

Summary: Understanding the VA Costing and Budgeting Tool

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This *CRVS summary* is edited from 'Developing a verbal autopsy costing and budgeting tool', a CRVS technical outcome series paper available at <https://crvsgateway.info/file/8420/2594>

Verbal autopsy for cause of death

Reliable mortality statistics, particularly on leading causes of death in a population, are important for the development of public health policy, resource allocation and future planning. This information would ideally come from medically certified cause of death (COD) data, in line with international standards developed by the World Health Organization.¹ However, in many low and middle-income countries deaths often occur in settings where this is very difficult to achieve (eg at home or in remote health centres). In such settings, a verbal autopsy (VA) can provide a probable or likely COD.

VA is an indirect method of estimating COD. It is, essentially, an interview of families and caretakers of the deceased conducted to gather information about the signs, symptoms and circumstances before the death of the individual, which together can be used to generate a probable COD. As an epidemiological tool VA has been used to estimate cause-specific mortality fractions in settings where medical certification of COD is not feasible.²

VA has been successfully used in research studies in many low and middle-income countries.³ In line with the global push to improve civil registration and vital statistics (CRVS) systems there is growing interest in expanding the use of VA for COD as a routine part of community-level CRVS systems.

Understanding the cost of routine verbal autopsy

Integration of VA into existing CRVS systems is a worthwhile, but usually complex undertaking. Globally, despite increasing interest in the idea, VA is yet to be routinely incorporated into CRVS systems anywhere (except in Brazil).⁴ This is thought to be at least partly due to a lack on information on the costs of incorporating VA into existing systems.

As part of the D4H Initiative, the Swiss Tropical and Public Health Institute, University of Basel, with support of the University of Melbourne, developed a VA Costing and Budgeting Tool ('VA Costing Tool'). This tool aims to:

- Assist those making VA budgets by providing detailed items to include
- Determine actual financial and economic costs per VA obtained, once countries start implementing VA
- Model costs in alternative implementation scenarios, including changes in economic costs.

The VA Costing and Budgeting Tool

The VA Costing Tool can be customised to the country context and covers all aspects of a VA system. The collection and analysis of VA cost are based on six activity groups:

1. Start-up activities
2. Governance activities
3. Program management
4. Supervision
5. Refresher training
6. VA delivery and analysis.

The VA Costing Tool produces the following **outputs**:

- Total program costs for baseline year by activity and input type
- Average costs per VA
- Key costs drivers.

The VA Costing Tool is a single Microsoft Excel® file (.xlsx). It is organised in three main sections: costing, budgeting and modelling (**Figure 1**).

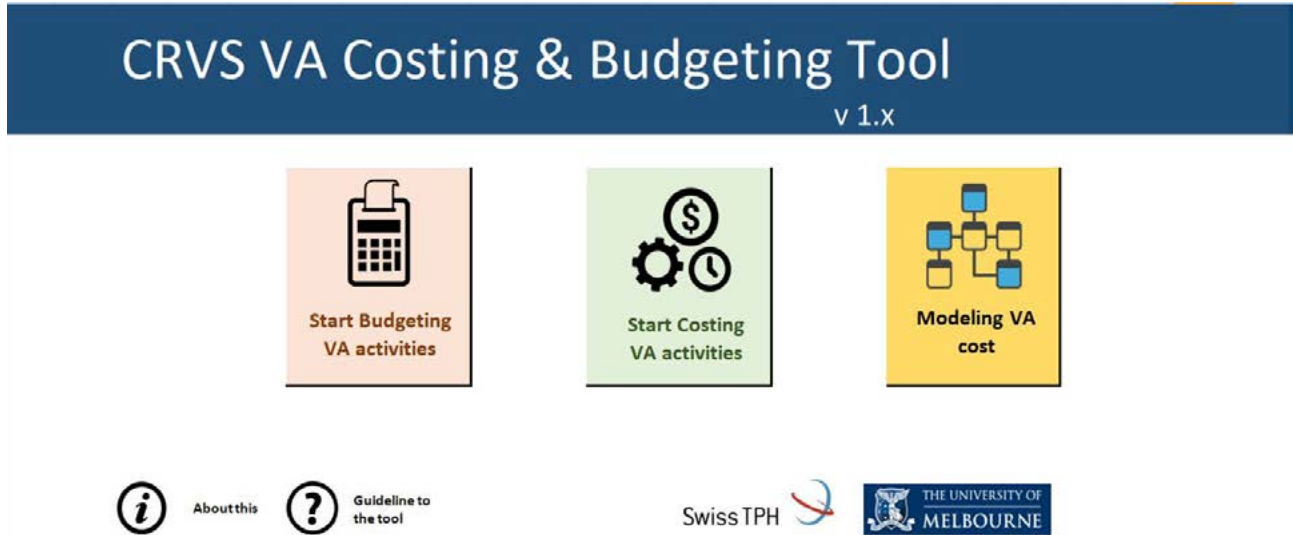
1 World Health Organization. *International classification of diseases and related health problems*, 10th revision. 5th ed. Geneva, Switzerland: WHO; 2016.

2 King G, Lu Y, Shibuya K. Designing verbal autopsy studies. *Population Health Metrics* 2010; 8:19.

3 Sankoh O, Byass P. The INDEPTH Network: filling vital gaps in global epidemiology. *International Journal of Epidemiology* 2012; 41(3):579-88.

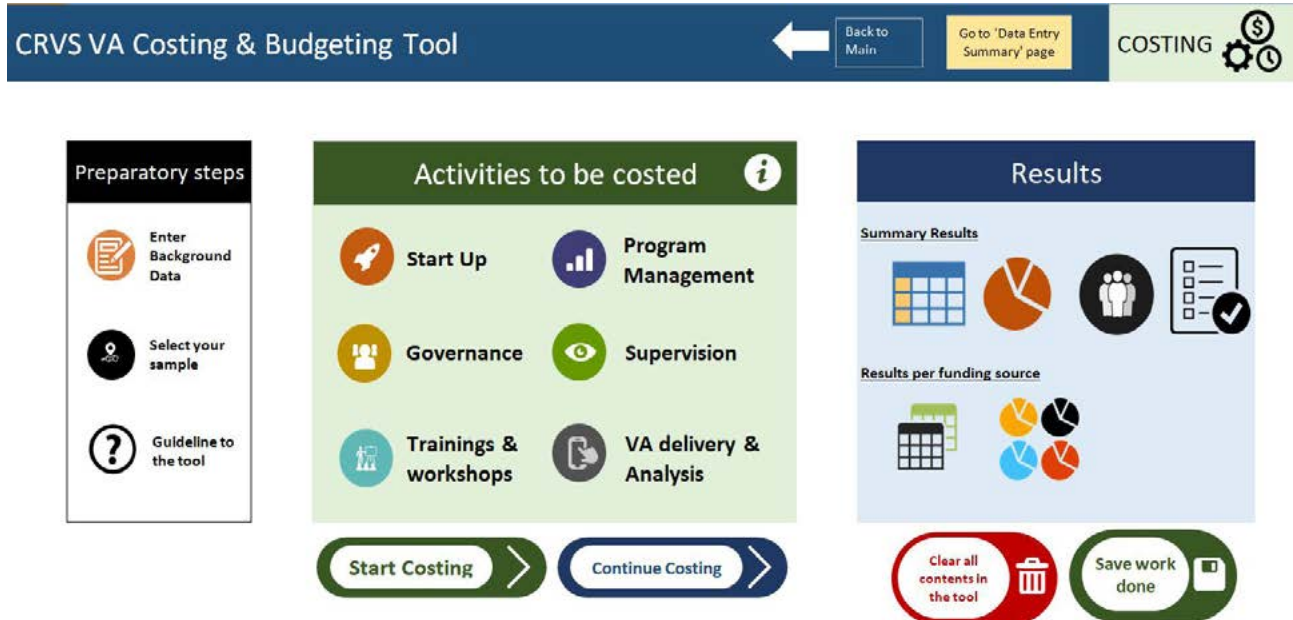
4 França EB, et al. Investigation of ill-defined causes of death: assessment of a program's performance in a State from the Northeastern region of Brazil. *Revista Brasileira de Epidemiologia* 2014; 17:119-34.

Figure 1 Splash screen with the three sections of the Verbal Autopsy Costing and Budgeting Tool



VA = verbal autopsy

Figure 2 Front screen of the costing section of the Verbal Autopsy Costing and Budgeting Tool



The budgeting and costing sections (orange and green buttons in **Figure 1**) are structured in a similar way and include three sub-sections. First, the VA Costing Tool collects **general information about the country** and defines assumptions for the analysis (for example, exchange rate and life span). In the second sub-section all the **cost data** are entered (green box in **Figure 2**).

Finally, a third sub-section **displays the results** of the analysis based on the information entered in the previous steps (blue box in Figure 2).

Costing verbal autopsy implementation

The VA Costing Tool considers both financial and economic costs. **Financial costs** represent the cost of developing and implementing an intervention, whereas economic costs capture the opportunity cost of the resources used in the intervention, regardless of whether a financial cost was incurred.

The VA Costing Tool estimates the incremental cost of implementing VA, ie the cost of adding VA on to existing services. It does not provide cost estimates for existing services. The tool can provide several cost estimates, including total incremental cost, cost per VA and further analyses and disaggregation.

When considering the cost of conducting a VA all relevant activities are considered including identification of the death event, notification, performing the VA, analysis to identify COD and also training of staff and volunteers. The costs of all the inputs are then aggregated to give the total costs for VA. This can then be used to work out the cost per VA or **unit cost**. The unit cost can be used to model costs at a national or other large scale.

Budgeting the implementation of verbal autopsy

The budgeting section of the tool is structured similarly to the costing section; it also collects information by the six activity groups (start-up, governance, management, supervision, analysis).

The inputs into the budgeting section take the form of several assumptions. Some of these are:

- Administrative structure in the country
- Population included in the budgeting exercise
- Crude death rate
- Proportion of deaths outside of health facilities
- Proportion of time allocated to VA by different staff
- Number of different staff categories
- Unit cost for some resources or activities, such as fees for personnel and cost of a domestic flight.

The VA Costing Tool provides the total cost of VA implementation under the user-provided assumptions, as well as different disaggregation and analysis of these costs.

Modelling verbal autopsy implementation scenarios

This section of the tool allows the results of either a costing or budgeting exercise to be modelled for different implementation scenarios and different timeframes. The following factors/ inputs can be modified to create different scenarios to assist with future planning:

- Number of administrative units included in the model
- Population included in the sample
- Crude death rate
- Proportion of deaths registered
- Proportion of deaths outside the health facility
- Inflation rate.

Preliminary results of applying the Verbal Autopsy Costing and Budgeting Tool

As a pilot the VA Costing tool has been used to estimate the cost of VA implementation in four countries.

1. Country 1 already had VA as part of routine CRVS and so was ready for application of the tool.
2. Country 2 was implementing VA using tablets for data capture in a select number of sub-national areas.
3. Country 3 was in the process of nation-wide roll out of VA using tablets.
4. Country 4 had conducted a small pilot of VA and was in the early stages of VA implementation.

Country experiences

The four countries vary greatly in their stage of VA implementation and have distinct approaches. The number of VAs conducted in these countries ranged from as few as 146 interviews to more than 5400. This difference in scale resulted in a wide range of total financial cost (from approximately US\$38,300 to US\$238,000) (**Table 1**).

Table 1 Financial and economic costs by cost type and country

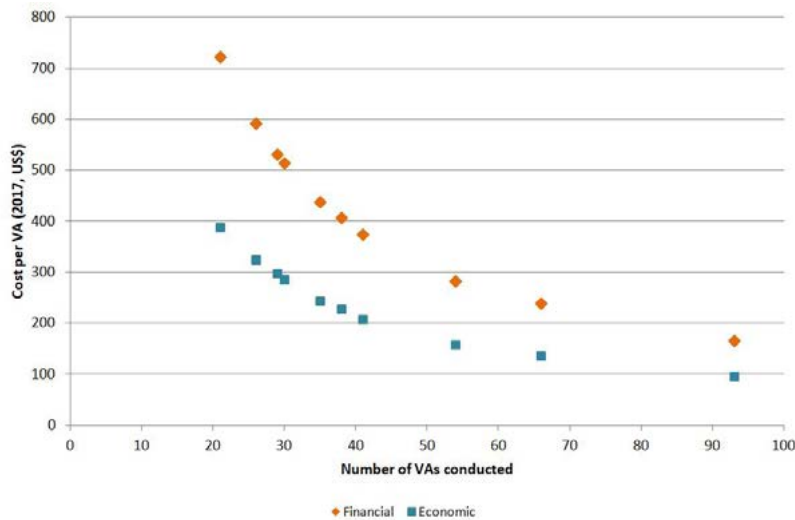
Cost type	Country 1 (routine)		Country 2 (pilot phase)		Country 3 (pilot phase)		Country 4 (pilot phase)	
	Financial cost (2015, US\$)	Economic cost (2015, US\$)	Financial cost (2017, US\$)	Economic cost (2017, US\$)	Financial cost (2017, US\$)	Economic cost (2017, US\$)	Financial cost (2017, US\$)	Economic cost (2017, US\$)
Start-up activities	137	664	35,927	13,863	38,390	7,717	95,595	19,622
Governance activities	0	0	16,773	6,472	681	715	1,298	1,298
Refresher training and workshops	3,312	3,312	0	0	2,216	2,216	0	0
Program management	592	587	12,747	9,738	9,474	7,145	23,826	27,805
Supervision	2,368	2,368	0	0	1,163	1,163	28,203	28,483
Verbal autopsy delivery and analysis	31,903	31,409	5,539	2,678	12,437	4,081	5,298	9,056
Total	38,312	38,340	70,986	32,751	64,361	23,036	154,221	86,265
Cost per verbal autopsy	262	263	229	106	315	113	356	199

In Country 1 VA is used to capture the few deaths that are missed by the CRVS system, whereas in the other three countries VA will likely be widespread and the main method for COD identification. These differences affect the distribution of cost and the cost per VA.

Often programs have high start-up costs in the early stages of implementation, which progressively decrease as the program evolves. This is reflected in the analysis, which shows that start-up cost accounted for more than 70 per cent in Countries 2–4, while being almost negligible in Country 1. In addition, there is also potential for economies of scale to reduce costs.

This can be observed in Country 4 (**Figure 3**). Over six months, financial costs ranged from US\$166 to US\$723, with an average cost of US\$356 per VA. The average economic cost was lower, US\$199, and ranged from US\$96 to US\$389. This relationship is not linear, and indicates that some geographic areas may have a certain amount of fixed costs due to reasons such as accessibility, and human resource availability.

Figure 3 Financial and economic cost per VA by number of VA interviews conducted per sub-national area, Country 4



VA = verbal autopsy

Summary

Reliable mortality statistics are crucial for well functioning CRVS systems. The identification of the patterns of cause of death in a population should ideally be through medically-certified COD data, however, where this is not available VA is a good option. Integrating VA into existing CRVS systems can be a complex undertaking and a lack of understanding of the costs involved may be a limiting factor. The VA Costing and Budgeting tool can assist by identifying detailed financial and economic costs per VA, considering a wide range of VA related activities for budgeting, and helping to model various scenarios for future planning. As demonstrated through a pilot study of four countries, the tool can be used at various stages of VA implementation activities from integrating into well-established CRVS systems for a few deaths, to rolling out at national level to capture a majority of deaths. The tool can help identify major areas of spending, unit cost over time and number of VAs performed and the human-resource related costs. The VA Costing and Budgeting tool can be a valuable asset in preparing for VA implementation at any stage at a national or sub-national level.

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

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