certified cause of death for all deaths taking place in health facilities or with the attention of a medical practitioner. Ten of these countries are effectively recording a cause of death for all deaths. In addition, four record causes of deaths for 80 per cent to nearly 100 per cent of deaths taking place in health facilities or with a medical practitioner in attendance, while nine record causes of deaths for less than 80 per cent of deaths taking place in health facilities or with a medical practitioner in attendance.

10. Nevertheless, many deaths in Asia and the Pacific are not taking place in a health facility or with the attention of a medical practitioner. Indeed, in at least 11 countries more than 50 per cent of deaths are not recorded by the health sector and thus without a medical certificate of causes of death. The lack of information about these deaths hampers the development of public health policies adequately responding to the needs of the population. Verbal autopsy can be used to determine their cause(s).

11. In 2020, at least 13 countries in Asia and the Pacific were using verbal autopsy. Its use varies depending on the country. Bangladesh, Indonesia, and India have integrated it in their sample registration system, which are sample enumeration systems that do not involve civil registration of deaths. Furthermore, Bangladesh is also integrating verbal autopsy into its civil

\(^5\) In the past, the responses were reviewed by one or more physicians in order to determine the probable cause of death. However, this is time consuming and a poor use of physician time. Recently, automated methods have been applied to determine the cause of death from the received responses without the need for a physician. Automated methods have the advantage of speed and reduce the burden on physicians who are generally required to prioritize their clinical responsibilities over other activities. The automation also guarantees reproducibility and remove inter-physician variability.
registration and vital statistics system as part of the scale-up of the “Kaliganj Model” - where front-line health workers support families in the civil registration of vital events. Verbal autopsy is also sometimes used in sample surveys to investigate specific causes deaths such as maternal mortality. These sample surveys are not linked to the civil registration and vital statistics system but are stand-alone activities within the health sector. In 2015, as part of the implementation of the Regional Action Framework on Civil Registration and Vital Statistics (see below), 14 countries had set a target to use verbal autopsy by 2024. However, due to the COVID-19 crisis more countries have recently expressed interest in implementing verbal autopsy. In response to country requests, a set of questions to identify COVID-19 deaths has been included in the most recent version of the World Health Organization (WHO) verbal autopsy instrument. The questions standardize and align questions proposed by different initiatives with the WHO definition of death due to COVID-19 and the underlying case definition for surveillance of COVID-19. Use of verbal autopsy in the identification of COVID-19 deaths, can fill a critical gap in measuring the mortality from COVID-19 for deaths which occur outside of a healthcare setting.

V. Implications of verbal autopsy for the Regional Action Framework

12. Due to the importance of verbal autopsy for the region, the Regional Action Framework on Civil Registration and Vital Statistics in Asia and the Pacific includes target 3E stating that “By 2024, at least … per cent of deaths taking place outside of a health facility and without the attention of a medical practitioner have their underlying cause of death code determined through verbal autopsy in line with international standards.” Various targets have been proposed, such as 50 per cent or 80 per cent of community deaths with verbal autopsy. However, these suggestions were proposed before evidence from country experiences in the routine implementation of verbal autopsy in civil registration and vital statistics systems became available and before scientific approaches to the conducting verbal autopsy on a sample of the population were developed. For example, in countries with large populations, which may have over 500,000 deaths annually, conducting verbal autopsy on even 50 per cent would be a major undertaking, imposing significant costs and burdens on community health workers, supervisors, families and communities. Experience from several countries shows that a single community health worker could absorb the additional work involved in conducting up to three verbal autopsies monthly, bearing in mind that in many instances the community health worker has to make more than one visit to be sure of finding the family available for the verbal autopsy interview.

13. The revised Regional Action Framework monitoring guidelines propose that “Rather than aiming for 100 per cent, the ideal target for this indicator should be high enough to ensure that verbal autopsies are conducted on a sample of a sufficient size to be representative of deaths that occur in the absence of a medical practitioner.” This means that countries should establish a minimum sample size of deaths outside medical facilities for verbal autopsy to generate a nationally representative distribution of causes of death.

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14. In support of this, it is important to demonstrate that verbal autopsy does not stand alone. Rather, it should be implemented within a broader context of civil registration and vital statistics strengthening. The overall aim should be universal death registration, medical certification of cause for all deaths that occur in the presence of medical care, and verbal autopsy for a nationally representative sample of registered deaths occurring without medical care. This would be aligned with the current targets 1D and 3D of the Regional Action Framework on the registration of deaths and the reduction of deaths coded to ill-defined codes.

VI. Integrating verbal autopsy into civil registration and vital statistics systems

15. The implementation of verbal autopsy within national civil registration and vital statistics systems will vary depending on local governance arrangements and health and civil registration and vital statistics system structures. A typical or generic sequence of events is shown below and illustrated in the figure:

(a) A person dies, outside a health facility with no medical certificate of cause of death. A community agent collects essential information (name, age, sex, date and place of occurrence);

(b) The community agent shares the information with a supervisor who checks for accuracy and to avoid duplications; the community agent or their supervisor share the information with the local civil registrar;

(c) The community agent also assists the family to declare the death in person to the civil registrar if legally required to do so;

(d) If the death occurs in an area identified for verbal autopsy sample implementation, the community agent makes an appointment with the family to conduct a verbal autopsy interview following an appropriate mourning period;

(e) The registrar assigns a registration number, registers the death in the system and provides a death certificate and/or burial permit to the family;

(f) The registration number is stored in the civil registration and vital statistics database and incorporated into the verbal autopsy questionnaire on the tablet. The contact details of the family and on the decedent are prepopulated in the verbal autopsy questionnaire;

(g) The interviewer conducts the verbal autopsy interview using the tablet after the mourning period;

(h) The verbal autopsy responses are uploaded to a central server for analysis using automated algorithms;

(i) The results are included in the cause of death database in the form of cause-specific mortality fractions;

(j) Cause specific mortality fractions are reviewed for plausibility and quality assessment and used for the production of vital statistics.
Verbal autopsy implementation scenario

16. Successful integration of verbal autopsy within civil registration and vital statistics is dependent on close collaboration between the health sector, particularly primary health care and the civil registration system. The integration of verbal autopsy into routine civil registration and vital statistics systems should consider some key principles:

(a) Civil registration of all deaths in health facilities with physicians’ assignment of cause of death by way of medical certification of cause of death;

(b) Complete civil registration of all deaths occurring outside health facilities with information on age, sex, date of occurrence and location;

(c) A nationally representative sample of deaths occurring outside health facilities have probable underlying cause of death determined through verbal autopsy in line with international standards.

17. Implementation guidance and tools are available, covering key issues and addressing systemic issues in relation to the collaboration between health and civil registration and vital statistics systems; including, for example:

(a) Identifying and convening key stakeholders across sectors;

(b) Reviewing the legal framework within which verbal autopsy and civil registration and vital statistics function;

(c) Establishing coordination and oversight mechanisms;

(d) Conducting analyses of business processes for civil registration and vital statistics and the inclusion of verbal autopsy-based data collection therein;

(e) Translation and adaptation of verbal autopsy instruments and analytic tools;

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(f) Defining analyses, reporting formats, and information flows that facilitate information sharing across health, civil registration, vital statistics and national identification systems;

(g) Organizing and managing human resources for verbal autopsy, including training and capacity development;

(h) Establishing coordination and oversight structures;

(i) Setting up monitoring and evaluation mechanisms;

(j) Addressing and managing information technology implications of automated verbal autopsy including data security, and;

(k) Ensuring individual privacy and confidentiality of data.

18. The WHO 2016 verbal autopsy manual and questionnaire has an implementation support package including guides for interviews, trainers, and planners. Guidance is also available on specific operational issues including costing and budgeting for verbal autopsy and approaches to sampling so that verbal autopsy cause of death distributions are representative of the total population and the country administrative structures.

VII. Conclusion

19. Verbal autopsy is critical to providing information on deaths taking place outside health facilities and without the attention of a medical practitioner. Verbal autopsy should be conducted on a sample of a sufficient number of deaths to be representative of these out of facility deaths to generate a nationally representative distribution of causes of death. However, it is not necessary to use verbal autopsy on all deaths taking place outside health facilities and without the attention of a medical practitioner. Indeed, the overall aim should be universal death registration, medical certification of cause for all deaths that occur in the presence of medical care, and verbal autopsy for a nationally representative sample of registered deaths occurring without medical care. Target 3E of the Regional Action Framework on the percentage of deaths taking place outside health facilities and without the attention of a medical practitioner which have their underlying cause of death code determined through verbal autopsy in line with international standards, should therefore reflect this aim.

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