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CRVS Fellowship report:

Proposal for the introduction of automated verbal autopsy in Nepal to generate reliable cause of death data at the sub-national and national levels

September 2020





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Published by the University of Melbourne, Civil Registration and Vital Statistics Improvement, Bloomberg Philanthropies Data for Health Initiative

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**Made possible through funding from
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Suggested citation

Mehata, S, Sharma, D, Adair, T, Chowdhury, M H. *Proposal for the introduction of automated verbal autopsy in Nepal to generate reliable cause of death data at the sub-national and national levels*. CRVS Fellowship reports and profiles. Melbourne, Australia: Bloomberg Philanthropies Data for Health Initiative, Civil Registration and Vital Statistics Improvement, University of Melbourne; 2020.



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Acknowledgements

This was a great opportunity to participate in the Bloomberg Philanthropies Data for Health (D4H) Initiative's CRVS Fellowship Program at the University of Melbourne (UoM). The in-depth participatory learning and knowledge sharing undoubtedly enhanced our professional capacity and supported an improvement in human resource capacity within Nepal's CRVS sector. The knowledge and skills learnt will be highly useful for the ongoing CRVS strengthening efforts in Nepal, including establishing a mechanism for collecting quality cause of death data, and embedding this as a routine component within the country's CRVS system. Because of the Fellowship, we are now able to share technical and management skills with other colleagues in Nepal and train field level officials for conducting automated verbal autopsy to collect and use cause of death data in more effective and cooperative ways. We are highly grateful to the Bloomberg Data for Health Initiative at the University of Melbourne for considering Nepal for this prestigious Fellowship Program. We are also wholeheartedly thankful to the whole UoM team, including the CRVS Fellowship Coordinator Dr. Tim Adair, and Dr. Hafiz Chowdhury and other instructors for their valuable guidance and crucial knowledge sharing. We also acknowledge other staff for supporting our travel and making our six-week stay in Melbourne such a fabulous and unforgettable time. We are thankful to our concurrent Fellows from other countries for sharing their knowledge and country experiences. Certainly, this will help us in our CRVS strengthening and cause of death data collection programs in Nepal.

Acronyms and abbreviations

CBS	Central Bureau of Statistics
CDR	crude death rate
CHW	Community Health Worker
COD	cause of death
COPD	chronic obstructive pulmonary disease
CR	civil registration
CRVS	civil registration and vital statistics
CSMF	cause-specific mortality fractions
DG	Director General
DONIDCR	Department of National ID and Civil Registration
FCHV	female community health volunteers
GBD	Global Burden of Disease
HIV	human immunodeficiency virus
HMIS	Health Management Information System
LG	Local Government
LMIC	low- to middle-income countries
LR	Local Registrar
MOHA	Ministry of Home Affairs
MOHP	Ministry of Health and Population
NCD	non-communicable diseases
NHRC	Nepal Health Research Council
ODK	Open Data Kit
PHC	Primary Health Centers
PHMRC	Population Health Metrics Research consortium
SDG	Sustainable Development Goals
UHC	Urban Health Centers (UHCs)
VA	verbal autopsy
VERSP-MIS	Vital Event Registration and Social Protection-Management Information System
VIPER	Verbal Autopsy Interpretation, Performance and Evaluation Resource



Proposal for the introduction of automated verbal autopsy in Nepal to generate reliable cause of death data at the sub-national and national levels

Between September to October 2019, Suresh Mehata from the Ministry of Social Development in Biratnagar, Nepal, and Dibakar Sharma from the Ministry of Social Development in Pokhara, Nepal, completed a CRVS Fellowship funded by the Bloomberg Philanthropies Data for Health Initiative at the University of Melbourne to develop a proposal for introducing automated verbal autopsy in Nepal. This report outlines the proposed strategy for a pilot rollout of automated VA in Nepal across an 18-month period.

Background

Nepal, a land-locked country of 28 million people, has made encouraging progress in recent decades in improving the overall health status of its citizens. Life expectancy at birth has increased from 50 years in 1981 to 67 years in 2011 through improving child and maternal survival rates, and the maternal mortality ratio has dropped from 790 per 100 000 live births in 1996, to 239 in 2016.¹⁷ Nepal has also made substantial improvement in disease control: polio and leprosy are close to being eradicated,¹⁸ and there has been progress towards halting and reversing the rates of tuberculosis, human immunodeficiency virus (HIV), and malaria.

Despite these clear improvements, Nepal faces a triple burden of disease. While communicable diseases still account for a large proportion of deaths and disability at younger ages, the prevalence of non-communicable diseases (NCDs) continues to increase and is emerging as a major public health problem.¹⁹ As per estimates from the Global Burden of Disease (GBD) study, the years of life lost due to premature death comprises NCDs (49 per cent), communicable maternal neonatal and nutritional (CMNN) diseases (39 per cent), and injuries (12 per cent).²⁰ Ischemic heart disease, lower respiratory infections, neonatal encephalopathy, chronic obstructive pulmonary diseases (COPD), and diarrheal diseases are the top five causes of deaths in Nepal, while lower back pain, migraine, COPD, and other musculoskeletal disorders are the leading cause of morbidity.²¹ Like many low- to middle-income countries (LMICs), Nepal has an ageing population, which is creating numerous challenges for the health system. These problems are further compounded by threats from natural disasters, the adverse effects of climate change, and accidents and injuries.²²

Nepal's civil registration and vital statistics system

In order to improve the national and sub-national estimates of mortality and causes of death to inform health policy decision-making, strengthening the country's civil registration and vital statistics (CRVS) system by improving the reliability of cause of death (COD) data is essential²³.

17 Ministry of Health of Nepal. *Nepal Demographic and Health Survey 2016*. Kathmandu, Nepal; 2017.

18 Ministry of Health and Population. *Nepal Health Sector Strategy 2015-2020*. Kathmandu, Nepal: Government of Nepal, MOHP 2015.

19 Nepal Health Research Council, Monitoring, Evaluation and Operational Research. *Nepal Burden of Disease 2017: A Country Report based on the Global Burden of Disease 2017 Study*. Kathmandu, Nepal: NHRC, MOHP, and MEOR; 2019.

20 GBD 2017 Causes of Death Collaborators. *Global, regional, and national age-sex-specific mortality for 282 causes of death in 195 countries and territories, 1980–2017: a systematic analysis for the Global Burden of Disease Study 2017*. *Lancet*. 2018;392:1736–88.

21 Nepal Health Research Council, Monitoring, Evaluation and Operational Research. *Nepal Burden of Disease 2017: A Country Report based on the Global Burden of Disease 2017 Study*. Kathmandu, Nepal: NHRC, MOHP, and MEOR; 2019.

22 Ministry of Health, Nepal Health Sector Support Programme, ICF. *Nepal Health Facility Survey 2015*. Kathmandu, Nepal; 2017.

23 Murray CJ, Barber RM, Foreman KJ, Abbasoglu Ozgoren A, Abd-Allah F, Abera SF, et al. *Global, regional, and national disability-adjusted life years (DALYs) for 306 diseases and injuries and healthy life expectancy (HALE) for 188 countries, 1990–2013: quantifying the epidemiological transition*. *Lancet*.386(10009):2145–91.



Nepal's civil registration system was established in 1977 to provide certificates of birth, death, marriage, migration and divorce to all citizens. Under the Birth, Death and Other Personal Events (Registration) Act, 1976, and Regulation, 1977, there are provisions to appoint a registrar at the Ministry of Federal Affairs and General Administration, and a local registrar for each ward of the rural municipalities. Each ward secretary is designated as the local registrar for civil registration. At the central level, CRVS is under the responsibility of the Ministry of Home Affairs (MOHA) and run by the Department of National Identification and Civil Registration. Further, two committees, the CRVS Steering Committee and the CRVS Technical Committee, have been operational since 2012.

Registration of vital events by individuals is free of cost within 35 days of occurrence of the event, after which there is a fine of eight Nepalese Rupee (NPR) for registration within another 35 days. For delayed registration due to unavoidable circumstances, a maximum fine of 50 NPR for more than 70 days of occurrence of the event is applicable. This penalty is routinely applied, and often acts as an impediment for families to register vital events. Although the law states that birth and death registration is compulsory, there is a need to review the laws and practice to improve the coverage of registration. The law does not clearly mention the operational definition of live birth, fetal death or stillbirth. Within the provisions of the law, the registrar is responsible for registering vital events at the local level. Within the health management information system (HMIS) there is a provision of reporting maternal death, neonatal deaths and stillbirths in all public health facilities, however, these are not currently captured by the CRVS system.

Existing notification and registration processes

In 2015, Nepal introduced an online registration system to 2500 of its 6743 local registrar (LR) offices. The process of notifying and registering deaths in Nepal involves several steps (see **Figure 1**) and differs between the online and offline systems. For the offline registration system, the informant (usually a family member of deceased) visits the LR office with supporting documents to declare and register the death. After completing the required form and undergoing further validation, the LR registers the death and issues the death certificate. For the online system, informants declare the death and complete an online information form via the Vital Event Registration and Social Protection-Management Information System (VERSP-MIS). After completion, informants visit the LR office with a token number (auto-generated via SMS), and after further validation, the LR registers the death and issues the death certificate.

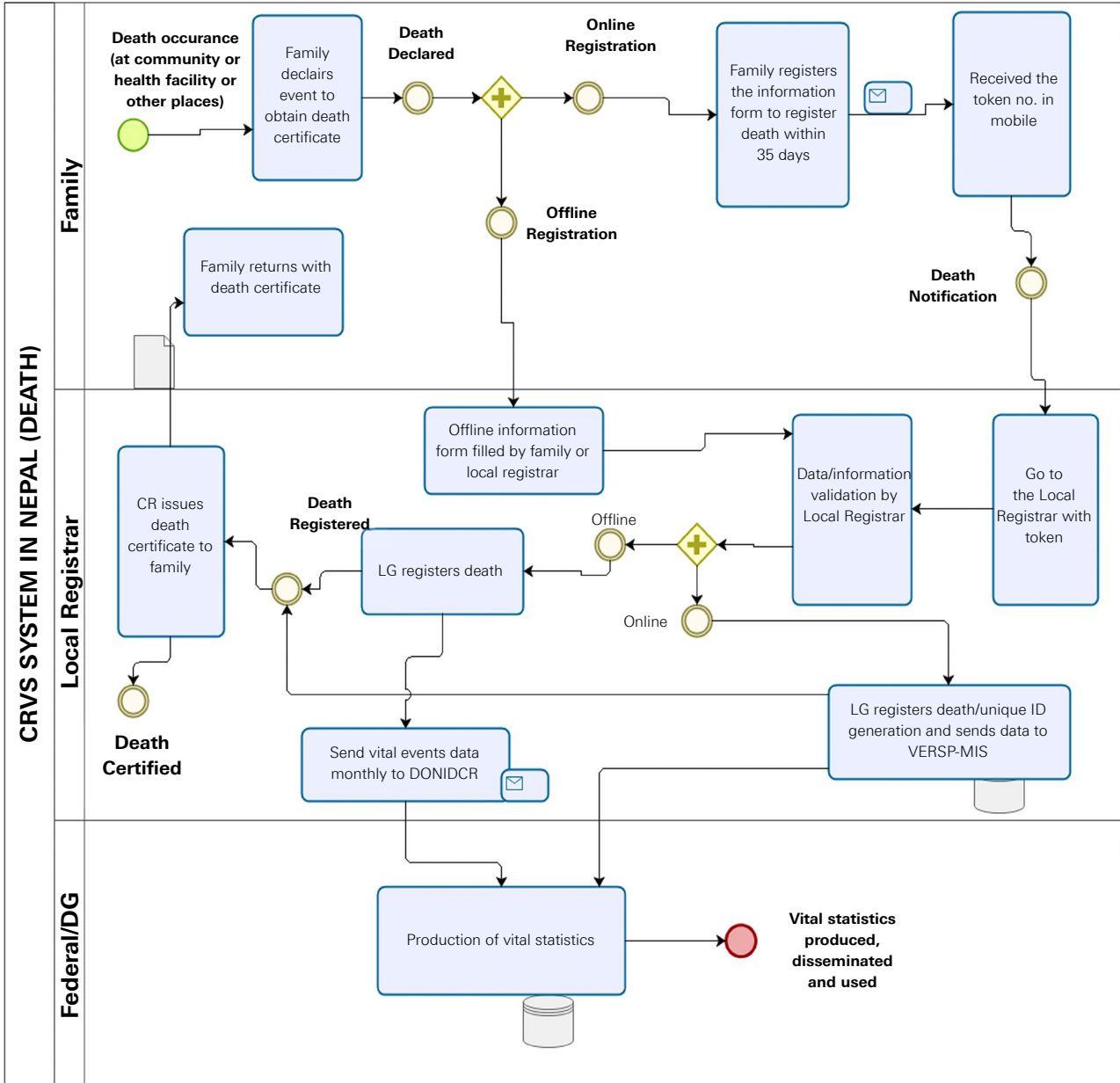
In the offline system, the LR sends a monthly report by number of deaths, disaggregated by sex only, to the local government (LG) (municipality/rural municipality) office. The LG office collates the reports, aggregates the deaths and sends these to the DONIDCR by email. Compiling both the online and offline death data, the DONIDCR then publishes an annual registration report. The lack of disaggregation of deaths by age in the offline system means that, for deaths captured by this system, there are no age-specific death data. The online system, however, does compile death data by age and sex.

The number of LR offices introducing an online registration system is increasing rapidly. However, from April 2017 to May 2018 (Nepali calendar: Baishak to Chaitra 2074BS), only 40 per cent of a total of 112 932 registered deaths were recorded through the online registration system (**Annex 1**). Compared with the GBD's total annual death estimate of 180 000 for Nepal, completeness is approximately 65 per cent.

In Nepal, the vast majority (71 per cent) of deaths still occur in the community, with no COD identified. Of the deaths which do occur in hospitals, most are either lacking COD information or have an improper cause assigned.¹⁷ Additionally, there is an inadequate COD data reporting mechanism within the CRVS system, and the death certification process is not clearly mentioned in the law. In practice, for deaths occurring in a health facility, the attending doctor certifies the COD, and for unnatural (external) or violent deaths, the police maintain additional records. Only a limited number of hospitals use the World Health Organization's (WHO) International Form of Medical Certificate of Cause of Death. For community deaths, the informant is required to select a COD based on a rudimentary and uninformative list of causes, such as "natural causes".

¹⁷ Registration DoNlaC. *Civil Registration and Vital Statistics Survey, 2019*. Kathmandu, Nepal: Department of National Identification and Civil Registration, Ministry of Home Affairs, Government of Nepal; 2019.

Figure 1: Business process map of Nepal's CRVS system



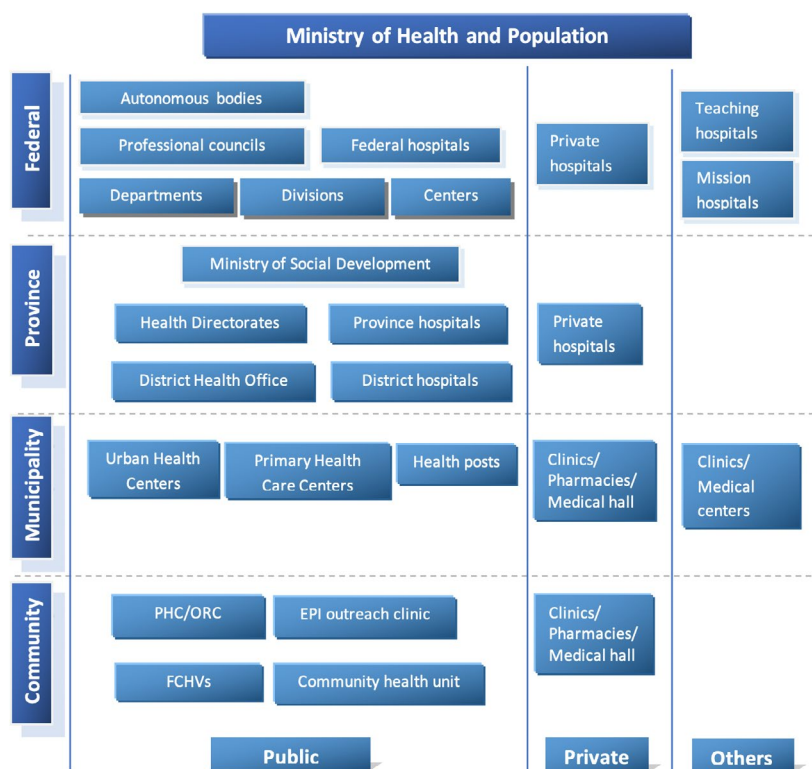
Other sources of mortality data

Nepal has been collecting mortality data through other sources, such as the decennial Population and Housing Census and CRVS Survey (last conducted in 2011). The 2011 Census collected, in addition to other information, data on household deaths occurring in the preceding 12 months. Annual deaths reported through this Census exceeded that recorded through national death registration data, and equated to 70 per cent of total deaths estimated through the 2017 GBD study.¹⁷ The CRVS survey, which collected death registration rates based on the responses of the interviewees (hence, the rates were not based on official registration records and may be subject to some errors), reported death registration rates in Nepal within the periods 2013/14, 2014/15 and 2015/16, recording national rates of 73.6, 68.4, and 68.4 per cent respectively.

Nepal's health care delivery system

The Ministry of Health and Population (MOHP) is accountable for the delivery of health services in coordination with different stakeholders, including both federal and provincial ministries. The MOHP provides health services through a network of departments, autonomous bodies, professional councils, federal hospitals, medical college teaching hospitals, provincial health directorates, district-level hospitals, and private hospitals. 77 district-level health offices manage primary health care service delivery through a network of Primary Health Care Centers, Urban Health Centers (UHCs), health posts, community health units, PHC outreach centers, and Expanded Program of Immunization (EPI) outreach clinics across the country (Figure 2).¹⁸ In 1988, the MOHP started the Female Community Health Volunteers (FCHVs) program to improve community outreach for health services. FCHVs are a trusted source of health information in communities, and an important link between the community and health facilities, particularly in rural areas. Increases in access to public health services, advancement in health care technologies, and access to quality health services to every citizen has been a prevailing agenda of the Government of Nepal.

Figure 2: Health care delivery system of Nepal



Note: FCHV (Female Community Health Volunteers); EPI (Expanded Program of Immunization)

17 GBD 2017 Mortality Collaborators. *Global, regional, and national age-sex-specific mortality and life expectancy, 1950–2017: a systematic analysis for the Global Burden of Disease Study 2017*. Lancet. 2018;392:1684–735.

18 Ministry of Health, Nepal Health Sector Support Programme, ICF. *Nepal Health Facility Survey 2015*. Kathmandu, Nepal; 2017.



Intervention rationale

Given the low death registration completeness rates, high occurrence of community deaths, and broader unreliability of COD and mortality statistics in Nepal, verbal autopsy (VA) for out-of-hospital deaths will be an essential tool to improve the quality and reliability of Nepal's mortality statistics. VA is a method for collecting information about a decedent's signs and symptoms before death from their family or next of kin, and interpreting these to diagnose the likely or most probable cause of death.¹⁹

This proposal describes a method to introduce automated VA into Nepal's national CRVS system to generate reliable COD information on a routine basis at both national and sub-national levels. Specifically, it details how key CRVS stakeholders, specifically the MOHP and DOCR, with technical assistance from the Bloomberg Philanthropies Data for Health Initiative at the University of Melbourne can:

1. Introduce routine automated VA into Nepal's mortality registration system, conducting VA interviews for all recent deaths (deaths within one year from date of interview)
2. Conduct training for appropriate staff to perform the VA interview and collect data
3. Establish a system of data collection, transference and storage
4. Develop capacity for staff to analyse and interpret VA interview data, including how to compare VA data against any available country-level mortality data.

Methods

This proposal details the introduction of automated VA into the national CRVS system. At the time of the completion of this proposal, Nepal's MOHP had been awarded a Bloomberg Philanthropies Data for Health Initiative Global Grant to conduct pilot VA activities in two districts over an 18-month period (without direct linkage to the death registration system). This proposal will inform the implementation of the grant's VA activities, however the scope of this proposal also includes the integration of VA into the CRVS system to provide nationally-representative cause-specific mortality fractions (CSMFs). The results of the VA activities implemented under the grant will not only provide evidence on COD patterns in Nepal, but will also inform how VA is scaled-up and eventually integrated into the CRVS system.

Sample design and size

Geographically, Nepal has three ecological belts: the northern mountain belt, the middle belt (which includes Kathmandu), and Terai (the plains), in the south. Across the three geographical belts are seven provinces which are further divided into 753 local levels, comprised of 460 rural municipalities, 276 urban municipalities, 11 sub-metropolitan cities and six metropolitan cities. There are 77 administrative districts in Nepal.²⁰

A two-stage cluster sampling is proposed to be used, and urban-rural stratification will be considered in the sampling of this pilot intervention. In the first stage of sampling, a total of fifteen districts will be selected: two districts randomly selected from each of the country's seven provinces, excluding Kathmandu Valley, and one district selected from Kathmandu Valley. In the second stage, one urban and rural municipality each will be selected randomly from each district. Finally, VA interviews will be conducted with the family/caretakers of 180 decedents from each municipality (10 deaths per month) over the 18-month period. Over 5000 VAs will be conducted across the country over the pilot period, which is a sufficient amount to estimate the major causes of death at a national level.

¹⁹ The University of Melbourne. *Challenges associated with automated VA training and rollout. CRVS best-practice and advocacy*. Melbourne, Australia: Bloomberg Philanthropies Data for Health Initiative, Civil Registration and Vital Statistics Improvement, The University of Melbourne; 2018

²⁰ CBS. *Nepal in Figures*. Kathmandu, Nepal: Central Bureau of Statistics; 2019.



Community death registration process

The proposed community death registration business process involves six primary stakeholders: (1) the decedent's family; (2) the community; (3) health facilities; (4) local/provincial/national CR offices; (5) the MOHP, and; (6) the National Statistics Office/DONIDCR.

For community deaths, the family will be responsible for declaring the death, following which a FCHV will notify the death to the local authority. The local authority will have two duties pertaining to each death. The first will be to issue the death notification form and number to the family, which the family will then take to the LR office for validation, registration of death through VERSP-MIS, and issuing of the death certificate. The second duty will be to send details of the death to the local health facility and LR office. This information will be used by the health facility to pre-populate the identity portion of the VA questionnaire, following which, the pre-populated VA form will be electronically transmitted to a community health worker (CHW). CHWs will be responsible for scheduling and conducting the VA interview with the decedent's family and referring the family to register the death. After conducting the VA, the CHW will transmit the completed VA questionnaire to the MOHP server. The VA diagnosed COD will be processed and stored on the MOHP server for quality control and analysis. Finally, the individual COD will be sent to the LR office and the health facility to counsel the family. The CR will receive the COD with the notification number to link to the death and process the death registration. Aggregated COD information will be used by the MOHP and shared with the National Statistics Office/DONIDCR to produce vital statistics.

Data collection procedure

FCHVs, teachers and social workers will be mobilised as notifiers for death events included in this pilot. These personnel will collect basic information on the decedents using a paper-based notification form. FCHVs already collect routine data on pregnant women and births occurring in their coverage area within the community, so this additional duty can be performed alongside their regular duties. Collected data will be shared with the civil registration office as a cross-reference to fill in any gaps in registration.

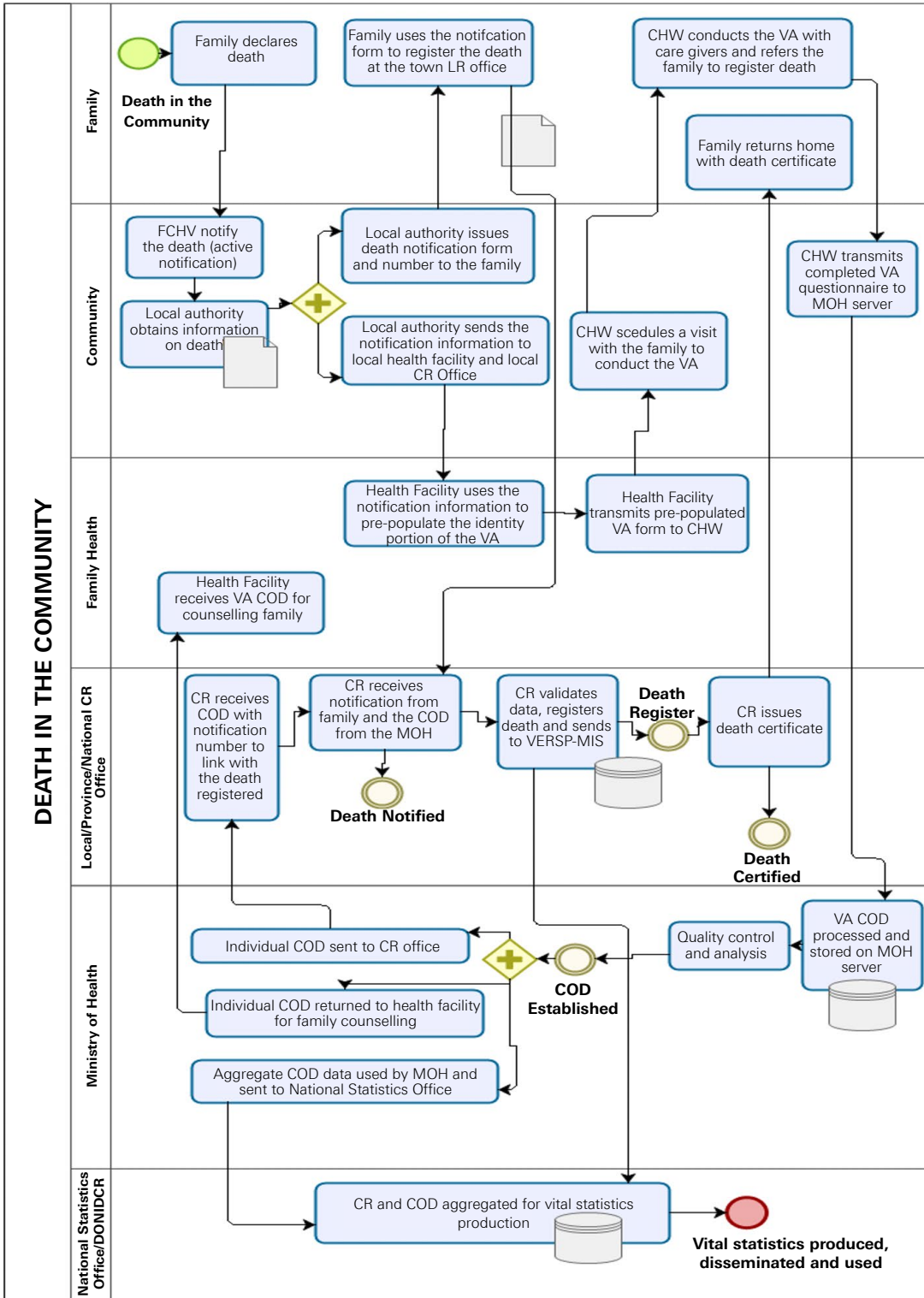
Trained VA staff (paramedics and CHWs with a minimum of two years tertiary education) will collect the decedent's address from the registry office and schedule an appointment with the decedent's family to conduct the VA interview. The interviews will be conducted in-person, using a mobile android tablet loaded with the electronic local language questionnaire. As the VA interviews will be an additional task for participating health workers, ongoing monitoring will be required to ensure the increased workload is manageable and not impacting their existing, routine duties. VA interviews will be conducted for all community deaths and deaths that did not receive medical death certification, where the death occurred within one year from the date of interview. Mobilisation of CHWs to collect COD data using automated SmartVA has been successful in other LMICs such as Bangladesh and Sri Lanka, among others,^{17,18,19} and this approach will help to cover the largest proportion of all community deaths and will be sustainable for the routine collection of COD data (see **Figure 3** for a detailed proposed business process map).

17 Chowdhury HR, Thompson SC, Ali M, Alam N, Yunus M, Streatfield PK. *A comparison of physicians and medical assistants in interpreting verbal autopsy interviews for allocating cause of neonatal death in Matlab, Bangladesh: can medical assistants be considered an alternative to physicians?* Popul Health Metr.8:23.

18 Nichols EK, Byass P, Chandramohan D, Clark SJ, Flaxman AD, Jakob R, et al. *The WHO 2016 verbal autopsy instrument: An international standard suitable for automated analysis by InterVA, InSilicoVA, and Tariff 2.0.* PLoS Med.15(1):e1002486.

19 Dharmaratne SD, Jayasuriya RL, Perera BY, Gunsekera E, Sathasivayyar A. *Opportunities and challenges for verbal autopsy in the national Death Registration System in Sri Lanka: past and future.* Popul Health Metr.9:21.

Figure 3: Potential business process for integrating community VA into the CRVS system (adapted from standard template by De Savigny)²⁰



²⁰ de Savigny D, Riley I, Chandramohan D, Odhiambo F, Nichols E, Notzon S, et al. *Integrating community-based verbal autopsy into civil registration and vital statistics (CRVS): system-level considerations*. *Glob Health Action*.10(1):1272882.



Data collection instrument/questionnaire

The Population Health Metrics Research Consortium's (PHMRC) shortened questionnaire will be used to interview respondents. The instrument/questionnaire consists of four modules: one general module, and one each for neonate (0-28 days); child (29 days to 11 years), and; adult and adolescent (12+ years) deaths.

Open Data Kit (ODK) software, the most widely used electronic data collection and management tool, will be utilised, with the VA questionnaire translated into Nepali (supported by the ODK platform). Forward (Nepali) and backward (English) translations of the PHMRC VA questionnaires (general and adult) has already been undertaken. To ensure consistency between the English and Nepali versions, two translators were utilised: one for forward and one for backward translation.

Pre-testing of the VA questionnaire was undertaken over a two-week period in the Morang district in late 2019. A total of 10 deaths in the preceding six months were selected from the hospital records of a tertiary-level hospital within the district, with the decedents ranging from 17 to 93 years. The interviews were carried out with the most knowledgeable kin (aged 18 years or above) of the deceased, with consent received before starting each interview. All questions from both modules were asked of each respondent, and what they understood of it was noted in a separate sheet. Key themes and issues noted of the questionnaires during the pre-test (see **Annex 2**) were addressed and incorporated into the two modules, both of which are now ready to be used in the pilot.

Staff training on automated verbal autopsy

A training manual will be produced in Nepali to aid training and provide a point of reference for staff during data collection. District supervisors will receive a day's orientation on the tool, the mapping process, and sampling procedures before joining the CHWs for a more in-depth five-day training in Kathmandu.

During the five-day training, a total of 30 people (supervisors and CHWs) will be trained on the questionnaire and data collection procedures. The training will include both theoretical and practical sessions, small group mock interviews, and supervised practice in the community. Lectures on subjects covered in the questionnaire will be led by experts from the Bloomberg Philanthropies Data for Health Initiative at the University of Melbourne. The focus of the training will be on clarity of content, instructions within the questionnaire, sequencing and phrasing of questions in local language, practice in interviewing techniques, handling of tablets (recording data, editing records, saving data and sending data to the server), and tablet troubleshooting.

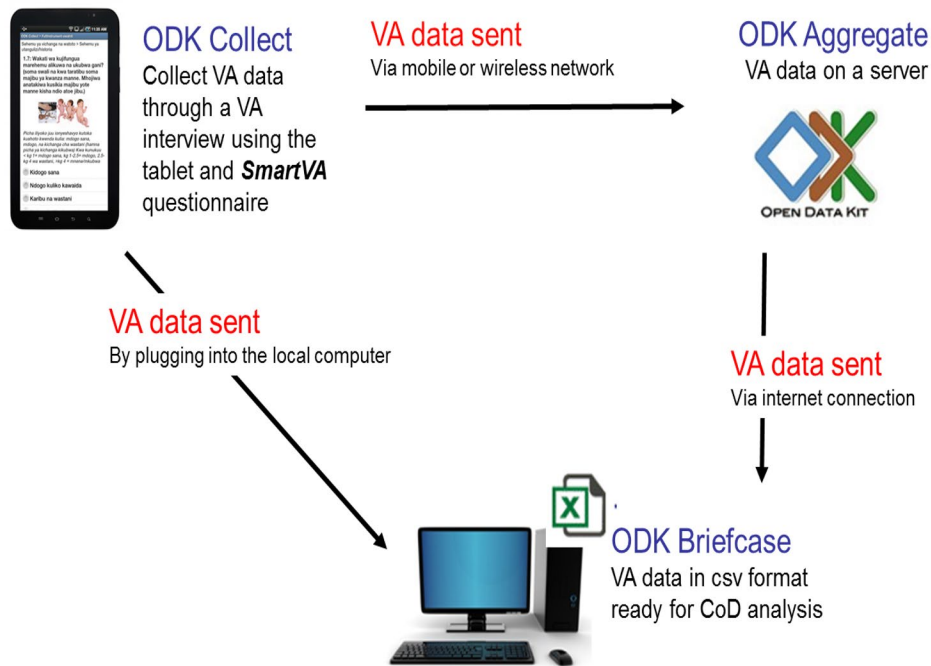
To help monitor the quality of VA data collected, supervisors will observe a sample of VA interviews and complete a checklist to assess the interview quality. A communication desk will be established in Kathmandu at the MOHP to ensure any data collection issues are identified and addressed rapidly and consistently.

Transfer of VA interview data and data archiving

VA data will be uploaded to the central server using ODK aggregate through the cell phone network. As a backup, should the online server not be set up in time, data from the tablets will be copied to a laptop/desktop and converted from .xml into .csv using ODK Briefcase. A VA monitoring system will also be implemented to track the number of VAs completed against the number of expected VAs.

An outline of the data collection, transference and storage process is shown in **Figure 4**:

Figure 4: Process of VA data collection, transference and storage



Cause of death diagnosis from VA interview data

SmartVA-Analyze version 2.0 will be used to implement the Tariff 2.0 diagnostic algorithm method,¹⁷ which interprets the VA interview data to diagnose/assign the most likely underlying COD. The primary use of Smart VA-Analyze will be, however, to generate cause-specific mortality fractions (CSMFs) to identify the leading causes of death (as a fraction) within the community.

Data analysis and interpretation

The University of Melbourne-developed Verbal Autopsy Interpretation, Performance and Evaluation Resource (VIPER) tool will be used to assess the completeness of death reporting for VA data, assess the plausibility of the age-sex distribution of deaths, and conduct a plausibility analysis on the CSMFs produced.¹⁸ These will be important monitoring and evaluation indicators to assess the performance of the new routine VA system. MOHP is best positioned to lead this analysis in collaboration with DONIDCR.

Ethics

Before data collection commences, ethical approval will be sought from the Nepal Health Research Council (NHRC), if necessary, and formal approval from the selected districts and municipal offices. Before starting an interview, enumerators will inform all household respondents of the purpose of the survey; show authorisation letters; inform respondents that they are under no obligation to participate in the survey, and that if they choose to participate, all responses will remain confidential. The enumerators will subsequently request verbal consent from the respondents before beginning an interview. Confidentiality will be maintained by assigning a unique number to each questionnaire, with responses linked to personal information through this unique number to be kept secure by the survey team.

¹⁷ Tariff diagnostic algorithms (a purely data driven approach) developed by PHMRC validated the algorithms against a large 'gold standard' diagnostic database of over 12 000 cases where the COD was reliably known to assess the performance of the algorithm. This is free software and is currently being widely used to diagnose the COD from VA data.

¹⁸ Adair, T, Chowdhury, M H, Cobos, de Savigny, D, Firth, S, Hazard, R, Joshi, R, Lopez, A, Mikkelsen, L, Noghavi, M, Nichols, E, Riley, I. *Guidelines for interpreting verbal autopsy data*. CRVS technical guides. The University of Melbourne, 2019.



Discussion

Plans for scale-up of automated VA

A high-level committee should be formed, comprising representatives of all stakeholder groups, to develop an implementation plan for the national scale up of VA in Nepal. This plan should be developed following a review of the pilot intervention's outcomes, and should clearly state the roles and responsibilities of the MOHA and MOHP. The plan should clearly articulate activities, costs and timelines to produce tangible progress towards national VA rollout. The existing CRVS National Steering and Technical Working Committees are well placed to provide an overarching governance structure for the planning, implementation and monitoring of Nepal's CRVS system moving forward, including oversight of the national VA implementation plan.

For a national scale-up to be effective, legal reforms based on the lessons learnt from this 18-month pilot study will need to be enacted, as the existing legal provisions are insufficient to support CRVS system strengthening.

Expected outcomes

Results from this pilot will provide guidance to establish a nationally representative system of COD data collection for community deaths, producing accurate and reliable data for evidence-based health planning and policy making which is vital to effectively allocate Nepal's limited resources.

The introduction of VA into Nepal's CRVS system will be a valuable source of public health evidence to understand the leading causes of death in Nepal, how they vary by geographic region, age and sex, and to monitor and develop effective and responsive health policies and programs.

Annex 1

Table 1: Online and offline death registrations by provinces (2017/18 - 2018/19)

Death registration by province: 2017/18 and 2018/19								
Province	2017/18(2074)				2018/19(2075)			
	Online		Offline		Online		Offline	
	Male	Female	Male	Female	Male	Female	Male	Female
Province 1	7,945	4,804	2,255	2,464	8,442	6,241	NA	NA
Province 2	1,123	732	8,420	6,068	1,411	1,131	NA	NA
Province 3	8,878	6,370	5,331	4,069	7,344	6,131	NA	NA
Province 4	2,409	1,746	6,260	5,007	3,117	2,529	NA	NA
Province 5	3,850	2,405	9,937	7,846	4,825	3,553	NA	NA
Province 6	745	442	1,370	904	700	436	NA	NA
Province 7	1,972	1,216	5,340	3,024	1,965	1,392	NA	NA
Total	26,922	17,715	38,913	29,382	27,804	21,413	NA	NA

Table 2: Online death registrations by age-sex (2018/19)

Online Death Registration of 2018/19(2075) by age and sex			
Age group	Male Death	Female death	Total Death
0-4	97	90	187
5-9	68	35	103
10-14	93	69	162
15-19	208	108	316
20-24	505	276	781
25-29	674	376	1,050
30-34	838	540	1,378
35-39	1,128	627	1,755
40-44	1,299	759	2,058
45-49	1,711	1,060	2,771
50-54	2,012	1,220	3,232
55-59	2,289	1,620	3,909
60-64	2,727	2,061	4,788
65-69	3,205	2,486	5,691
70-74	3,356	2,863	6,219
75-79	2,968	2,497	5,465
80-84	2,249	2,171	4,420
85-89	1,443	1,373	2,816
90-95	667	741	1,408
95+	267	441	708
Total	27,804	21,413	49,217
27,804	21,413	NA	NA



Annex 2

- Q1.1 to 1.4 → q1.3 & q1.4 should be adjusted as per the response of Q1.2. Good level of understanding across the section for the rest of the questions.
- Q2.1 to Q2.10 → most of the respondents didn't understand q2.4 so additional explanation is required. Good level of understanding across the section for the rest of the questions.
- Q3.1 to q3.53 → q3.41 was not very clear to the respondents, so it was reviewed and revised, and the revised version was used in community interview. Good level of understanding across the section for the rest of the questions.
- Q4.1 to q4.16 → Q4.14 was not understood by the respondents without additional explanation. Good level of understanding across the section for the rest of the questions.
- Q5.1 to Q5.3 → Good level of understanding: no need to revise.
- Q6.1 to Q6.18 → Q6.9 & Q6.10 additional explanation is required. Good level of understanding across the section for the rest of the questions.
- COPD “दिर्घ दमखोकी” was not self-explanatory to most of the rural respondents, additional explanation would be required in the questions itself.
- Overall, the interview took on an average of 40 minutes and there was good level of understanding of the tools.
- Proofreading for grammar should be conducted
- Q2.5, 2.9 and 3.29 should be written in English also to include terms for certain typical Nepali names (e.g. **बान्ता** Vomit).

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.

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CRICOS Provider Code: 00116K

Version: 0920-01

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