

# Summary: Integrating verbal autopsies into CRVS systems

This *CRVS summary* is edited from 'Integrating community-based verbal autopsy into CRVS: System-level considerations', a Global Health Action article available [here](#).

## Strengthening civil registration and vital statistics systems

It has long been advocated that better health outcomes are created in countries with strong civil registration and vital statistics (CRVS) systems because:

- Accurate birth and death statistics – including cause of death (COD) data – from reliable and complete CRVS systems are key for policy and planning.<sup>1</sup>
- Vital statistics are the most cost-effective source of continuous data on births and deaths.
- Accurate, real-time statistics on mortality and COD are essential for countries to plan and respond to emerging health threats and epidemics.
- Vital statistics disaggregated by factors such as area of residence, gender, disability, ethnicity, indigenous status and age can support countries to fight health inequities.<sup>2</sup>
- Birth certification is a human right, and facilitates access to education, identity and passport documentation, bank accounts, public health insurance, and medical and other allied health care services.<sup>3</sup>

Although vital statistics can be produced from other data sources (such as censuses, household surveys and demographic surveillance sites), vital statistics from complete civil registration systems are better than sampled data because they provide continuous, timely information that is regionally and nationally representative, allowing informed local-level decision-making.

## Mortality statistics and verbal autopsy

Most deaths in low- and middle-income countries occur away from health facilities and without physicians available to certify the death. This means that the majority of national mortality statistics for such countries are derived from hospital-based deaths. Because this information does not cover the whole population – or even most of the population – it is a biased sample. Verbal autopsy (VA) was developed to determine probable cause of death data by gathering information about the signs and symptoms experienced by the deceased prior to death (**Box 1**).

### Box 1: What is verbal autopsy?

VA is a method for collecting information about an individual's signs and symptoms before their death from their family or next of kin, and interpreting these to diagnose the likely or most probable COD. VAs are short, structured and retrospective interviews, generally with family members of the deceased. They are the only practical option for assessing COD patterns in communities where the majority of deaths occur outside of health facilities. VAs can also be applied for deaths in health facilities with limited diagnostic capability, or if the deceased arrived at the hospital already dead or died very soon after admission.

Conducting a VA is important for a number of reasons. People who die in the hospital often have different causes of death than those who died at home or in the community. This is because factors such as wealth, education, and living in an urban area can influence the likelihood of a person visiting the hospital. Wealthy people die of different causes than their poorer counterparts. Deaths due to road traffic accidents are more likely to occur in the community, as opposed to obstructed labour deaths, which are more likely to occur in hospital.<sup>4</sup> Therefore, relying on hospital-based cause of death data does not paint a full picture of a country's disease burden.

1 Phillips DE, AbouZahr C, Lopez AD, et al. Are well functioning civil registration and vital statistics systems associated with better health outcomes? *Lancet* 2015; 386:1386-1394.

2 Shibuya K, Boerma JT. Measuring progress towards reducing health inequalities. *Bulletin of the World Health Organization* 2005; 83:16.

3 Brito S, Corbacho A, Osori R. Does birth under-registration reduce childhood immunization? Evidence from the Dominican Republic. *Health Economics Review* 2017; 7:14.

4 Murray CJ, Lopez AD, Barofsky JT et al. Estimating population cause-specific mortality fractions from in-hospital mortality: validation of a new method. *PLoS Medicine* 2007; 4:e326

It is important that countries ensure all deaths are captured, and that home or community-based deaths do not go unreported. This is especially true for generating accurate and reliable mortality data. In countries wanting to improve their CRVS systems, VA is the only practical alternative to medical certification of cause of death, particularly in communities where a large proportion of deaths occur outside of health facilities.<sup>5</sup> The main purpose of verbal autopsy is to describe the leading causes of death by estimating cause-specific mortality fractions in a population. This information can be used to guide health planners and policy-makers to improve the health situation of a country.

Potential users of information generated through VA include communities, healthcare managers, researchers, global decision-makers and donors.<sup>6</sup>

## Integrating verbal autopsy into CRVS systems

Various systems integration issues will need to be carefully addressed during planning, piloting and implementation when introducing VA into settings with limited resources.<sup>7</sup> Sustainable integration of VA into CRVS systems is more than just a technical challenge. When developing CRVS-VA implementation plans, countries will need to consider integration issues in each of the following five areas.

### Governance issues

Many actors, institutes and interests are at the cross-section of the collection and production of complete and reliable vital statistics. Developing a **high-level CRVS committee** can help countries overcome many of the governance challenges that can arise. In some settings, it may be useful to establish a specific **sub-committee on mortality and cause of death**. Such committees can deal with the legal, design, operational, technical and systems issues with CRVS-VA integration, by:

- Reviewing the legal framework.
- Developing a detailed VA integration plan.
- Making budget recommendations.
- Determining how COD data from VA will be integrated with COD data from hospitals.
- Monitoring and evaluating all phases of VA integration into the CRVS system.

5 Sankoh O, Byass P. Time for civil registration with verbal autopsy. *The Lancet Global Health* 2017; 2:e693-e694.

6 Byass P. Who needs cause-of-death data? *PLoS Medicine* 2007; 4:e326.

7 Shibuya K, Boerma JT. Measuring progress towards reducing health inequalities. *Bulletin of the World Health Organization* 2005; 83:16.

## Design and operational issues

### Integrating processes

Process mapping – the mapping of all major steps and procedures in the CRVS system, including the flow of information between actors – is a critical first step when planning for the integration of VA.<sup>8</sup> Process mapping gives stakeholders a common understanding of the current system and its activities, and facilitates the development of an agreed vision of how VA could best be integrated into the CRVS system.

### Sampling strategies

Countries will need to consider operational and budgetary constraints in upscaling CRVS-VA implementation. Ideally, VA systems should cover all deaths that occur at home or in the community. However, budget constraints may dictate that scale-up instead aims to cover a nationally representative sample. It is important that a nationally representative sample is drawn,<sup>9</sup> and that VA data can be integrated into the CRVS system. Countries may wish to use civil registration administrative units to identify the sample, to facilitate data administration.

### Notification

The starting point for integrating VA will be consideration of the current processes for declaring or notifying deaths in the community. Currently, this is a passive step in most communities.<sup>10</sup> However, identifying households that have experienced a death, and subsequently administering a VA will need to become an active step.

Countries will need to evaluate different methods of a more active reporting system, such as notification of death to the civil registry by village chiefs, community volunteers and health workers. In a system where reporting is enforced, the notification of a death can initiate the scheduling of a VA and, if desired, the official registration of death. Regardless, it is important that there is a clear process for linking COD from the VA to the death record in the CRVS system.

8 de Savigny D, Cobos Muñoz D. *Understanding CRVS systems: The importance of process mapping*. CRVS development series. Melbourne, Australia: Bloomberg Philanthropies Data for Health Initiative, Civil Registration and Vital Statistics Improvement, The University of Melbourne; 2018.

9 The Swiss Tropical and Public Health Institute, as part of the BD4H Initiative, is developing a VA sampling tool

10 de Savigny D, Cobos Muñoz D. *Where there is no physician: Improving the notification of community deaths*. CRVS technical outcome series. Melbourne, Australia: Bloomberg Philanthropies Data for Health Initiative, Civil Registration and Vital Statistics Improvement, The University of Melbourne; 2018.

### *VA interview interpretation*

In many countries, the only legally-recognised source of COD data is from deaths that have been medically certified by a physician. As such, a legal and regulatory review may be required as a first step in CRVS-VA integration.<sup>11</sup>

## **Human resource issues**

Introducing VA into a CRVS system will require additional human resources, as well as expanding the duties of existing employees. It is expected that, as the more active reporting of community deaths scales up, the workload of the existing staff entering notifications into the system will increase. Furthermore, although key informants in the community may be volunteers, other staff will need to be remunerated. All staff will need to be trained and supervised; additional costs should be considered for the development of job descriptions, training plans and training materials for new staff.

## **Financing issues**

For planning, human resource allocation and investment purposes, countries will want to know the estimated costs of integrating and maintaining routine VA in CRVS systems.<sup>12</sup> This information is also key to developing a business case for VA implementation. Cost drivers may include training, information technology infrastructure, and the remuneration and supervision of VA interviewers.

## **Infrastructure and logistics issues**

### *Data and information technology systems*

Responses to the VA interview are best captured digitally in a mobile tablet; this helps to ensure quality, decrease the time taken to transfer the data for analysis, and reduce the cost of data entry.

As countries increasingly use automated VA data collection methods, they will need to consider how mobile devices will link to servers, either locally or nationally. They also need to consider whether those servers exist in the various and requisite locations around the country. To assist countries in this regard, a CRVS digitisation guidebook has been developed by the UN Economic Commission for Africa.<sup>13</sup>

Countries will also need to address how mobile devices will be supported, updated and maintained, and how data will

be securely stored, transmitted and received. In addition, data will need to be collated and delivered to the responsible reporting agency in a timely fashion. IT and logistical skills for these functions are often not available, so it is important that these roles have personnel dedicated specifically to them.

### *Access to data*

There are already important legal and ethical considerations in regard to COD data in CRVS systems.<sup>14</sup> A legal and regulatory review is important for planning VA integration. The review could designate who has the right to access VA data, and outline the necessary encryption needs for data transmission, as well as server security and access protocols. Although challenging, data management and security are of the utmost importance and should be given due attention.

## **Quality assurance**

### *Monitoring and evaluation*

Integration of VA into CRVS systems is a complex undertaking, with many system-wide considerations. Therefore, monitoring and evaluation, and data quality assessment and assurance are critical for maintaining a well-functioning CRVS-VA system. **Figure 1** describes a monitoring and evaluation cycle for integrating VA into CRVS.

A small number of key indicators should be developed to monitor and evaluate each discrete stage.

### *Data quality assessment and assurance*

Measures should be put into place at various stages of the collection and production cycle of vital statistics. Reviewing process maps for the generation of vital statistics is an important first step to identify places where data quality checks should be put into place. At the first stage where a death notification is generated and a VA is administered, data quality checks should focus on accuracy and completeness of the individual record. As the data become aggregated and move down the line to the agency responsible for reporting vital statistics, the data quality focus will be on accuracy, consistency and plausibility of the data.

<sup>11</sup> Schwid A, Frederes A, Bronson G, et al. *CRVS legal and regulatory review tools and methodology*. New York, USA: Vital Strategies and Global Health Advocacy Incubator; 2018.

<sup>12</sup> The Swiss Tropical and Public Health Institute, as part of the BD4H Initiative, have developed a course and guidance materials on a VA costing tool. More information is available at <https://crvsgateway.info/courses>

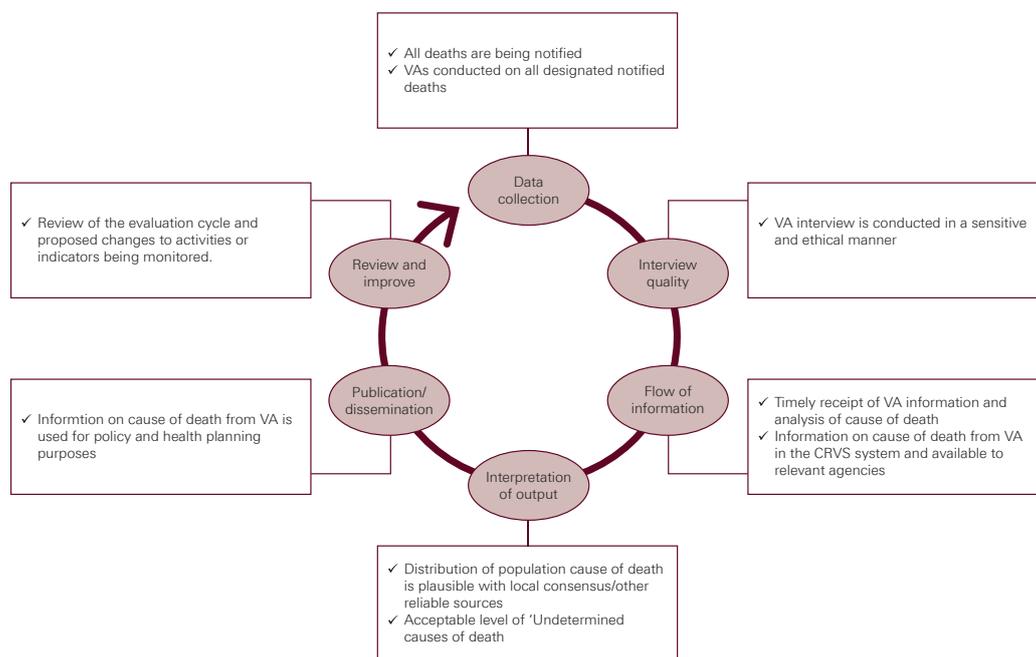
<sup>13</sup> Available at <http://www.crvs-dgb.org/en/>

<sup>14</sup> Gouda HN, Flaxman AD, Brolan CE, et al. New challenges for verbal autopsy: Considering the ethical and social implications for verbal autopsy methods in routine health information systems. *Social Science and Medicine* 2017; 184:65-74.

Registration and the production of vital statistics are often the responsibilities of different government agencies. As both these activities are not under the purview of a single agency, inconsistencies can arise. When registered vital events are not all included in vital statistics, the quality of the vital statistics suffers due to under-reporting.

Having clearly defined procedures and process maps can alleviate some of these issues. By reviewing process maps – and introducing monitoring and evaluation processes at appropriate steps – or auditing vital event logs, under-reporting can be identified and addressed.

**Figure 1 Example of a monitoring and evaluation cycle for verbal autopsy (VA) in civil registration and vital statistics (CRVS)**



Source: Adapted from de Savigny D, Riley I, Chandramohan D, et al. Integrating community-based verbal autopsy into civil registration and vital statistics (CRVS): system-level considerations. *Global Health Action* 2017; 10:1272882.

## Summary

Complete and reliable data on deaths by age, gender, and cause of death is necessary for monitoring the health and development of a population. However, less than one-third of deaths have an assigned cause. While the accepted standard for determining cause of death is medical certification by a physician, for many countries this is an impossible task, given the large number of deaths that occur away from health facilities, and without an attending physician.

Verbal autopsy offers a practical alternative to generate cause of death statistics in such settings. Integrating verbal autopsy into civil registration and vital statistics systems is critical for its sustainability, and will require careful consideration of a number of issues. These issues, as discussed above, have also been developed into a **planning checklist of system-level considerations**.

## Planning checklist of system-level considerations for verbal autopsy (VA) integration into civil registration and vital statistics (CRVS) systems

- Ensure that a high-level National CRVS Policy and Coordination Committee is in operation
- Ensure that the relevant authorities, agencies or ministries for civil registration, statistics, local government and health and are engaged collectively for CRVS
- Ensure that a Comprehensive CRVS Assessment has been conducted in the past 4 years and has been used to develop a national CRVS vision and strategy or is being planned
- Set up a National Sub-committee on Mortality and Cause of Death
- Establish a task force for VA implementation reporting to the National Sub-committee on Mortality and Cause of Death
- Ensure that detailed process mapping of CRVS processes for registration of death in health facilities and death in communities has been done as part of the comprehensive assessment, and if not, prepare such process maps
- With all relevant stakeholders, use these process maps of notification and registration processes of death in the community as a base to develop the plan of implementation for how VA would be integrated into a modified set of processes
- Prepare an investment case to justify using VA as a method to increase notification and registration of deaths and ascertain underlying cause of death
- Consider a legal and regulatory review of the implications of VA in CRVS as an early step in the plan
- Apply the enterprise architecture Digital CRVS Guidebook to assess the additional IT needs (<http://www.crvs-dgb.org/en/>)
- Map the existing CRVS and DHIS2 IT infrastructure and its gaps
- Seek synergies with existing IT for population registration efforts (i.e. National Identification agencies)
- Determine how mobile tablets will be supported, maintained and securely transmit/receive data (wireless, General Packet Radio Service, etc.)
- Design data flow and quality assurance mechanisms
- Ensure that e-governance, interoperability, data security, confidentiality, and data encryption issues addressed
- Decide how VA-coded deaths will be distinguished from medically certified deaths in aggregate databases
- Decide on scale (sample system or full coverage) and phased introduction
- Use a VA costing tool to develop the start-up and annualized budgets
- Prepare a profile of the existing CRVS human resources and needs
- Develop job descriptions, training plans and training materials for new and revised positions
- Plan for an increase in the workload for existing staff
- Consider adding VA functions to existing position descriptions of community workers
- Develop a training programme for Master Trainers, Trainer of Trainers, and training of VA supervisors, interviewers and analysts
- Prepare a monitoring and evaluation plan for the new VA processes, including the use of VA costing tools to document costs and an independent quality assurance mechanism
- Work with stakeholders to develop a learning platform for phased introduction and assemble necessary funding

The program partners on this initiative include: The University of Melbourne, Australia; CDC Foundation, USA; Vital Strategies, USA; Johns Hopkins Bloomberg School of Public Health, USA; World Health Organization, Switzerland.

Civil Registration and Vital Statistics partners:



**The University of Melbourne recognises the Swiss Tropical and Public Health Institute for their partnership and contribution**



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