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CRVS COUNTRY PERSPECTIVES

Peru:

An exceptional example of CRVS
system advancement

March 2018



Applying country experiences and knowledge



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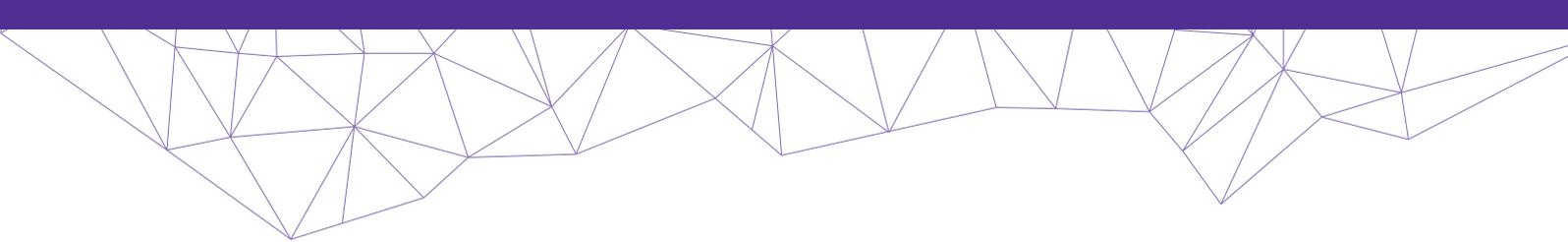
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Abbreviations

ANACONDA	Analysis of Causes of (National) Deaths for Action
BD4H	Bloomberg Philanthropies Data for Health Initiative
CNV	Certificado de Nacio Vivo
COD	cause of death
CRVS	civil registration and vital statistics
DFAT	Department of Foreign Affairs and Trade, Government of Australia
EA	Enterprise Architecture
INEI	National Institute of Statistics and Information Technology, Government of Peru
MDG	Millennium Development Goal
MEF	Ministry of Economy and Finance, Government of Peru
MINSA	Ministry of Health, Government of Peru
RENIEC	National Registry of Identity and Civil Status, Government of Peru
SINADEF	Electronic Death Notification System
VA	verbal autopsy
VCEV	Peruvian Civil Registry and Vital Statistics system

Key terms

Completeness:	(of registration). The extent to which births and deaths that occur are registered within the civil registration system.
Process map:	is a visual snapshot of the end-to-end activities, stakeholders and requirements of a system. Process mapping is becoming an essential early step in the comprehensive assessment of any CRVS system.
Verbal autopsy:	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 cause of death.

Peru: An exceptional example of CRVS system advancement

This *CRVS country perspectives* paper highlights Peru's impressive commitment to CRVS systems improvement. A number of major interventions are being implemented and will be described in detail below, including: improving coordination of the CRVS system and strengthening the capacity of Peru's national CRVS committee; supporting implementation of an online system for notification of deaths; using process mapping to better understand CRVS activities and potential bottlenecks; training physicians in medical certification of cause of death; and improving human capacity to produce demographic estimates.

- **Civil registration and vital statistics in Peru**
- **Backdrop to CRVS improvement efforts**
- **The importance of high-level political commitment**
- **CRVS-strengthening activities as part of the BD4H Initiative**
 - **Improving coordination**
 - **Implementing a system for online death notification and certification**
 - **Improving mortality statistics from hospitals**
 - **Building capacity in demographic analysis**
- **Other CRVS activities**
- **Moving forward**

The Government of Peru has prioritised strengthening its CRVS system.

Civil registration and vital statistics in Peru

With a population of over 31 million people, the South American country of Peru – whose borders stretch from the Pacific Ocean to include sections of the Amazon basin (**Figure 1**) - has over the past decade been one of the region's fastest-growing economies.¹ Encouragingly, the Government of Peru is utilising its economic success to invest in the health of the Peruvian people. This is evidenced by the President of Peru's commitment in early 2017 to increase public health financing to nearly 6% of GDP by 2021.² The Government of Peru recognises this investment will be vital not only for Peru's achievement of the Sustainable Development Goal 2030 Agenda, but also importantly for achieving Peru's 2021 Bicentennial Plan and its special emphasis on health, education and social development.³

A key focus of the Government of Peru's investment in health and development is on strengthening the nation's civil registration and vital statistics (CRVS) system (**Box 1**). Strengthening the nation's CRVS system will be crucial for the Government of Peru to develop informed, cost-effective health (and intersectoral) policy and planning initiatives, which will further support the Peruvian Government's efforts to address health inequities, provide universal health coverage, and optimally respond to current and future health threats.^{4,5,6}

¹ World Bank (2017). *The World Bank in Peru*. Overview. Available at: <http://www.worldbank.org/en/country/peru/overview>

² Pan American Health Organization/World Health Organization. *President of Peru and PAHO Director analyze major health challenges* (Lima, 14 March 2017). PAHO. Available at: http://www.paho.org/hq/index.php?option=com_content&view=article&id=13065%3Apresidente-peru-recibe-directora-ops-analizar-retos-salud-hacia-2021&catid=1443%3Aweb-bulletins&Itemid=135&lang=en

³ Plan Bicentenario: Peru hacia el 2021 (March 2011). Document: 054-2011-PCM. Available at: https://theredddesk.org/sites/default/files/plan_bicentenario_peru_hacia_el_2021.pdf

⁴ Huicho L, Trelles M, Gonzales F. National and sub-national under-five mortality profiles in Peru: a basis for informed policy decisions. *BMC Public Health* 2006; 6:173.

⁵ Huicho L, Trelles M, Gonzales F et al. Mortality profiles in a country facing epidemiological transition: An analysis of registered data. *BMC Public Health* 2009; 9:47.

⁶ Setel PW, Macfarlane SB, Szreter S. A scandal of invisibility: making everyone count by counting everyone. *The Lancet* 2007; 370:1569–1577.

This is particularly important in the context of Peru because each of the country's three regions has a very distinct birth, death, disease and injury profile due to differing epidemiological, socioeconomic and geographical characteristics.^{4,5} Therefore, each region will have different health needs and priorities, which will in turn require a suitable health response from the Peruvian government.

Figure 1: Map of Peru



Source: Adapted from World Atlas, available at worldatlas.com/webimage/countrys/samerica/pe.htm, and Maphil, available at maphill.com/peru/detailed-maps/detailed-satellite-map/



Box 1: CRVS snapshot

Civil registration is the process through which major vital events that occur in a population – including births, deaths, marriages, divorces and adoptions – are officially recorded. Civil registration is the continuous, permanent, compulsory and universal recording of the occurrence and characteristics of vital events in a population, in accordance with the law.⁷ CRVS systems generate vital statistics using the information contained in individual civil registration records, and such statistics include:

- Numbers and rates of births.
- Key characteristics of births, such as births by sex, location, and maternal age.
- Numbers and rates of deaths.
- Deaths by key characteristics such as age, sex, location and cause of death (COD).

The backdrop to current CRVS improvement efforts in Peru

In Peru, three key government agencies are responsible for supporting the nation’s CRVS system. They are:

1. The Ministry of Health (MINSA).
2. The National Registry of Identity and Civil Status (RENIEC).
3. The National Institute of Statistics and Information Technology (INEI).

Since 2001 MINSA, RENIEC and the INEI have had a framework agreement in place for the improvement of Peru’s CRVS system. This framework agreement is periodically renewed and the last agreement, signed in 2013, is valid until December 2018. This agreement clarifies the different roles played by these three agencies in supporting Peru’s CRVS system. This is especially with respect to death certification and generation of the country’s mortality data. For example, MINSA medically certifies the death, RENIEC legally certifies the death, while the INEI performs Peru’s mortality data calculations and is responsible for providing the country’s official birth and death figures.

RENIEC was created in 1995. Before then, the country’s vital events were registered in the civil registry offices in Peru’s municipalities. In turn, the civil registry offices were tasked with sending the information they collected on vital events (such as births, deaths and marriages) in their respective municipalities to the INEI. However, once RENIEC was established in 1995, RENIEC registry offices were created in the capital city of each of Peru’s three regions, and then the RENIEC office in the regional capitals assumed administrative responsibility of the municipal registry offices. RENIEC would then inform the INEI of the number of registered vital events. This shift in authority aimed to streamline and better organise the collection and quality of information on vital events across the country.⁸ However, the data supplied by RENIEC to INEI was not disaggregated, and thus health and other important social disparities (relating to gender, disability, or the health of Peru’s indigenous peoples) remained invisible.

One of the features of success of Peru’s CRVS system is the agreement in place between the three main agencies involved.

⁷ UN Department of Economic and Social Affairs (Statistical Division). *Principles and recommendations for a vital statistics system, revision 3*. New York, USA: UNSD; 2014.

⁸ Iguíñiz-Romero R, Palomino N. Data do count! Collection and use of maternal mortality data in Peru, 1990-2005, and improvement since 2005. *Reproductive Health Matters* 2012; 20:174-184.



Monitoring progress towards the MDGs was an important factor in Peru's ongoing commitment towards better mortality data.

After 2005, national efforts to improve mortality data from both regional and national levels continued, particularly as part of Peru's broader commitment to achieve the Millennium Development Goals' (MDGS) three global health goals (MDG 4: Reduce child mortality; MDG 5: improve maternal health; MDG 6: Combat HIV/AIDS, malaria and other diseases).^{9,10} Indeed, Peru has had "huge success" in achieving the health MDGs and "was ranked first globally among 75 low-income and middle-income countries in the reduction in neonatal mortality and second in the reduction of under-5 mortality; stunting prevalence was cut in half; and equity in health-care use and in health outcomes improved significantly".¹¹ Political will, multi-sectoral dialogue, citizen participation in policy-making, as well as long-term civil society and community advocacy have all played a contributory role in securing the country's overall MDG health performance.^{12,13}

The role of high-level political commitment

An online birth registration system was launched in 2012 by the Ministry of Health.

The Government of Peru appreciates that – first and foremost - the rights of the citizens of Peru are enhanced through a strong CRVS system.¹⁴ It follows that in 2012, the Certificado de Nacio Vivo (or CNV) was launched online. The launch of this web application was a significant achievement for the Government of Peru; this meant that doctors and obstetricians, in health facilities with internet connections throughout the country, could complete the birth certificate online immediately following the birth of the child. A copy of the birth certificate (that also contained a footprint of the child), was then printed and given to the newborn's parents and then the parents could present the birth certificate to their local municipal civil registry office to be issued with the official or legal birth certificate document. This latter document is particularly crucial because it is the proof needed for the newborn (or rather, their parent on behalf of the child) to be able to access the national identity card, which will later enable the child's access to education, health services, and so forth.

Registry offices are available in major health facilities to complete the registration process and provide birth certificates to newborns.

Today, the online CNV has reached 85% coverage of all births – a tremendous achievement.¹⁵ This has occurred through ongoing high-level, inter-agency commitment and collaborative support. For example, Peru's Ministry of Economy and Finance (MEF) and the Ministry of Development and Social Inclusion have contributed to the MINSA by financing the implementation of the CNV online, and by providing an economic incentive to the budget of the Regional Directorate of Health (and their networks) to comply with implementing the CNV in establishments in their territorial jurisdiction. Additionally, the MEF has financed, through the RENIEC, the implementation of registry offices in the main health establishments that attend deliveries of newborns and that have already implemented the CNV, so that when a child is born, they leave the hospital with their official or legal birth certificate.

Following the success of Peru's online birth certification and notification system, the Government of Peru is now turning its attention to improving death registration completeness across the country. This is especially important as approximately 57% of all deaths are not registered.

9 United Nations Development Program. Peru country progress report 2013. <http://www.undp.org/content/undp/en/home/librarypage/mdg/mdg-reports/lac-collection.html>.

10 Save the Children (2013). Surviving the first day: state of the World's Mothers 2013. http://www.savethechildren.org/atf/cf/%7B9def2e8e-10ae-432c-9bd0-df91d2eba74a%7D/SOWM-FULL-REPORT_2013.PDF

11 Cotlear D, Christel Vermeersch. Peruvian lessons for the transition from MDGs to SDGs. *The Lancet Global Health* 2016; 4:e353-e354.

12 Huicho L, Huayanay-Espinoza CA, Herrera-Perez E, et al. *BMC Public Health* 2016; 16(Suppl.2):796.

13 Iwami M, Petchey R. A CLAS act? Community-based organizations, health service decentralization and primary care development in Peru. *Journal of Public Health Medicine* 2002; 24:246-251.

14 Felix Ortega de la Torre, RENIEC, Peru. Linking civil registration, identification, and social programs. Youtube interview. IDRC/CRDI; 2017. Available at: <https://www.youtube.com/watch?v=j2JmKpeiwR0&index=3&list=PLhbb-JA5bO7OGgKn0rLZUvKlZICnomTHE>

15 Prior to the introduction of the CNV, the paper-based birth notification system captured only 65% of all births in Peru.



An overview of CRVS strengthening activities occurring in Peru as part of the Bloomberg Philanthropies Data for Health Initiative

The BD4H Initiative is working with sixteen countries and two cities.

Peru is part of the Bloomberg Philanthropies Data for Health (BD4H) Initiative, funded by Bloomberg Philanthropies and the Australian Government Department of Foreign Affairs and Trade (DFAT). BD4H is working with sixteen countries and two cities to increase the registration of births and deaths, improve the quality of COD information at hospitals, apply verbal autopsy (VA) to better understand probable COD in communities, and to produce high-quality data sets and data analysis skills for policy and program analysis.

In collaboration with BD4H, the Government of Peru aims to:

1. Improve the completeness and quality of health sector mortality data, particularly with respect to hospital or health facility based deaths; and
2. Improve national capacity to generate demographic estimates used for vital statistics (including estimating registration completeness) (**Box 2**).

Box 2: What is registration completeness?

The completeness of registration is defined as the percentage of actual births or deaths in a population that are registered. Put another way, it is the number of registered births or deaths divided by the actual number of births or deaths in a population.¹⁶

Subsequently, a number of major interventions are being implemented by the Government of Peru in collaboration with BD4H. These include:

- Improving coordination of the CRVS system and strengthening the capacity of Peru’s national CRVS committee.
- Supporting implementation of an online system for the notification of deaths.
- Improving coverage of mortality data for health facility deaths using Enterprise Architecture, routine studies of linking of records, as well as introducing institutional incentives to improve capture and quality of mortality data.
- Training physicians in medical certification of cause of death and introducing such training as an institutional requirement at all stages of the medical career.
- Improving human capacity to produce demographic estimates.

An overview of the country achievements relating to these interventions will be outlined below.

Improving coordination of the CRVS system

Having a national CRVS committee, with an agreed work-plan and regular meetings, has been critical to the success of CRVS-strengthening efforts in Peru.

The Government of Peru aims to build commitment and understanding among key CRVS stakeholders of the importance of cause of death data for population health policy and planning. Encouraging such understanding of the importance of these data for CRVS will further enhance the government’s efforts to encourage stakeholders to efficiently produce quality and reliable birth and COD data.

¹⁶ University of Melbourne. *The importance of routinely measuring birth and death registration completeness*. CRVS summaries. Melbourne, Australia: The University of Melbourne, Civil Registration and Vital Statistics Improvement, Bloomberg Philanthropies Data for Health Initiative: 2018.



Consequently, a national CRVS committee known as the Technical Committee for Inter-Institutional Coordination (comprising INEI, MINSAs, and RENIEC), have devised an annual work plan and have been meeting regularly to co-ordinate implementation efforts. In addition to their own work plan, the Inter-Institutional Coordinating Committee has developed a broader plan for institutionalisation of CRVS strengthening activities at the national and subnational level. This includes the formation of a network of collaborators at the national and local levels, with special focus on the Medical College of Peru and the universities. The Inter-Institutional Coordinating Committee has also developed indicators and a system to monitor the coverage and quality of cause of death data from medical certification.

Also for the first time, and most encouragingly, a specialist subcommittee on mortality has been formed that sits under the Inter-Institutional Coordinating Committee. This committee's role is to enhance the multi-pronged efforts to produce meaningful mortality data nationally and at the community-level.

Supporting implementation of an online system for death notification

SINADEF is an online system for recording data on the medical certificate of cause of death.

In 2016, with the support of BD4H, the Government of Peru implemented the nation's new Electronic Death Notification System, known as SINADEF. Operationalisation of SINADEF was clearly successful: by early 2017, almost 90 health facilities nationwide had produced over 4,100 electronic death certificates since the online system's introduction. This is further testimony to the underlying IT supports in place for this to occur, and the ease-of-use of the SINADEF for health personnel across Peru. Consequently, SINADEF has vastly improved the coverage, quality and availability of the death records in Peru's CRVS system. In turn, this increases the efficiency and timeliness of the government's ability to produce mortality data and official death certificates. This is because SINADEF incorporates information not only from death certificates that now can be completed through the online centralised system, but also supports consolidation of the transcription of death data from paper-based death certificates into an online format.

Importantly, the online death certificate accounts for notification of the vital event as well as the medically certified cause of death. SINADEF will permit an increase in the coverage of deaths reported to MINSAs and recorded in RENIEC.

Improving the coverage of mortality data for deaths that occur in hospitals or health facilities

Enterprise Architecture (EA), also known as business process mapping (**Box 3**), is a methodology that can help countries to understand and improve their CRVS systems and processes. Following an introductory in-country workshop on process mapping in October 2016 with key INEI personnel in Lima, process maps for deaths in hospitals, as well as deaths in the community have been designed.

A process map is a visual snap-shot of the activities, stakeholders, and requirements of a system.

The Government of Peru's engagement in process mapping of its CRVS system is an excellent way the country can identify systems challenges and bottlenecks, as well as visually identify systems solutions for cost-effective and sustainable CRVS systems strengthening moving forward. For instance, a positive outcome of the process mapping exercise is that it highlighted the need for Peru to strengthen law and policy relating to CRVS, especially in regards to removing disincentives or barriers to notification and/or registration of vital events.

Box 3: What is process mapping?

A process map is a visual snapshot of the end-to-end activities, stakeholders and requirements of a CRVS system. When undertaking a process mapping exercise for CRVS systems strengthening, countries should aim to create maps for four CRVS systems processes:

1. Process map for births in the community.
2. Process maps for deaths in the community.
3. Process maps for births in a health facility.
4. Process maps for deaths in a health facility.¹⁷

Strengthening certification practice through physician training

The Government of Peru aims to strengthen medical certification practice and therefore improve the quality of COD data nationally. The poor quality of medical certification - in Peru and in many countries elsewhere in the world - is usually owing to the fact that physicians do not receive any training on the medical certification of cause of death, either in medical school or as part of their continuing professional medical education. Therefore, to close this training gap, the Government of Peru is embarking on a certification training program of Peru's physicians. Indeed, in collaboration with BD4H, as of early 2017, close to 1,800 Peruvian physicians had received MCCOD training, as well as 252 statisticians (who enter death certificates into SINADEF) (Figure 2). This training targeted physicians who mainly work in public hospitals and legal medicine divisions within government.

Importantly, upskilling Peru's physicians in medical certification will also strengthen the process of implementing SINADEF. MINSA has also contacted Peru's medical schools throughout the country requesting inclusion of certification training in medical school academic programs.

Figure 2: Training in the medical certification of cause of death in Peruvian hospitals (used with permission)



¹⁷ de Savigny D, Cobos Muñoz D. *Understanding CRVS systems: The importance of process mapping*. CRVS development series. Melbourne, Australia: The University of Melbourne; Civil Registration and Vital Statistics Improvement, Bloomberg Philanthropies Data for Health Initiative; 2017.

Box 4: What is the medical certification of cause of death?

Worldwide, death certification is routinely conducted by trained medical physicians, supported by national policy and legal frameworks. The physician is often thus tasked – in the ordinary course of performing their professional duties – with recording the underlying COD on a certificate that is aligned with the WHO International Form of Medical Certificate of Cause of Death (often referred to as the ‘medical death certificate’). To correctly fill in the medical certificate, the physician must identify the disease directly causing the death, and then trace the sequence of events back to the underlying COD. The physician must also enter other diseases or conditions contributing to the death in the death certificate form. However, very few physicians have received certification training. This is the case in low, middle and high-income countries alike.¹⁸

Improving human capacity to produce demographic estimates

Working in collaboration with BD4H, the aim of this intervention is to improve the quality of data for programmatic decisions and efficiency in assigning resources, based on more exact national vital statistics information. Subsequently, a training course was conducted for INEI personnel on ‘Denominators for small areas and treatment of internal migration’. This intervention was directed at supporting INEI to strengthen a very specific competency among INEI team members – that is, obtaining the population denominator when the geographic area is small. Such training is important because it contributes to the building of better death and birth estimates – and complete registration – at national and subnational levels in Peru.

Specialised research activities have taken place to actively examine why deaths are ‘getting lost’ in the CRVS system.

Other CRVS-strengthening activities

In late 2016 BD4H supported a qualitative investigation in isolated and remote locations in all three of Peru’s regions (Amazon, coastal, and mountain) to examine how and why death registration information was ‘getting lost’ or falling through CRVS system cracks. Staff at local municipal civil registry offices, hospitals, cemeteries and funeral homes, as well as statisticians from Regional Health Directorates, were subsequently interviewed (**Figure 3**). MINSA aims to utilise the information collected from the interviews to assist it formulate incentives for death registration. In 2017, and following on from this BD4H sponsored-study, the Ministry of Finance and MINSA have been in discussions around potential financial incentives for death registration.

¹⁸ University of Melbourne. *Reducing barriers to the accurate medical certification of cause of death*. CRVS development series. Melbourne, Australia: The University of Melbourne, Civil Registration and Vital Statistics Improvement, Bloomberg Philanthropies Data for Health Initiative; 2018.



Figure 3 Local cemeteries



Training on how to use the data quality assessment software, ANACONDA (Analysis of Causes of (National) Deaths for Action, **Box 5**), was also conducted in April 2017 by members of BD4H's University of Melbourne team, with staff from MINSa, INEI and the Ministry of Health in Ecuador attending. This course introduced participants to a series of steps to help them check the accuracy and completeness of mortality and COD data using the tool into which Excel files with COD data by age and sex can be imported. Participants received guided instruction and practice in using the ANACONDA tool and interpreting the results.

In addition to the above, in August 2017 Peruvian statisticians from Lima and an additional five states attended a workshop coordinated by MINSa on ICD-10 training.

Box 5: What is ANACONDA?

ANACONDA is an electronic tool that assesses the accuracy and completeness of mortality and COD data. It checks for potential errors and inconsistencies in the data and provides users with an understanding of basic epidemiological and demographic concepts to interpret their data.¹⁹

Moving forward: Next steps

This *CRVS country perspectives* paper highlights Peru's impressive commitment to CRVS systems improvement, including the many complementary CRVS system-strengthening activities that have occurred in such a short amount of time.

Moving forward, the Government of Peru will continue to prioritise strengthening governance to guarantee institutionalisation and sustainability of a fully functional CRVS system, expand coverage of birth and death data nationally, and improve the quality of the nation's COD data. A legal review will be carried out to better understand legislation that may be contributing to disincentives, or acting as a barrier, to death registration and notification. Improvements of standards and regulations should also make use of SINADEF more efficient.

¹⁹ Mikkelsen L, Lopez AD. *Guidance for assessing and interpreting the quality of mortality data using ANACONDA*. CRVS Resources and tools. Melbourne, Australia: The University of Melbourne, Civil Registration and Vital Statistics Improvement, Bloomberg Philanthropies Data for Health Initiative; 2017.



Iris software for automated mortality coding will be introduced, and Iris training is planned for statistical personnel in MINSA and the INEI in late 2017 (**Box 6**). A country-appropriate dictionary for Peru's use of the Iris software is also under development. Implementation of Iris in Peru should greatly increase the quality and timelines of COD data to support informed health decision-making. Significantly, the Iris software should lead to the eventual removal of manual ICD-10 coding and is likely to lead to further increases of computerised data from local government areas.

Box 6: What is Iris?

Iris is an automated coding software that allows death records to be coded according to ICD-10 rules and standards. Iris has been installed in a number of European Union countries, as well as by the the Office for National Statistics in the United Kingdom and by Statistics Canada. In the Asia-Pacific region it is used by the Australian Bureau of Statistics and the Fijian Statistical Office. The Philippines is the first country in Asia to implement Iris: another BD4H initiative.²⁰

Automated methods of analysing Verbal Autopsy questionnaire data will also be introduced in Peru. The use of Smart VA Auto Analyse will allow physicians in Peru to obtain a probable COD that can be used to assist completion of the medical certificate of cause of death and subsequent death registration.

Finally, the Government of Peru plans to continue to raise awareness and training on medical certification of cause of death and SINADEF among medical staff in all 26 regions of the country to improve death certification and notification practices. It will be important that MINSA continues the process of certification upskilling, especially involving Peru's private physicians. MINSA is also keen to collaborate with the Medical College of Peru to encourage Schools of Medicine and the Association of Schools of Medicine to incorporate MCCOD training into their tertiary curriculum. Training Peru's future physicians on the importance of medical certification, and the generation of quality cause of death data for population health planning purposes, will be key to enhancing the future sustainability and reliability of mortality statistics generated from Peru's CRVS system.

²⁰ University of Melbourne. Topic 6: CRVS tools (Iris ICD coding tool). CRVS Knowledge Gateway: Learning Centre. Available at: <https://crvsgateway.info/learningcentre/improving-quality-and-presentation-of-crvs-data/iris-icd-coding-tool>

Related resources and products

University of Melbourne, BD4H Initiative, CRVS Knowledge Gateway: Library

<https://crvsgateway.info/library>

Action guide on improving the quality of cause of death data in hospitals. CRVS summaries.

CRVS country overview: Peru. CRVS summaries.

Intervention: Improving registration practices. CRVS summaries.

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

Strategies for improving the quality of cause of death data in hospitals. CRVS development series.

Strengthening CRVS systems through effective legislation. CRVS development series.

The importance of routinely measuring birth and death registration completeness. CRVS summaries.

Understanding CRVS systems: The importance of process mapping. CRVS development series.

University of Melbourne, BD4H Initiative, CRVS Knowledge Gateway: Learning Centre

<https://crvsgateway.info/learningcentre>

Topic 3: CRVS processes.

Topic 4: Cause of death in CRVS.

Topic 6: CRVS tools.

University of Melbourne, BD4H Initiative, CRVS Knowledge Gateway: Courses

<https://crvsgateway.info/courses>

ANACONDA.

Estimating completeness of birth and death registration.

Medical certification of cause of death.

Further reading

UN Department of Economic and Social Affairs (Statistical Division). *Principles and recommendations for a vital statistics system, revision 3*. New York, USA: UNSD; 2014. Available at: <https://unstats.un.org/unsd/demographic/standmeth/principles/M19Rev3en.pdf>

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:



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