



# National Sample Vital Registration System: A sustainable platform for COVID-19 and other infectious diseases surveillance in low and middle-income countries

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Sample vital registration systems (SVRS) provide strong and sustainable platforms for continuous monitoring of mortality, causes of death, diseases and population health at national and subnational levels that low- and middle-income countries can reliably and quickly develop and implement to monitor outbreaks and pandemics such as COVID-19.

The COVID-19 pandemic raises the critical need for effective national surveillance systems, capable of detecting the onset of outbreaks rapidly but also sustainable platforms for mortality and cause of death (CoD) surveillance that allow rapid data collection to address questions during and after epidemics or crises. These pre-, during, and post-outbreak functions are necessary for effective responses. They are particularly needed in resource-constrained countries where health systems are limited. Low- and middle-income countries (LMIC) struggle to establish exhaustive surveillance platforms at community level for national response in real time. Systems such as Integrated Disease Surveillance and Response are mostly limited to health facilities. Beside, they do not generate standard mortality and CoD indicators over time. Many organizations, including the World Health Organization, react to the COVID-19 by developing tools to support countries with rapid mortality surveillance strategies. However, a significant challenge is the crucial lack of comparable historical data allowing an assessment of excess mortality due to the COVID-19 [1,2]. Well-designed sample vital registration systems (SVRS) offer rapid, and sustainable platforms for achieving the need for real-time data and the ability to nest data collection to respond to rising questions [3].

SVRS complements and reinforces other existing systems, including Civil Registration and Vital Statistics (CRVS), Health Information Systems, and household surveys.

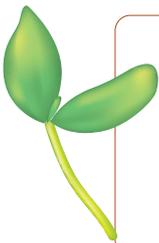


**Photo:** From COMSA Project showing interview of a mother with a baby. Data are collected directly on a phone (from the authors' own collection, used with permission).

An SVRS uses a national random sample of communities to continuously track population and demographic events to measure multiple indicators including mortality and CoD. It constitutes a second alternative to exhaustive monitoring of the entire country population, as in civil registration and vital statistics (CRVS) systems. An SVRS fulfills the features needed in a multi-surveillance system. First, with most deaths occurring at the community level, it is an ideal platform for generating recent nationally representative mortality and causes-specific mortality rates. It allows an understanding of the seasonal patterns of deaths over time, thus permitting the measurement of any excess mortality due to temporary crises, as well as changes in CoD patterns by socio-demographic characteristics. Second, the system is often structured and staffed from communities to national levels, with long-term staff, making it ready for addition of data collection modules. Third, the system is ready for drawing subsample for specific purposes, including surveillance of diseases. The clusters will be well-established platforms for determining important epidemic transmission patterns, needed for adequate response. The rapid growth in digital solutions offers a real-time data collection system solution, allowing rapid data access and analysis. SVRS complements and reinforces other existing systems such as CRVS, Routine Health Information Systems, and household survey programs, and can serve to assess the accuracy, completeness and quality of these systems.

An SVRS can be developed and operationalized within a short period. However, to date, few LMICs are implementing it, as most continue to rely exclusively on household surveys. India initiated an SVRS in the 1970s and now covers 7597 clusters with over 7 million population. It produces reliable national and state representative mortality and CoD statistics [4]. The Bangladesh SRVS system was initiated in the 1980s in 103 communities and progressively increased to 2012 communities, covering about 700 000 people [5]. China's SVRS integrated since 2013 two separate parallel systems and collects data from 601 clusters and about 324 million people [6]. In Africa, Mozambique launched an SVRS in 2017 with 700 clusters, about 900 000 people, producing mortality and CoD indicators [7]. The government of Mozambique is implementing the SVRS with technical assistance from the Johns Hopkins University [8]. Using innovative digital tools, the system is set up for real-time data production, analysis, and release. The government is mobilizing the system to support its response to the COVID-19 pandemic, starting from the epicenter province in northern Mozambique.

SVRS systems have not received needed attention because the international community has hitherto focused on promoting household surveys. The emergence of outbreaks, such as the Ebola epidemic and the COVID-19 pandemic, which call for more permanent monitoring systems, provides further impetus for investment in sustainable and multi-purpose national SRVS.



**Funding:** Bill & Melinda Gates Foundation.

**Author contribution:** AA wrote initial draft, AA, IM, AA, EG, PD, REB reviewed and edited the draft. All authors reviewed and approved the manuscript.

**Competing interests:** The authors completed the ICMJE Unified Competing Interest form (available upon request from the corresponding author). All authors are funded by the BMGF for the implementation of the COMSA project in Mozambique.

- 1 Vital Strategies, World Health Organization. Revealing the Toll of COVID-19: A Technical Package for Rapid Mortality Surveillance and Epidemic Response. New York: Vital Strategies. 2020. Available: [https://preventepidemics.org/wp-content/uploads/2020/05/RMS\\_Report.pdf](https://preventepidemics.org/wp-content/uploads/2020/05/RMS_Report.pdf). Accessed: 25 June 2020.
- 2 Setel P, AbouZahr C, Atuheire EB, Bratschi M, Cercone E, Chinganya O, et al. Mortality surveillance during the COVID-19 pandemic. *Bull World Health Organ.* 2020;98:374. [Medline:32514207](#) [doi:10.2471/BLT.20.263194](#)
- 3 Setel PW, Sankoh O, Rao C, Velkoff VA, Mathers C, Gonghuan Y, et al. Sample registration of vital events with verbal autopsy: a renewed commitment to measuring and monitoring vital statistics. *Bull World Health Organ.* 2005;83:611-7. [Medline:16184280](#)
- 4 Office of the Registrar General & Census Commissioner. India. Available: [http://censusindia.gov.in/vital\\_statistics/SRS/Sample\\_Registration\\_System.aspx](http://censusindia.gov.in/vital_statistics/SRS/Sample_Registration_System.aspx). Accessed: 25 June 2020.
- 5 Bangladesh Bureau of Statistics (BBS). Report of Bangladesh Sample Vital Statistics 2018. Dhaka, Bangladesh, May 2019. Available: [www.bbs.gov.bd](http://www.bbs.gov.bd). Accessed: 25 June 2020.
- 6 Liu S, Wu X, Lopez AD, Wang L, Cai Y, Page A, et al. An integrated national mortality surveillance system for death registration and mortality surveillance, China. *Bull World Health Organ.* 2016;94:46-57. [Medline:26769996](#) [doi:10.2471/BLT.15.153148](#)
- 7 COMSA. Available: [www.Comsamozambique.org](http://www.Comsamozambique.org). Accessed: 25 June 2020.
- 8 Nkengasong J, Gudo E, Macicame I, Maunze X, Amouzou A, Banke K, et al. Improving birth and death data for African decision making. *Lancet Glob Health.* 2020;8:e35-6. [Medline:31839138](#) [doi:10.1016/S2214-109X\(19\)30397-3](#)

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