World Health Organization
REGIONAL OFFICE FOR Africa

# Improving mortality statistics and cause of death recording and its linkages to CRVS systems in Africa

## I. Introduction

1. WHO in its ***Improving Mortality Statistics in Africa Technical Strategy 2015-2020***[1], calls for an immediate need to design better mortality statistics systems. The regional strategy promotes three key elements: 1) timely registered deaths by sex, age, and place of occurrence; 2) a focus on improving death registration and cause of death at health facilities; and 3) representative and scalable designs for identifying deaths and their causes at community level.

2. One of the lessons from the 2014-2016 West African Ebola virus epidemic was that a strong health information and national statistics system with the ability to monitor basic and key indicators at an individual and aggregated level is essential for resilient health systems[2]. Better mortality statistics systems are of strategic importance not only for predicting health status and epidemiological transitions, but also detecting impending health threats in real time. It merits the continued and joint efforts from health and non-health sectors. More than one third (45 out of 120) of the SDGs indicators proposed in 2016, require a well-functional Civil Registration and Vital Statistics (CRVS) system to track timely and reliably[3]

3. This report discusses recent progress and challenges, while using assessment, reviews, follow-up and discussions from the regional network. Specifically, the role of the health sector and WHO in improving mortality statistics and cause of death recording and its linkages to CRVS systems is examined. Ways forward, particularly priority actions to overcome implementation bottlenecks, are identified. The objective is to continue working with the countries to convert efforts at all levels and demonstrate improvement on the system in the coming years.

## II. Current situation

*4.* Out of the total 54 member states in Africa, 12 countries have registered more than 60 per cent of deaths in its recent year (Figure 1). They have already met the 2020 regional target of registering 60 per cent of death, but needs to sustain the progress towards universal coverage and improve the quality

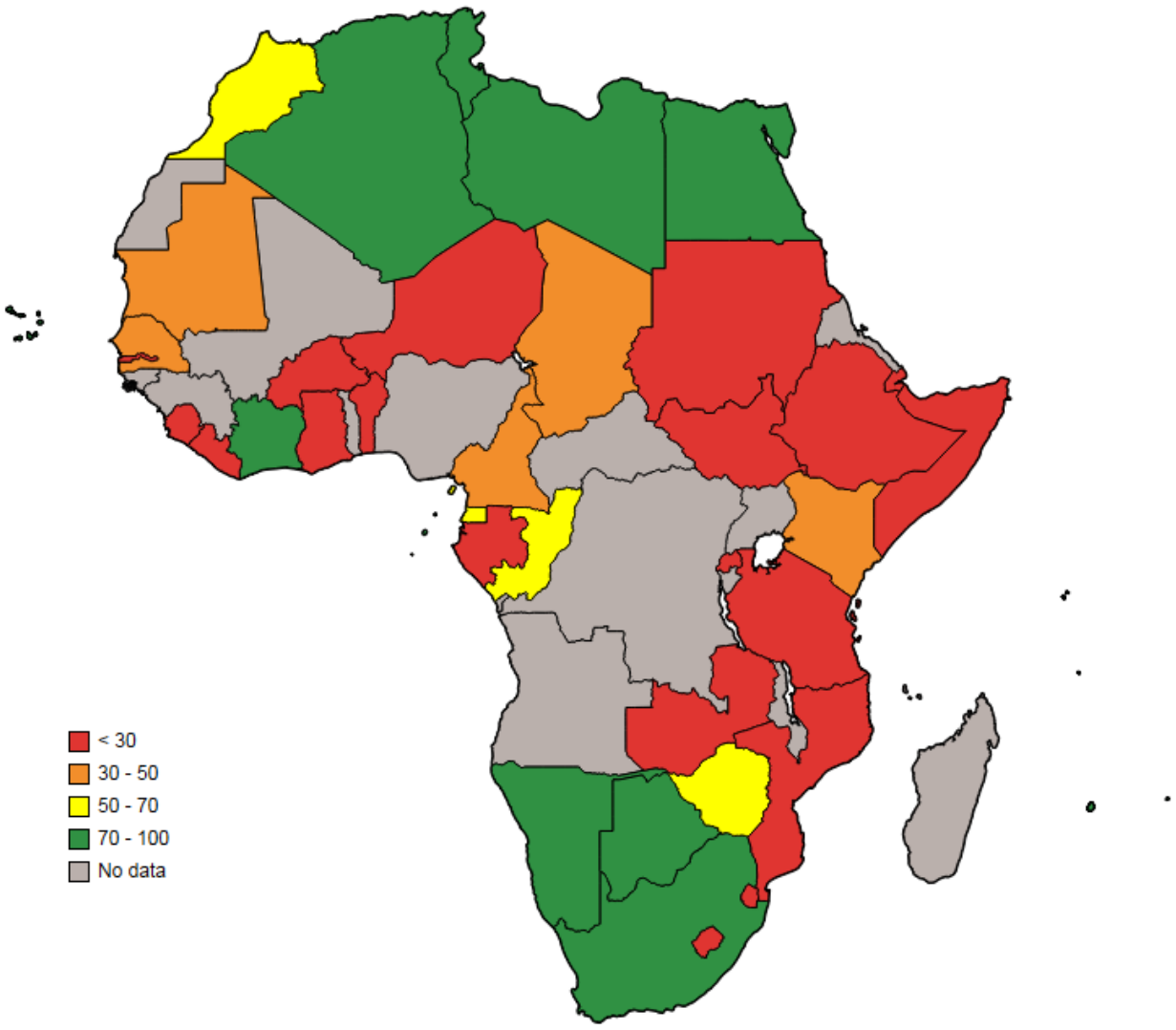
[1] http://www.apai-crvs.org/resources/publications

[2] Kruk ME, Myers M, Varpilah ST. What is a resilient health system? Lessons from Ebolo. Lancet 2015; 385: 1910–12

[3] http://unstats.un.org/sdgs/indicators/database

of cause of death data. Those countries are: Algeria, Botswana, Egypt, Cape Verde, Libya, Mauritius, Morocco, Namibia, Sao Tome & Principle, Seychelles, South Africa, and Tunisia. Kenya, stagnated between a 40-50% coverage rates on death registration in its recent year, is now revitalizing its effort in this regard. On the use of death and cause of death registration front, the country has made effort by producing annuals death and cause of death report and sharing cause of death data with WHO. Countries, such as Ethiopia, Ghana, Malawi, Mozambique, Rwanda, Tanzania, Uganda, and Zambia, are now aided by both domestic and external resources.

**Figure 1. Percentage of death registration completeness in Africa, 2017**



5. Proactively follow-up the status on death and causes of death registration has empowered the region to track its accumulative progress. This is remarkable whereas two years ago the Africa region were largely popped as grey zone equated no information available[4].

## III. Targeting low-resource settings strategically

6. In its recent operation, the WHO organization has seen a dramatic shift in terms of producing strategy, methodology, and technology targeting low-resources settings to improve mortality and cause of death statistics. System providing real-time death and cause of death data is now feasible to deploy. The below table showcases the achievement in this front.



[4] http://www.who.int/gho/publications/world_health_statistics/2017/en/

**Table 1: Strategy, methodology, and technology targeting low-resources settings, during 2015-2017**

| |
|---|
| **Strategy** |
| **Improving Mortality Statistics in Africa Technical Strategy 2015-2020**<br>• To call for a significant improvement by 2020, such that: 60 per cent of deaths in a given year are continuously notified, registered and certified with key characteristics.The strategy is tailored to the context of a **large proportion of home and community deaths.** http://www.apai-crvs.org/resources/publications<br>**EMRO Regional strategy for the improvement of civil registration and vital statistics systems 2014–2019**<br>• Civil registration is recognized as the only data source from which complete and continuous demographic statistics on population dynamics and causes of death can be generated. The system is necessary for the progressive realization of human rights for all individuals in countries with migrant and refugee populations. |
| **High level advocacy** |
| **WHO AFRO Regional Committee 66th Session**<br>• (AFR/RC66/6)Health Security and Emergency (HSE): Over 90% of Member States are implementing IDSR including event-based surveillance systems with at least 90% country coverage by 2020.<br>• (AFR/RC66/7)Sustainable Development Goals (SDGs): Strengthening CRVS and routine health information with disaggregated data to monitor health equity should be a priority.<br>• (AFR/RC66/9)Reproductive, Maternal, Newborn and Child Health (RMNCH) Implementation Strategy: indicate the need to operationalize universal civil registration and vital statistic systems.<br>**WHO EMRO Regional Committee 60th Session**<br>• Urging Member States to prioritize and strengthen civil registration and vital statistics systems, including developing CRVS strategic plan, strengthening infrastructure and capacity within MOH, and mobilizing support. |
| **Methodology, guideline, tools** |
| **Global strategy to improve mortality statistics through CRVS**<br>• New guidance acknowledges the multiple systems that often exist in countries. http://www.who.int/healthinfo/civil_registration/CRVS_MortalityStats_Guidance_Nov2014.pdf?ua=1<br>**The Start-Up Mortality List (ICD-10-SMoL): WHO Application of ICD-10 for initial low resources cause of death collection**<br>• The around 106 (plus 17 optional) diseases which is ICD-10 compatible and can be expanded and linked to the national dictionary. Simplified set of rules on underlying cause of death, procedures of ICD10 coding, requires only minimum 2-3 days training or eLearning, compared to two weeks training previously.<br>**Development of ICD11**<br>• The development of ICD11 could be another milestone of health data and informatics in the new era based on electronic infrastructure. http://apps.who.int/classifications/icd11/browse/f/en<br>**ICD10 eLearning**<br>• Flexible (online and offline) and interactive ICD10 eLearning tools serve as alternative option to the traditional training approach. http://www.who.int/classifications/icd/en/<br>**WHO Reference Group on Global Health Statistics (RGHS):**<br>• Guidelines for Accurate and Transparent Health Estimates Reporting (GATHER) are available.<br>**Verbal autopsy tool to define probable cause of death.**<br>• Standardized and digitalized. http://www.who.int/healthinfo/statistics/verbalautopsystandards/en/ |
| **Electronic technology and integration** |
| **DHIS2:**<br>• Real-time patient cause of death data collection mirroring MCCD form, data entry and transfer through DHIS2<br>• Integrated SMoL data being collected in DHIS2 systems, ongoing French version. |

7. CRVS, particularly death and cause of death, is a complex issue. The nature of its work is cross-sector, involving health and health institute, home affair, justice, national security, and national statistics office. Inter-sectoral collaboration and participatory approach has enhanced the appreciation for the efforts of other partners to uphold their responsibilities within the system[5]. Major international agencies have published a wide range of CRVS technical documents which can be publically accessed. .

## IV. Implementation of accurate cause of death certification in health facilities

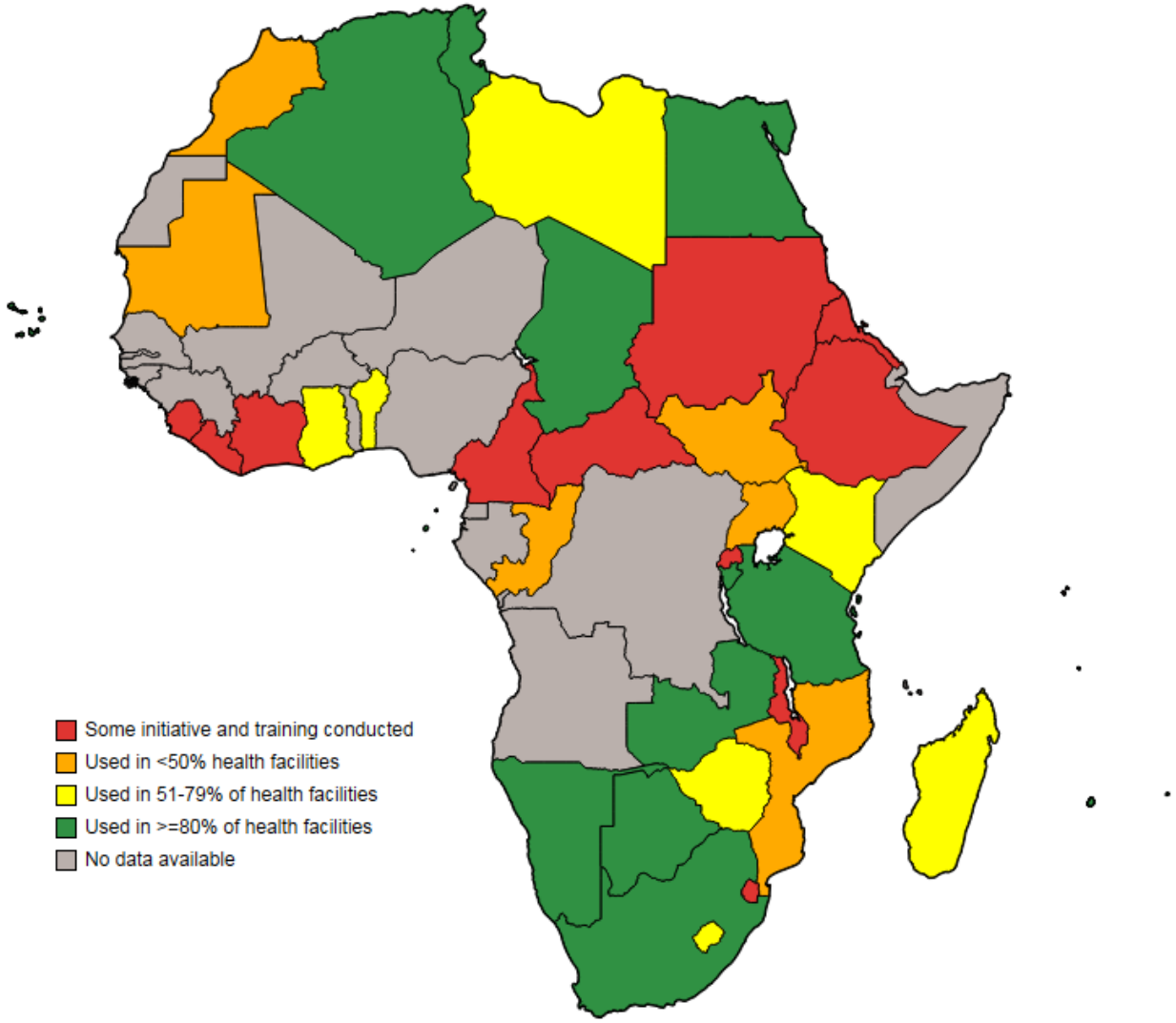
8. The first step in implementing an integrated mortality data system is to ensure that every death in every health facility is counted and recorded. For each death occurred at health facilities, the cause of death should be captured on the International Medical Certificate for Cause of Death (MCCD) form.

9. Out of 54 member states, around a quarter of them indicated there was compulsory death notification and cause of death using MCCD form at more than 80% health facilities (Figure 2).

**Figure 2. Using International Medical Certificate for Cause of Death (MCCM) form and ICD at health facilities in Africa.**



[5] Nichols EK, Giles D, Kang'oma S, et al. Rapid assessment of Malawi's civil registration and vital statistics system. PHA 2015; 5(3): 162–164




10. Despite initial trainings and workshops and the availability of guidelines and cause of death and ICD tools, many countries failed in terms of start-up and scale-up. A recent study in selected Sub-Saharan countries indicated some bottlenecks. For example,

- At policy level, some countries don't have compulsory national death registration. Health facilities are not mandated to use MCCD form on the cause of death recording. Some countries charge fee to the family on registration of deaths or cause of death.
- At logistic and management level, in many countries paper work can't be obtained in the same day.
- At process level, almost all countries have a parallel overlapping routine health information or diseases surveillance system to report death on specific diseases. The three systems are not necessary interoperable.
- At health sector, competing priorities and lack of capacity and financial support has cited as obstacles to conduct national start-up and roll-out, after receiving the initial training.

11. There is good experience. In North Africa, Egypt has now a fully automated deaths notification and registration system, while using the WHO deaths certificate. Libya is incorporating the WHO MCCD form in the proposed electronic death notification system from health facilities.

12. In Sub-Saharan countries, to overcome the bottlenecks, countries such as Kenya and Zambia has made a series of action. Kenya has designed the registration from with slips linking to burial permits. Mozambique has ongoing efforts to scale up its system. This includes universal death registration at health facilities, collecting probable cause of death using verbal autopsy for community death, and using disbursement-liked indicators as incentives. Mauritius, Kenya, Tanzania and Zambia mentioned being able to obtain MCCD and other registration papers immediately, almost in the same place, or even in after work hours. Botswana mentioned that local civil registration offices and health facilities always coordinate in real-time, to assist in issuing the necessary paper work and conduct verifications if needed.

13. The civil registration authority in Zambia, working with Ministry of Health (MOH), has provided training to physicians on death certificates and ICD principles, and coders on ICD10. Zambia is also engaging medical schools, the Health Professionals Association of Zambia, and the Medical Association of Zambia, to include death certification in the curriculum.

14. As part of the implementation, and in the context of decentralization, health research institutes can play an important role in terms of routine and ad hoc vital statistics quality control, long-term sustainable training, and health district or sub-district mortality profiling. The Medical Research Council of South Africa, a WHO International Classification Collaboration Centre, and an example of a health research institute in the African region that supports the implementation of the CRVS system and timely monitor the quality of CRVS system. WHO has also initiated efforts with institutes in Benin, Ghana, Rwanda, and Zimbabwe, through its national health information training programme, post-graduate programme, and involving professionals/doctors in the training programme.

15. As seen at Asia countries, regional networks can assist in this process to exchange and seek cost-effective local solutions[6]. Such a network in the Africa countries is necessary, while the continent is moving towards greater economic integration.

## V. The road to automation and real-time data

16. The Start-Up List for Mortality and its programming into DHIS2 means that countries have access to a system which delivers real-time data as well as aggregate data. This will ensure countries are in a stronger position to monitor their public health needs both in the short term and the long term. This is also leading to the integration and cross-checking on death, and cause of death data quality when needed.

17. In 2016, working with partners including Bloomberg and the University of Oslo, WHO both its HQ and AFRO regional office, has mobilized resources and trained 16 countries and some partners on the latest DHIS2 module, its patient tracking cause of death, and simplified ICD rule on underlying cause

[6] http://www.whofic-apn.com

of death. Follow-up has been provided through WHO Country Offices and implementation partners. The most recent success story is from Ghana (see text box). Through the MOH Centre of Health Information Management, Ghana is now the first country in the world to use DHIS2 as the platform to integrate and standardize its routine health information and mortality reporting. Countries, such as Ethiopia and Mozambique, have now adopted DHIS2 as a national platform the health facility data reporting.

18. Automation plus institutionalization has been another common character in countries with internationally recognized vital registration systems, such as Egypt and South Africa, as well as other countries in Africa. Egypt has a fully automated event notification system, which reports events directly from the MOH to the civil registration authority. In the case of South Africa, which is partially automated, medical practitioners must first certify the cause of death for any person attended before death or any corpse examined. In instances where a death occurs in remote areas where there is no medical practitioner, a chief or tribal leader completes a form as confirmation of death occurrence, without the cause of death information. The deaths are then registered by the nearest Department of Home Affairs (DHA) office within 72 hours of occurrence. Statistics South Africa collects all death notification forms. Using different software, the Statistics South Africa Data Processing Centre regularly captures, processes, assesses the quality of data, and releases statistics in a short cycle. Other countries, such as Botswana, Djibouti, Lesotho, Libya, Malawi, Morocco, Rwanda, Sudan, and Tunisia have achieved some automation systems at the civil registration sector.

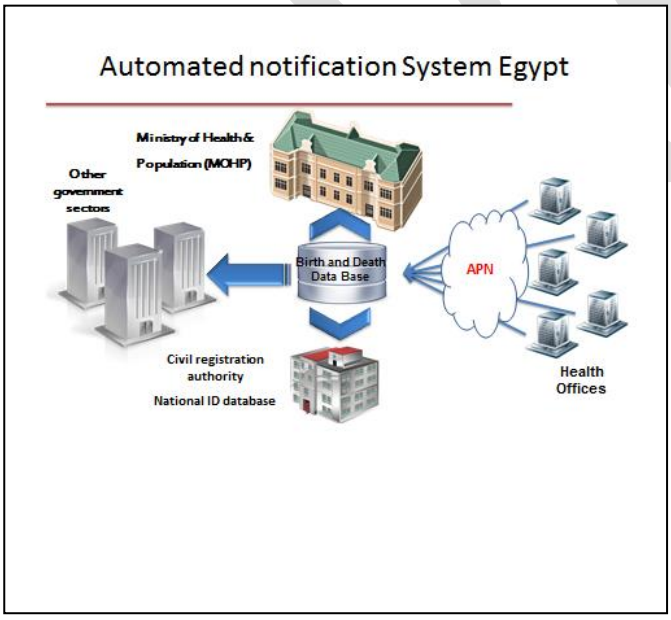
## Ghana story


Ghana: the Honourable Minister of Health has recently launched the DHIS2 system for tracking death statistics nationwide. This means the country is not just able to use real-time routine health service data in all 216 districts to track its health system performance and UHC progress, but also can use real-time integrated population denominators and mortality data for population planning, health trend calculations and estimation. This is a good example of health information accountability.

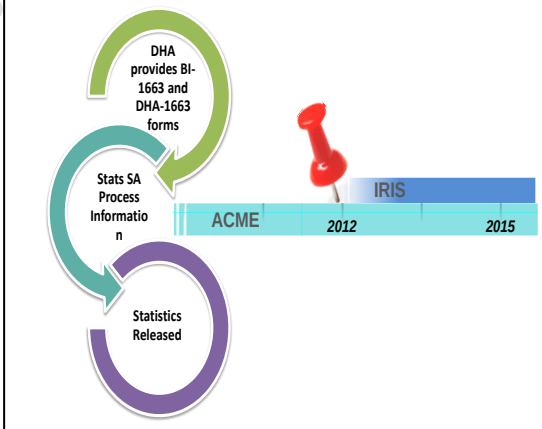
https://citifmonline.com/2017/04/12/health-ministry-launches-system-for-tracking-death-statistics/

## Egypt and South Africa story

- Egypt used the existing health infrastructure at service entry points. Statistics South Africa has used automation coding to aid data processing and reduce the processing time. Yearly vital statistics reports are now produced by these countries, as well as Botswana and Kenya[7].




Statistics South Africa and Automation




[7] Meeting of Experts on Mortality Statistics, Cairo, WHO EMRO, 28th Sep-1st Oct 2015

20. Digital technology is not a solution for all issues. In the beginning phase, technology often has issues in terms scale-up and efficiency. In Kenya, there is a need to improve the coverage of death registration, which has been below 60% for many years. This may be possible through reengineering mobile-based applications or through an innovative system approach, for better tracking and cause of death data quality verification, as well as real-time death notification both at health facilities and community level. Targeted intervention to some geographic hard reach with poor infrastructure should be considered in addition to the technology solution. In Rwanda, the E-CRVS is a web-based system that was launched in 2015 by the National Institute of Statistics and is operational at both administrative sector level and health facility level. It is being refined and currently collects a minor proportion of deaths reported through the Rwanda HMIS at health facilities. The E-CRVS was recently upgraded with the WHO's ICD Start-up Mortality List. However, a critical step to adopt the MCCD is still needed.

21. Kenya, Mozambique, and Rwanda are now looking at eHeath architecture, big data standards and interoperability issues while endeavouring to improve the data system for better UHC tracking and policy decision-making guidance, and the linkage to other system such as citizen ID and voting system.

22. As clearly demonstrated by developing countries such as Mexico, Iran, and South Africa, a long-term, step-wise strategy for CRVS system development is crucial[8]. The 2017 Cause of Death report released by Statistics South Africa indicated a 96% completeness for adult death registration (15 years and above), with 77.5% of deaths registered within 72 hours of occurrence, and 14 months of lag time for formal publication of the statistics. Statistics South Africa, as a vital statistics agency, in close collaboration with the registration agencies and the Department of Health South Africa, has achieved good international standards of death registration over a 10-year journey.

## VI. Resource mobilization, partnership, and linkage among sectors

23. At WHO AFRO and EMRO level, no external funding for CRVS activities has been received. In this regard, the bulk of the work is conducted through working with donors and agencies at international and regional level, on strategy, automation tools such as DHIS2 and IRIS, training, workshops and meetings. For example, Bloomberg foundation and UN agencies have contributed towards the inter-country CRVS meetings and training workshops.

24. Major efforts are made at AFRO level to overcome its own working silos and operate mortality and cause of death support as a cross-cutting issue. This has involved in the Health System and Services Cluster, but also collaborated with disease programme and health security cluster. Cross-cutting work included harmonizing methodology/tools and jointly supporting countries. Countries, such as Benin, Kenya, Mozambique, Swaziland, Tanzania, and Uganda have now lined up their reproductive health programme professionals to support the vital registration system and link data to the reproductive health surveillance.

[8] http://www.who.int/gho/publications/world_health_statistics/2017/en/

25. The MOH in some countries have made progress in leveraging resources, drawing investment internationally or regionally such as through the World Bank or African Development Bank, partnering with international institutes, and in some cases through South-South Collaboration. It is vital that the countries quickly develop the core capacity while using external aid, and be able to maintain the core capacity when the aid ends.

**Mozambique Story: Investment Case**

Strengthening CRVS in Mozambique involves different sectors: The registration of vital events takes place in the Ministry of Justice and Constitutional and Religious Affairs (MINJUST); while the production of vital statistics is the mandate of the Institute of National Statistics (INE). The role of the Ministry of Health (MISAU) is to notify the occurrence of births and certifying deaths in health facilities and recording information on causes of death. Other government ministries involved in CRVS activities include: the Ministries of Interior; Science and Technology, Higher and Technical-Professional Education; and Local Government bodies (Ministry of State Administration and Public Service). CRVS is also supported by development partners, donors and NGOs including UNICEF, WHO, UNHCR, UNFPA, CDC, Government of Canada, Plan International and Save the Children.

Reproductive, Maternal, Newborn, Child and Adolescent health (RMNCAH) investment case has been used as a vehicle to gather necessary resources and support activities to strengthen CRVS through the health sector. Priorities in the RMNCAH for Mozambique include reducing maternal and neonatal and child deaths; and preventing early marriage and early adolescent childbearing. A well-functioning civil registration and vital statistics (CRVS) system that collects information on births, deaths and causes of death was identified as a best source to track progress made.

The WHO Country Office has executed its leadership and provided technical assistance and resource mobilization, with health sectors, donors and developing partners. These include University of Toronto, Canada, UNICEF, USAID, regional and cross-regional networks, and South-South collaboration with the Portuguese speaking country of Brazil. Mozambique is now planning post census mortality surveillance, and the Countrywide Mortality Surveillance for Action (COMSA) initiative-a sample registration system-based approach to collect mortality data. WHO has played a key role to guide and integrate multiple projects and interests into the mainstream CRVS strengthening work, while training and exposing both its country staff and MOH colleagues on WHO standards including ICD and cause of death standards.

**Rwanda Story: Link to SDGs Domestication and National Development Plan**

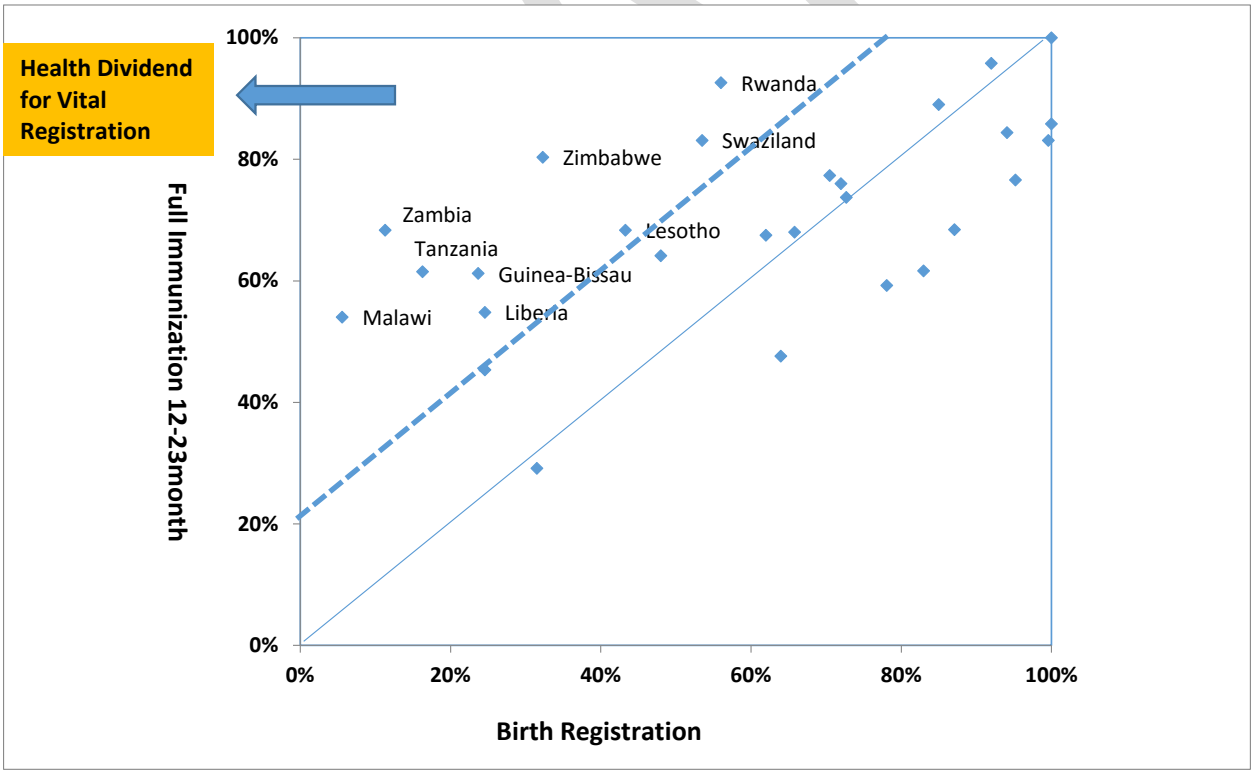
The national strategy recognizes CRVS as a key priority. The National Institute of Statistics (NISR) provides data to support the Second Economic Development and Poverty Reduction Strategy (EDPRS2) and provides capacity support to sectors in order to strengthen their administrative data system, particularly the civil registration system. The country also benefits from a conducive environment, where ICT is perceived as a tool for progress towards Vision 2020, which seeks to reach middle-developed country status. Recent progress on CRVS development includes: the Law Governing Persons and Family in 2016; launch of a CRVS web-based application at all levels including health facility; CRVS comprehensive assessment report; new draft forms for births, deaths, and marriages; Verbal autopsy Initiative from Bloomberg; Advocacy for the implementation of medical certification of causes of death and its related supporting tool, the DHIS-2 module for causes of death, with WHO support; Centre for eHealth and Biomedical Engineering (CEBE), as a potential partner for eLearning

**Main needs and challenges include:** A multi-sectoral approach and strong coordination among different stakeholders, and capacity building; integration of various systems, including using/linking MCCD to maternal/child death audits; producing regular death and cause of death statistics; and increasing awareness of the public and the community.

26. Moving forward, the availability of ICT technology and simplified processes for notification, registration and certification using national IDs to redesign data and digital architecture may make linkages easier. Systems can be linked to each other using optimized designs and processes to reduce the burden on the family of the deceased through only needing to present once and data only needing to be entered at a single point. Database with detailed disaggregated individual character and cause of death is the key for further validation, cross-reference, linkage and timely updating, as the lesson reflected in Kenya.

27. It is worthy to note at national and subnational level, there are good improvement in recent years on health service utilization, such as delivery and immunization. This poses potential opportunity using health facilities as quick win and low cost solution to expand the vital registration such as birth registration (Figure 2). Below graph visualize the quick win solutions using health dividend, while using the data from survey to examine immunization coverage and birth registration.

**Figure 2. Percentage of children received birth registration and full immunization in Africa, latest available population survey data**




## VII. Conclusions

28. The SDGs agenda and the enabling global and regional environment present opportunities to establish functioning CRVS systems. In terms of death and cause of death statistics at health facilities, low-cost solutions are available, and more innovative local solutions have the potential to drive the nation or sub-national districts forward.

29. Countries such as Botswana, Ghana, Mauritius, Namibia, Rwanda, Seychelles, South Africa, and Swaziland, have produced reports on vital statistics and cause of death, including quality analysis of its mortality and cause of death data. Epidemiology and Statistics Section, Ministry of Health Seychelles produces weekly number and cumulative number on registered birth and death (including infant death, child death, and maternal death).

30. South Africa is now in the position to produce many thematic health reports using vital registration information as a backbone data resource, combined with complementary data sources such as householder surveys. These reports are in turn used for policy-making guidance. For example, a report of youth mortality and morbidity has been able to inform the youth health programme for policy making. [9]

31. To meet the 2020 targets, countries must revitalize the death collection at health facilities and prioritize it into the current CRVS investment plan, health information and policy plan. Three immediate actions are recommended: 1) Adopt the new international medicate certificate of cause of death form as an entry point; 2) Train physicians/health workers to use the MCCD form and follow up the implementation; 3) Consider implementation incentives/motivators for improving cause of death collection at health facilities (burial permits, insurance, disbursement-linked indicators, etc.).

32. Country must demonstrate high-level political commitment on the prioritized actions. This includes the amendment of legal and policy framework if needed. There is need to example other enabling factors also. This include multiple dimensions, such as strengthening coordination, integration and interoperability; establishment of safe archiving and records maintenance; scaling up innovative solutions including promoting district champions; increasing investment to ensure health sector a full national-wide operation; and institution support.

**Acknowledgements:**

This report has been prepared by Health Information and Knowledge Management (HIK) Unit from the World Health Organization Regional Office for Africa (WHO AFRO) under the overall guidance of Health System and Service Cluster. WHO Regional Office for the Eastern Mediterranean (WHO EMRO) contributed to the report particularly the input/data from the northern African countries. Input and support received from WHO colleagues and collaborators, the Africa Centre for Statistics from ECA. The support from WHO EMRO, and Africa APAI-CRVS partners, are received with gratitude.

[9] www.statssa.gov.za/publications/Report.../Report-03-09-122013.pdf