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DATA FOR HEALTH INITIATIVE

CRVS Fellowship profile

Strengthening civil registration processes and improving vital statistics in Rwanda

August 2018

NISR
NATIONAL INSTITUTE OF STATISTICS OF RWANDA

Resources available from the University of Melbourne, Bloomberg Philanthropies Data for Health Initiative

CRVS course prospectuses
These resources outline the context, training approach, course content and course objectives for the suite of CRVS trainings delivered through the Bloomberg Philanthropies Data for Health Initiative. Each course focuses on a specific CRVS intervention or concept, and is designed to support countries to strengthen their CRVS systems and data.

CRVS Fellowship reports and profiles
The CRVS Fellowship Program aims to build technical capacity in both individuals and institutions to enhance the quality, sustainability and health policy utility of CRVS systems in Fellows' home countries. *Fellowship reports* are written by Fellows as a component of the program, and document, in detail, the research outcomes of their Fellowship. *Fellowship profiles* provide a summary of Fellows' country context in relation to CRVS, an overview of the Fellowship experiences, the research topic and the projected impact of findings.

CRVS analyses and evaluations
These analytical and evaluative resources, generated through the Initiative, form a concise and accessible knowledge-base of outcomes and lessons learnt from CRVS initiatives and interventions. They report on works in progress, particularly for large or complex technical initiatives, and on specific components of projects that may be of more immediate relevance to stakeholders. These resources have a strong empirical focus, and are intended to provide evidence to assist planning and monitoring of in-country CRVS technical initiatives and other projects

CRVS best-practice and advocacy
Generated through the Initiative, CRVS best-practice and advocacy resources are based on a combination of technical knowledge, country experiences and scientific literature. These resources are intended to stimulate debate and ideas for in-country CRVS policy, planning, and capacity building, and promote the adoption of best-practice to strengthen CRVS systems worldwide.

CRVS country reports
CRVS country reports describe the capacity-building experiences and successes of strengthening CRVS systems in partner countries. These resources describe the state of CRVS systems-improvement and lessons learnt, and provide a baseline for comparison over time and between countries.

CRVS technical guides
Specific, technical and instructive resources in the form of *quick reference guides, user guides* and *action guides*. These guides provide a succinct overview and/or instructions for the implementation or operation of a specific CRVS-related intervention or tool.

CRVS tools
Interactive and practical resources designed to influence and align CRVS processes with established international or best-practice standards. These resources, which are used extensively in the Initiative's training courses, aim to change practice and ensure countries benefit from such changes by developing critical CRVS capacity among technical officers and ministries.

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Fellowship profile: Strengthening civil registration processes and improving vital statistics in Rwanda

Between February and May 2018, Xavier Ngomituje, a statistician from the National Institute of Statistics Rwanda, came to the University of Melbourne to learn about measuring the completeness of death registration, in order to improve national mortality statistics. He then spent time at the Swiss Tropical and Health Institute, University of Basel, to analyse and strengthen the organisation, processes, work flows and functionality of the civil registration and vital statistics (CRVS) system. This fellowship profile documents Xavier's experiences during his fellowship, including what he worked on, what he learned, and what impact this might have on strengthening registration processes and improving the quality of vital statistics in Rwanda.

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Country context

Xavier is from Rwanda, a participating country in the Bloomberg Philanthropies Data for Health (D4H) Initiative. Rwanda is a low-middle income country of nearly 12 million people, located in the Central-East of Africa.1 The country is divided into five geographical provinces, with most people – almost 84 per cent – living in rural areas (**Figure 1**).[2,3] About half of the urban population lives in the capital of Kigali, which is Rwanda's largest city, followed by Huye and Muhanga.[3,4]

According to the United Nations Human Development Report 2016,[5] Rwanda's Human Development Index (HDI) was classified as 'low' in 2015, with a life expectancy of 67 years.[1] A little over one-third of deaths in Rwanda are from non-communicable diseases.[6]

1 The World Bank Group. Rwanda country data. 2018. Retrieved from https://data.worldbank.org/country/rwanda

2 National Institute of Statistics Rwanda. 2012 Population and Housing Census Brochure. 2014. Retrieved from http://www.statistics.gov.rw/publication/rphc4-brochure

3 National Institute of Statistics Rwanda. Rwanda Civil Registration and Vital Statistics Systems: Comprehensive Assessment Final Report, Volume 1. 2016. Retrieved from http://www.statistics.gov.rw/file/5059/download?token=4VFetbmn

4 World Population Review. Population of cities in Rwanda. 2018. Retrieved from http://worldpopulationreview.com/countries/rwanda-population/cities/

5 United Nations. Human Development Report 2016: Human Development for Everyone. 2016. Retrieved from http://hdr.undp.org/sites/default/files/HDR2016_EN_Overview_Web.pdf

6 World Health Organization. Noncommunicable Diseases (NCD) Country Profiles: Rwanda 2014. Retrieved from http://www.who.int/nmh/countries/rwa_en.pdf?ua=1

Figure 1 Map of Rwanda with provinces

Source Adapted from Nations Online, available at http://www.nationsonline.org/oneworld/map/rwanda-admin-map.htm

Strengthening the CRVS system

Rwanda is committed to improving its civil registration and vital statistics system.

The Rwandan Government has demonstrated its commitment to improving its population's health status through strengthening its civil registration and vital registration (CRVS) system. These efforts were supported by the declaration of the *Second Conference of African Ministers Responsible for Civil Registration* in September 2012, during which time African countries were encouraged to undertake in-depth assessments of their civil registration systems and develop strategic action plans for improving CRVS.[7] As Rwanda takes steps to improve its CRVS system, it must ensure that vital events – like births and deaths – are being registered. Complete registration of vital events is integral to the production of accurate vital statistics, which the Government can then use to guide health policies and programs.

7 National Institute of Statistics Rwanda. Rwanda Civil Registration and Vital Statistics (CRVS) systems. 2016. Retrieved from http://www.statistics.gov.rw/publication/rwanda-civil-registration-and-vital-statitics-crvs-systems-0

During his fellowship, Xavier spent time at Melbourne and Basel, where he learnt new skills around measuring the completeness of death registration and business process mapping.

The fellowship project

The National Institute of Statistics Rwanda (NISR) is a key stakeholder of the CRVS system in Rwanda. The NISR is primarily responsible for the production of vital statistics, and one of its main objectives is to improve the monitoring of death notification and registration, as well as the quality of cause of death data. As a statistician at the National Institute of Statistics in Rwanda, Xavier has several responsibilities. He works in the CRVS department, in which he monitors and analyses vital statistics data and produces vital statistics reports. He is also in charge of the monitoring program of verbal autopsy (VA),[8] which involves linking verbal autopsy into the CRVS system.

The aim of Xavier's fellowship was to improve understanding of the performance of the CRVS system, to ensure system integration of VA, and to enable the timely production of reliable vital statistics. The fellowship had four objectives:

- Measure the completeness of death registration, its trend and intra-country differential in recent years and, if possible, generate summary mortality statistics from registration data.
- Improve CRVS system architecture (business process mapping)[9] and analysis to ensure integration of community deaths.
- Develop and implement a CRVS monitoring framework based on the Ten CRVS Milestones.[10]
- Improve monitoring of the notification and registration of deaths, including cause of death data.

As such, Xavier's fellowship was divided into two phases: one at the School of Population and Global Health, University of Melbourne, and the second at the Swiss Tropical and Public Health Institute (Swiss TPH), University of Basel. During his time in Melbourne, Xavier learned a new method to estimate completeness of death registration that can be applied to any routine mortality data source using data that are widely available. His time in Basel focused on how to integrate cause of death data from VA into Rwanda's CRVS system.

Improving the completeness of death registration

Focusing on completeness of death registration is important in the Rwandan context. Whilst birth registration completeness sits at 51 per cent,[11] death registration is only at 30 per cent, with almost no reliable cause of death information recorded.[3] Furthermore, death registration is problematic given that most deaths occur in the community, where are there are few incentives for families to register these deaths. It is also difficult to obtain reliable cause of death information for these community deaths. Despite these challenges, Rwanda aims to achieve 70 per cent completeness of death registration by 2021, making it imperative that completeness of death registration is routinely measured (**Box 1**).

8 VA is a method for collecting information about a deceased individual's signs and symptoms prior to their death from their family or next of kin and interpreting these to diagnose the likely or most probable cause of death. Source: de Savigny D, et al. Integrating community-based verbal autopsy into civil registration and vital statistics (CRVS) systems: system-level considerations. Global Health Action 2017: 10; 1272882.

9 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, University of Melbourne; 2018.

10 Cobos Muñoz D, Abouzahr C, de Savigny D. The 'Ten CRVS Milestones' framework for understanding Civil Registration and Vital Statistics systems. BMJ Global Health 2018; 3:e000673.

11 National Institute of Statistics Rwanda. Rwanda Demographic and Health Survey 2014-15. 2015. Retrieved from https://dhsprogram.com/pubs/pdf/FR316/FR316.pdf

Box 1: What is death registration completeness and why does it matter?

The completeness of death registration is defined as the percentage of actual deaths in a population that are registered. In short, it is the number of registered deaths divided by the actual number of deaths in a population.

$$\text{Completeness of death registration (\%)} = \frac{\text{Number of registered deaths}}{\text{Actual number of deaths}} \times 100$$

Countries seeking to create effective health interventions need accurate vital statistics. This means that most, if not all, deaths that occur must be registered to avoid biased and incomplete registration data. Unregistered deaths will have a different cause of death profile than registered deaths, and so governments need to routinely measure the completeness of death registration.[12]

The new method of estimating the completeness of death registration only requires local data, a critical advantage when estimating completeness at the sub-national level.

A new empirical method to estimate the completeness of death registration has been developed and launched by the CRVS team at the University of Melbourne.[13] Knowing the completeness of death registration reasonably and reliably is critical to properly plan strategies to improve completeness and thus the public policy utility of mortality data.

The method estimates completeness of registration using inputs of:

- RegCDR: This was calculated using the number of registered deaths and the total population.
- The under-five mortality rate (5q0): This was calculated from the 2014-15 Rwanda Demographic and Health Survey, and adjusted to align with estimates from the UN Inter-agency Group for Child Mortality Estimation (UN IGME).[14]
- The per cent of the population aged 65 plus: This was obtained from NISR.

The completeness of under-five death registration: This is calculated as the 5q0 from registration data divided by the estimated actual level of 5q0.

Using the new method, the estimated completeness of death registration was calculated by province between 2015 and 2017. It showed a completeness of 41 per cent in Kigali in 2016, compared with much lower levels in the southern (11 per cent) and western (9 per cent) provinces. The method was also able to show an improvement in registration completeness over time, from 20 per cent in Kigali in 2015, to 43 per cent in 2017.

The ten milestones framework provides a systematic way of assessing and improving CRVS processes.

Improving CRVS system architecture

CRVS systems are complex adaptive systems and in need of strengthening in many places worldwide. Rwanda's CRVS system is relatively young and has explored various solutions with different approaches to governance and policies, and accountability to multiple ministries such as local government, gender and family promotion, justice, health and national Institute of statistics. Rwanda has conducted a CRVS Comprehensive Assessment in 2016 which helped to design CRVS Strategic Plan for 2018 to 2021.

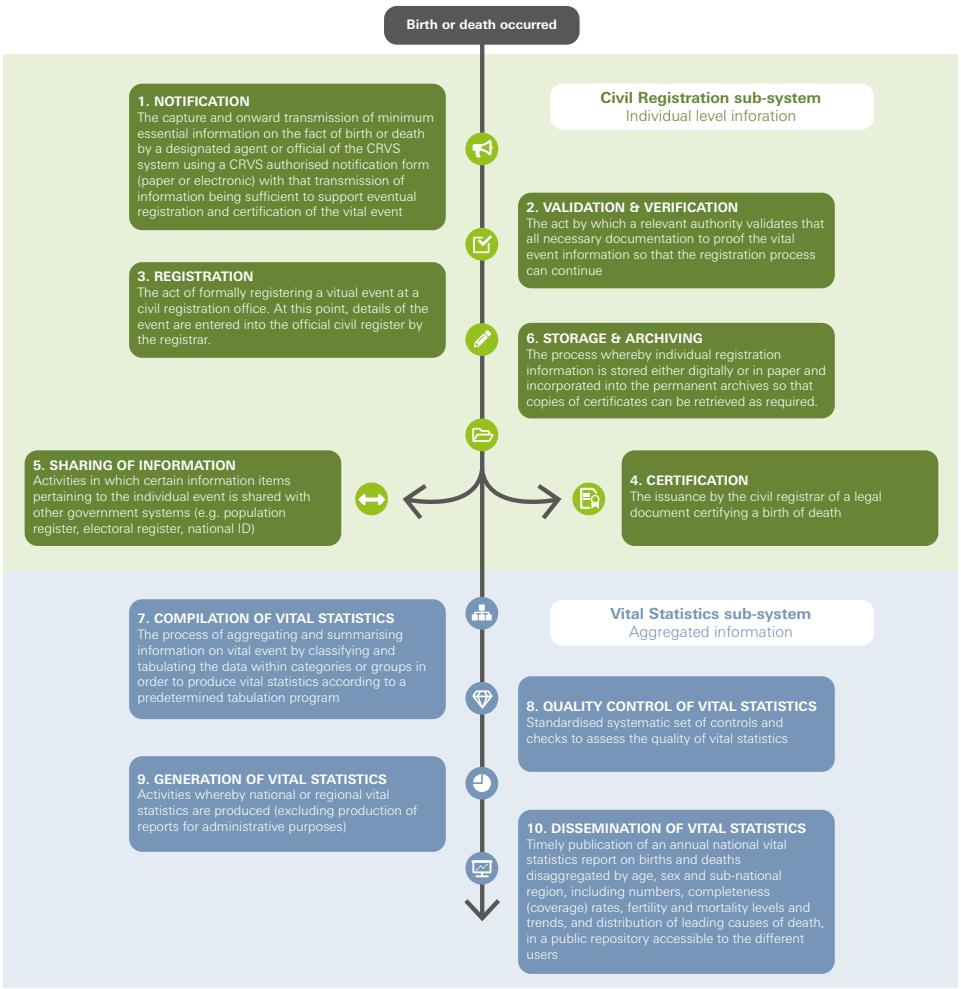
12 University of Melbourne. A new method for estimating the completeness of death registration. CRVS summaries. Melbourne, Australia: Bloomberg Philanthropies Data for Health Initiative, Civil Registration and Vital Statistics Improvement, University of Melbourne; 2018.

13 Adair T, Lopez AD. Estimating the completeness of death registration: An empirical method. PLoS ONE 2018; 13(5):e0197047.

14 UN Inter-agency Group for Child Mortality Estimation (UN IGME), 2017, Child Mortality Estimates, childmortality.org.

The 'Ten CRVS Milestones' framework (**Figure 2**), used as part of the CRVS assessment and during the design and integration of new interventions, encourages CRVS stakeholders to take a systemic approach to all the essential steps needed for the system to be fully operational. The framework was used to systematically analyse the processes related to births and deaths that occur in health facilities and in the community.

Figure 2 The 'Ten CRVS Milestones' framework



Reflections: take-home lessons

New skills developed

Xavier had the opportunity to apply the new method of estimating completeness, and redesign the CRVS processes map for community deaths in Rwanda.

While at Melbourne, Xavier applied the new method of estimating completeness, and was able to demonstrate the large under-registration of deaths that continue to occur in Rwanda. This has reinforced to him the need to routinely measure the completeness of death registration for monitoring and statistical purposes, as part of strengthening the CRVS system.

During his time at Swiss TPH, Xavier was also able to redesign the CRVS process map to allow for digital notification and registration of community deaths. This will help Rwanda to implement the project on digital notification and registration of community deaths and strengthen the CRVS system in terms of increasing death registration.

Sharing country experiences

Xavier highlighted the opportunity to work with other fellows from countries as a key aspect of his fellowship. He mentioned that fellows from countries like Ghana, Bangladesh, and Brazil were all eager to share their respective country's experiences, including possible solutions to common CRVS challenges, making the fellowship project an even richer learning experience. The CRVS Bootcamp provided an opportunity to learn about the full scope of the types of interventions being implemented as part of the D4H Initiative. Further, while in Melbourne Xavier was able to attend the VA Data Analysis and Interpretation workshop, where he was able to discuss experiences thus far in regards to interpreting and using VA data, and participate in developing guidelines around data analysis and use.

The cross-over effect

Spending time with other fellows, learning about their CRVS systems, and attending various meetings and workshops were all additional benefits of the fellowship program.

Skills learned throughout the fellowship project were applicable to multiple tasks, Xavier commented. For example, learning how to interpret mortality and death registration data would also supplement Xavier's work in the VA program, particularly when dealing with VA questionnaire data.

While at Swiss TPH, Xavier visited the World Health Organization headquarters in Geneva where he met with health information experts to discuss improving coding of medical death certificates from health facilities, including the application of the WHO Start-up Mortality List (SMoL), and integration into DHIS-2. He also met with the Unintentional Injury Prevention Unit to discuss the availability of data on causes of death due to injuries and road traffic accidents, as there is evidence these deaths may be under-reported in health facilities. Xavier was also able to attend a number of lectures while at Swiss TPH, including learning about the importance of mortality statistics and cause of death data for health policies; systems thinking for population health; and the spring symposium on Clinical Decision Support and Health Information Systems – Potential and Pitfalls of New Technologies, which discussed tools that can aggregate and visualise data effectively, thereby facilitating decision-making for managers and policy makers.

The Gateway as a knowledge hub

'... this fellowship will not only benefit me as an individual, but the entire country at large for improved CRVS implementation.'

Xavier spoke highly of the CRVS Gateway.[15] He remarked that the Gateway was a great place to access information about CRVS systems and verbal autopsy in general, and he recommended it as a way for people to share and learn about other countries' experiences in CRVS.

Benefits for CRVS development in Rwanda

Xavier said that the first thing he was going to do when he returned to Rwanda was share what he learned with his colleagues. The experience gained in Melbourne – and later in Basel – will help stakeholders to identify gaps in Rwanda's registration and vital statistics data, ultimately defining which areas the country should prioritise along its path to CRVS improvement. Xavier reflected how, 'this fellowship will not only benefit me as an individual but the entire country at large for improved CRVS implementation. Rwanda is on the way to strengthen its young CRVS system, since we only had our comprehensive assessment in 2016. I believe that the knowledge I learned will enable me to contribute to improve the CRVS system in Rwanda in terms of monitoring of notification and registration of vital events. I plan to share the new knowledge and skills acquired during the fellowship with colleagues in NISR, Ministry of Health, Rwanda Biomedical Center and others so as to extend capacities for further CRVS development.'

He reflected that the skills gained in assessing and improving CRVS system architecture will help strengthen the VA program in Rwanda, especially in regards to integrating VA into the system, and around data analysis and interpretation. This will assist Rwanda in scaling-up the VA program, as well as improving the completeness of death registration, and ultimately improving the accuracy of national vital statistics.

15 The CRVS Knowledge Gateway hosted by the University of Melbourne contains a Learning Centre, Library of resources, and more. It can be accessed at https://crvsgateway.info

Related resources and products

University of Melbourne, D4H Initiative, CRVS Knowledge Gateway: Library

https://crvsgateway.info/library

CRVS country overview: Rwanda. CRVS summaries.

Improving registration: best-practice guidelines. CRVS summaries.

Intervention: Automated verbal autopsy. CRVS summaries.

Intervention: Improving registration practices. CRVS summaries.

Intervention: Medical certification of cause of death. CRVS summaries.

University of Melbourne, D4H Initiative, CRVS Knowledge Gateway: Learning Centre

https://crvsgateway.info/learningcentre

Topic 1: Introduction to CRVS.

Topic 4: Cause of death in CRVS.

University of Melbourne, D4H Initiative, CRVS Knowledge Gateway: Courses

https://crvsgateway.info/courses

Analysis of Causes of (National) Deaths for Action.

Estimating the completeness of birth and death registration.

Medical certification of cause of death.

SmartVA.

Further reading

Africa Programme for Accelerated Improvement of Civil Registration and Vital Statistics (APAI CRVS). *CRVS digitisation guidebook*. Available at http://www.crvs-dgb.org/en/ (accessed 3 January 2018).

Cobos Muñoz D, AbouZahr C, de Savigny D. The 'Ten CRVS Milestones' framework for understanding Civil Registration and Vital Statistics systems. *BMJ Global Health* 2018; 3:e000673.

Cobos Muñoz D, de Savigny D. Process mapping and modelling: a tool for visualizing system processes from end-to-end. In: de Savigny D, Blanchet K & Adam T (eds). *Applied systems thinking for health systems research*. Maidenhead, UK: Open University Press; 2017.

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.

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Civil Registration and Vital Statistics partners:

Vital Strategies

CDC Foundation
Together our impact is greater

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