Civil Registration and Vital Statistics System

End-of-Project Assessment Report

October 2017

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MEASURE Evaluation PIMA

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MEASURE Evaluation PIMA is funded by the United States Agency for International Development (USAID) through associate award AID-623-LA-12-00001 and is implemented by the Carolina Population Center at the University of North Carolina at Chapel Hill, in partnership with ICF International; Management Sciences for Health; Palladium; and Tulane University. The views expressed in this publication do not necessarily reflect the views of USAID or the United States government. TR-17-220

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ACKNOWLEDGMENTS

This end-of-project assessment evaluates the status of Kenya's civil registration system to determine whether support for the system has improved the availability and use of quality vital statistics among stakeholders at different levels.

MEASURE Evaluation PIMA (MEval-PIMA) would like to thank the Department of Civil Registration Services and the Ministry of Health at the national and county levels for their engagement and support throughout the project. Special thanks go to our implementing partners who have worked with us and under the direction of the civil registration and vital statistics technical working group to improve the system.

We would like to acknowledge all those who took part in this assessment by either planning and coordinating the interview sessions, or taking part in the interviews and discussions. We extend our gratitude to the consultants who reviewed documents and gathered data from multiple sources.

We would like to thank the United States Agency for International Development (USAID) for its support and, in particular, our Agreement Officer's Representative (AOR) Lize Ojowi and alternate AOR, Washington Omwomo, at USAID/Kenya for their technical inputs.

It is our hope that this assessment will encourage continued strengthening of the civil registration system beyond the MEval-PIMA project.

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ABBREVIATIONS

ASSD	African Symposium for Statistical Development
CDC	Centers for Disease Control and Prevention
CRO	civil registration office
CRS	Department of Civil Registration Services
CRVS	civil registration and vital statistics
CRVSS	civil registration and vital statistics system
DivMEHRDI	Division of Monitoring and Evaluation, Health Research Development and Informatics
ICD	International Classification of Diseases
IPRS	Integrated Population Registration System
ICT	information and communication technology
KNBS	Kenya National Bureau of Statistics
KVSR	Kenya Vital Statistics Report
M&E	monitoring and evaluation
MCH	maternal and child health
MEval-PIMA	MEASURE Evaluation PIMA
MOH	Ministry of Health
NGAO	National Government Administrative Officers
TWG	technical working group
UN	United Nations
UNESA	United Nations Department of Economic and Social Affairs
UNFPA	United Nations Population Fund
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
WHO	World Health Organization

EXECUTIVE SUMMARY

The MEASURE Evaluation PIMA project's goal was to assist the Government of Kenya to strengthen monitoring and evaluation systems, including the civil registration system which is the basis of all vital statistics in Kenya. The project targeted four main areas: (1) increasing the monitoring and evaluation capacity of the Department of Civil Registration Services, (2) expanding birth and death registration coverage, (3) improving data quality, and (4) enhancing use of quality vital statistics for evidence-based decision making at national and county levels. This scope was informed by the project's 2013 baseline civil registration and vital statistics system assessment and a separate assessment of the capacity of the department to undertake monitoring and evaluation functions. The recommendations from these assessments, coupled with objectives prioritized in the Department of Civil Registration Services Strategic Plan 2013–2017, guided development of the project's interventions. In the project's last year of implementation, MEASURE Evaluation PIMA sought to assess the status of the civil registration system. This end-of-project assessment aims to determine the level for which support for the system has improved availability and use of quality vital statistics among stakeholders at different levels while also recognizing the broader legal and administrative challenges inherent in ensuring a functioning system.

The assessment involved a desk review of available documents and onsite analysis of civil registration processes and the electronic system at select civil registration offices. Structured interviews with key informants—including staff from the Department of Civil Registration Services, registrars at the county level, personnel in select county departments of health, and implementing partners—were conducted. A focus group discussion was held with select local registration agents in Kakamega County. Quantitative data were extracted from vital statistics reports, routine monitoring reports, and the health information system. These data were analyzed using Microsoft Excel, and the analysis involved computation of basic descriptive indicators defined in the project's performance monitoring plan.

This report outlines findings from the assessment and provides recommendations on how gaps in specified aspects of the system can be bridged. Specifically, the assessment reveals commendable efforts to strengthen the civil registration and vital statistics system, which have resulted in improvements in the quality of statistics produced. Vital statistics are readily available, and reporting by government agencies has been harmonized. Guidelines implemented for certifying and coding causes of death have resulted in the availability of higher quality cause-of-death information from health facilities. Data quality assurance procedures need to be improved, however, to increase reporting and enable use of mortality statistics at the international level. The report provides documentation on project achievements and lessons learned.

INTRODUCTION

The goal of the USAID-funded MEASURE Evaluation PIMA (MEval-PIMA) project has been to assist the Government of Kenya to strengthen monitoring and evaluation (M&E) systems, including the civil registration system because it is the basis of vital statistics. The project's interventions have targeted four broad areas: (1) increasing the M&E capacity of the Department of Civil Registration Services (CRS), (2) expanding birth and death registration coverage, (3) improving data quality, and (4) enhancing use of quality vital statistics for evidence-based decision making at national and county levels. This scope was informed by the project's 2013 baseline civil registration and vital statistics (CRVS) system assessment and an assessment of the capacity of CRS to undertake M&E functions.

The capacity assessment found that the ability of CRS to effectively and efficiently deliver on its M&E functions was affected by numerous challenges, including the following:

- Limited M&E knowledge and skills, and in particular inadequate capacity to process, analyze, and report on vital statistics.
- Lack of capacity in surveys and surveillance.
- Poor reporting and transmission of data from registration points, resulting in delayed production of statistical tables for various users.
- Lack of clearly defined M&E roles in job descriptions for staff within the statistics unit. CRS did not have an M&E unit, but the statistics unit carried out M&E functions.
- Lack of guidelines and tools for support supervision.
- A strategic plan was in place that did not include a clear M&E framework. A costed M&E plan was, therefore, not available, nor was a data use plan.
- CRS did not have a research agenda but acknowledged that having such an agenda would be useful to increase demand for and utilization of vital statistics.

The CRVS system assessment determined that the civil registration system has not functioned adequately enough to produce useable data on births, deaths, and cause of death. Recommendations from the CRS and CRVS assessments included:

- The need to scale up, through use of the health system, notification of vital events occurring at home.
- Establishment of additional civil registration offices (CROs) in regions where registrars were serving large or sparse populations. Other measures proposed to expand civil registration services included mobile services or other applications of technology to modernize civil registration and improve service delivery.
- The need to implement an electronic system to address barriers that exist due to manual reporting and untimely submission of vital events data
- A proposal to develop a standard International Classification of Diseases (ICD) training curriculum and the need to train all medical certifiers of death and coders of this information. The use of verbal autopsy was suggested as an interim measure to monitor community patterns of mortality, with the understanding that causes of death reported through verbal autopsy are not in accordance with international standards for assigning causes of death at the individual-level.
- The need for regular reconciliation, verification, and harmonization of country vital statistics.
- A suggestion to transform the annual vital statistics report into a joint publication of CRS, the Ministry of Health (MOH), and the Kenya National Bureau of Statistics (KNBS).

- Establishment of a functional M&E unit with clearly defined roles and responsibilities that are also included in staff job descriptions.
- The need to enhance staff capacity in M&E, including training on data collation, data processing, and analysis for generating vital statistics.
- Development and implementation of a data use plan that clearly guides dissemination and sharing of relevant information with stakeholders.

These recommendations were combined with objectives prioritized in the CRS Strategic Plan 2013–2017 (Civil Registration Department, 2013), and guided development of the project's interventions on an annual basis. The baseline CRVS system assessment also established an objective reference point on which to track improvements in the system using a set of indicators (see Appendix A). Project indicators for CRVS are shown in Table 1.

Table 1. MEval-PIMA project indicators for CRVS

Indicator	Description
Birth and death registration coverage	Number of registered births or deaths in a given period divided by the number of expected births or deaths in the same period, multiplied by a hundred.
Percentage of CROs submitting birth and death registration summaries by the 15th day of the month	Number of CROs submitting complete summary sheets to CRS by the 15th of every month as a percentage of the number of CROs expected to submit reports in target counties.
Proportion of registered deaths correctly coded with ICD	Number of deaths reported in DHIS 2 that are correctly coded using ICD as a proportion of the number of deaths reported by the facility.
Proportion of target facility-reported deaths registered at CROs on time	Number of deaths from the target health facilities registered by the CROs as a proportion of the number of deaths reported in the DHIS 2.
Number of health workers trained in cause-of-death certification and coding	Number of health workers participating in training on cause-of-death certification and coding that is funded by the project.
Number of community registration agents trained in birth and death registration	Number of community registrations agents participating in training on birth and death registration that is funded by the project.

The project's interventions in the first three years took place in 12 counties: Wajir, Garissa, Kirinyaga, Embu, Siaya, Kakamega, Bungoma, Nakuru, Nairobi, Mombasa, Kilifi, and Machakos. In Year 4 of the project, the geographic scope was revised to a targeted 10 counties: Kisumu, Homa Bay, Migori, Murang'a, Siaya, Kakamega, Nakuru, Nairobi, Kilifi, and Machakos.

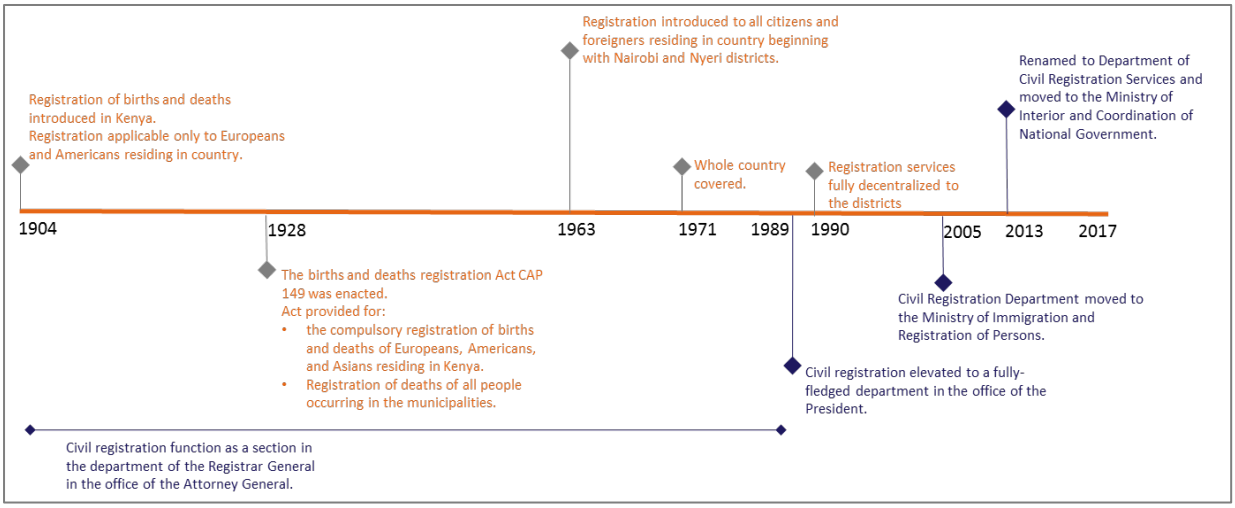
In the final year of project implementation, MEval-PIMA sought to assess the status of the civil registration system. The end-of-project assessment aimed at informing the level for which support for the CRVS system has improved the availability and use of quality vital statistics among stakeholders at different levels, while recognizing the broader legal and administrative challenges inherent in ensuring a functioning system. This report describes findings from the assessment and provides recommendations on how gaps in specified aspects of the system can be bridged.

Civil Registration in Kenya

History of Civil Registration

The history of civil registration in the country is summarized in Figure 1.

Figure 1. History of civil registration in Kenya



Source: MEval-PIMA

The vision of CRS is to be a comprehensive and reliable source of personal legal records and vital statistics. The department is set to achieve this by creating a comprehensive population database for personal legal records and generating timely and reliable vital statistics through registration of births and deaths as mandated by the laws of Kenya CAP 149. Following the recommendations of the Civil Registration Demonstration Project in 1985, Kenya adopted a community-based system in which an informant, also known as local registration agent, notifies the local registrar of the occurrence of a birth or death by completing a registration form. There are two types of informants: (1) health institutions that notify events happening in health facilities, and (2) assistant chiefs who notify events that occur outside of health facilities. Informants submit copies of completed registration forms to local registrars every month. Registrars are responsible for the legal registration of birth and death events, issuance of legal certificates, and compilation of vital events data. The data are compiled in Excel summary templates and submitted to CRS headquarters by the 15th of every month. The statistics unit at CRS is then responsible for receiving the tallied summaries and compiling and analyzing the data into national vital statistics. KNBS is the agency responsible for disseminating government statistics on births and deaths. Information exchange between CRS and KNBS is at the national level and informs the annual economic survey report. KNBS also reports these statistics to the United Nations Department of Economic and Social Affairs (UNESA) for publication in the Demographic Yearbook.

Legal Framework on Civil Registration

Implementation of the Constitution of Kenya 2010 keeps the country in compliance with international conventions and treaties, such as the 1948 Universal Declaration of Human Rights that states that every person has a right to nationality. Articles 14 and 12 of the Constitution are in line with the 1959 Declaration of the Rights of the Child and the 1996 International Covenant on Civil and Political Rights, which entitle every child through registration the right at birth to a name and nationality. During the MEval-PIMA baseline assessment in 2013, the births and deaths registration act (CAP 149 of the laws

of Kenya) was being repealed to meet the requirements of the Constitution of Kenya 2010 and to move oversight of civil registration to the semi-autonomous government agency created by the 2011 Kenya Citizens and Foreign Nationals Management Service Act. The Service was established in 2013. The draft National Registration and Identification Bill 2012 was introduced for the first reading in the Senate in 2014.[1] On assent, the bill will become the Registration and Identification of Persons Act 2014. The reviewed legal framework is not yet anchored to policy documents. A national registration policy that would consolidate all efforts to improve registration to full coverage and provide unique identification and related services to citizens is in draft form.

CRS has participated annually in meetings of the African Symposium for Statistical Development (ASSD). In 2014, the ASSD meeting held in Botswana focused on promoting use of CRVS in support of good governance. The third conference of African Ministers Responsible for Civil Registration took place in 2015 in Cote d'Ivoire and focused on ASSD's 2014 theme of "promoting use of CRVS in support of good governance." The participants resolved to implement a clear strategy for sustainable capacity development, including forging purposeful partnerships with technical institutions of higher learning in order to appropriate substantive and technological benefits.[2] During this meeting, discussions were held regarding the need to intensify efforts in real-time registration by adopting information and communication technology (ICT) solutions to create linkages between civil registration and national identity systems for managing one legal identity. The agenda of the ASSD meeting held in South Africa in 2016 was on promoting the use of ICT solutions for improving CRVS in Africa. The themes of these international meetings were in line with strategies already documented in the CRS strategic plan. For example, Kenya began rollout of an electronic system of civil registration in 2016.

Organizational Structures

The national registration policy framework provides for an organizational structure that guarantees implementation of civil registration activities to realize the country's strategic goal of universal birth and death registration coverage. The placement of CRS within the Ministry of Interior and Coordination of National Government in 2013 has enhanced working relationships, accountability for targets, and performance of the assistant chiefs. The assistant chiefs are members of the National Government Administrative Officers (NGAO) as stipulated in the 2013 National Government Coordination Act.

In addition, there have been commendable efforts to integrate civil registration operations and services with the health information system, including the creation of the CRVS unit at the MOH, which coordinates CRVS activities and prioritizes the improvement of civil registration in the health sector. The unit is responsible for assuring quality vital events data and analyzing medically certified cause-of-death statistics. Following the August 2014 Dar es Salaam workshop for defining strategies for implementing ICD in Africa, a taskforce was formed to oversee improvement in mortality statistics through implementation of the Dar five-element strategy for ICD. The taskforce was chaired by Kenya's MOH with CRS as the secretariat and participation from stakeholders including KNBS, the World Health Organization (WHO), MEval-PIMA, the Centers for Disease Control and Prevention (CDC), and the United Nations Population Fund (UNFPA). The taskforce has since been transformed into a mortality statistics subcommittee under the national CRVS technical working group (TWG).

[1] Kenya Gazette Supplement No. 153 (Senate Bills 2014 No. 39)
[2] http://www.uneca.org/sites/default/files/uploaded-documents/Statistics/CRMC3/crmc3-final_resolution_third_ministerial_conference_on_crvs_en.pdf; downloaded on June 15, 2017

In 2015, the Government of Kenya launched the Integrated Population Registration System (IPRS), a "one-stop shop" for citizens' information. Data from the civil registration system feed into the IPRS and links with other registration agencies to provide data on the identity of citizens and foreign nationals. Through the government's digitization efforts, civil registration services are available in citizen service delivery centers, commonly known as *huduma centers,* at the county level.[3]

Stakeholder Engagement

Stakeholder coordination at the national level is achieved through the CRVS TWG formed in 2011 following a recommendation by the national stakeholders' conference. Membership in the TWG consists of CRS as the secretariat; MOH; KNBS; representatives from NGAO and the national council for population and development; Kenya Police Service; Ministry of Education; a representative from the M&E directorate of the Ministry of Devolution and National Planning; representatives from the University of Nairobi's Population Studies and Research Institute and the School of Medicine; and partners including WHO, UNFPA, the United Nations Children's Fund (UNICEF), the United Nations (UN) Refugee Agency, MEval-PIMA, CDC, Plan International, World Vision, and GOAL Kenya. The TWG meets regularly to share expertise in CRVS strengthening as it guides implementation of technical interventions. Partners use the TWG platform to share progress about achievement of work plans.

The national registrars' conference has been held in 2012, 2013, and 2014 with financial assistance from WHO, and in 2016 with support from UNICEF, CDC, and MEval-PIMA. The meeting is used to share learning and deliberate on effective strategies to improve registration. The 2016 meeting was structured around strategies to improve the quantity and quality of vital statistics, featuring discussions on implementation of the CRS Strategic Plan 2013–2017, performance contracting and target setting, and sensitization on computerization of civil registration business processes. MEval-PIMA made a presentation on strategies for improving quality of mortality statistics.

At the county level, weak stakeholder engagement and coordination has been addressed with the formation of a TWG in Homa Bay County and the establishment of stakeholder forums with support provided by MEval-PIMA and UNFPA. This was in line with the CRS Strategic Plan 2013–2017 objective to increase the level of stakeholder engagement and promote the use of vital statistics for planning. In 2014, CRS, with support from MEval-PIMA, held one-day stakeholder meetings in 12 counties: Bungoma, Embu, Garissa, Kakamega, Kilifi, Kirinyaga, Machakos, Mombasa, Nairobi, Nakuru, Siaya, and Wajir. Discussions on challenges for civil registration and proposed approaches to mitigate them were documented in county-specific action plans (MEASURE Evaluation PIMA & United States Agency for International Development, 2014). In 2016, follow-up forums were held in 10 counties: Homa Bay, Kakamega, Kilifi, Kisumu, Machakos, Migori, Murang'a, Nairobi, Nakuru, and Siaya. The Homa Bay, Kilifi, and Nairobi forums were financed by MEval-PIMA and UNFPA.

In addition, Garissa County has since integrated civil registration matters with maternal, newborn, and child health stakeholder forums.

[3] The centers provide birth and death certificates for all registrations conducted within six months after a birth or death occurrence.

CRS Strategic Plan 2013–2017

At the time of MEval-PIMA's CRVS system assessment in 2013, CRS, in consultation with stakeholders through the CRVS TWG, was finalizing the department's strategic plan. The document was informed by the CRVS country comprehensive assessment, conducted with support from UNICEF (Civil Registration Department & UNICEF, 2013), and used the WHO assessment tool and resource kit (WHO, 2013). MEval-PIMA participated in the final review workshop held on February 12–14, 2014, in Naivasha and disseminated findings from the project's M&E capacity assessment and the CRVS system assessment. The additional reports informed new strategies and activities, such as inclusion of a detailed M&E framework to inform performance monitoring; development of a data use plan that was incorporated in the M&E framework; clear guidance on M&E capacity gaps; and strategies to strengthen mortality reporting, including information on cause of death. In collaboration with UNICEF, MEval-PIMA undertook a review of the consolidated draft document, and was involved in the design, editing, and printing of 200 seed copies. The strategic plan was disseminated at the county-level stakeholder forums.

M&E Capacity for CRS

Following the development of the CRS strategic plan 2013–2017, MEval-PIMA worked with CRS to develop an M&E plan to monitor performance and evaluate achievements in strategic plan implementation. A data use plan that guides demand and use approaches was incorporated into the M&E plan. A meeting was then held with the statistics unit to mainstream M&E functions by reviewing the unit's standard operating procedures and incorporating specific M&E activities. Terms of reference for staff who undertake M&E functions were formulated. There was also need to standardize monitoring visits to yield high-quality registration outcomes, enhance timely reporting, improve supply management, and generally oversee the productivity of staff at the county level. A support supervision guide and tools were developed with financial and technical assistance from MEval-PIMA; these provide clear guidance on frequency of visits, tools to use, tasks to be accomplished, and mechanisms for follow-up.

To address capacity at the individual level, 19 staff participated in data demand and use training workshops in 2013, and seven others (four from national CRS and three CROs) took part in the M&E fundamentals training conducted by MEval-PIMA. CROs from 12 counties—Bungoma, Embu, Garissa, Kakamega, Kilifi, Kirinyaga, Machakos, Mombasa, Nairobi, Nakuru, Siaya, and Wajir—were provided with training in data capture, data management, and data use to address the limited capacity in data transmission, processing, and use. Subsequently, training in data analysis using Stata was held for staff from the statistics unit with the goal of improving their capacity to produce vital statistics information products.

Key research priorities of the CRS were documented in 2014 to inform establishment of MEval-PIMA's small grants program (Civil Registration Department, 2014). This report guides the CRS research agenda.

METHODS

The CRVS end-of-project assessment was carried out at the national level through interviews with a select team from CRS headquarters and implementing partners (KNBS, WHO, UNFPA, UNICEF, Plan Kenya, and CDC). At the county level, four CROs (Kakamega, Kisumu, Machakos, and Nakuru) were visited, and a focus group discussion was held with a select number of assistant chiefs in Kakamega County. The respondents at the national level were purposefully selected based on their roles and interactions with MEval-PIMA. At the county level, proximity to CRS headquarters, the scope of the project's interventions, and the period for which the project has intervened were factors considered in the selection of CROs. For example, Kisumu and Kakamega are both distant from CRS headquarters, but the project has intervened for five years in Kakamega, compared to two years in Kisumu. Data were gathered from primary and secondary sources in May–June 2017 as follows:

- Desk reviews of project work plans, annual reports, activity reports, CRS strategic plan and M&E plans 2013–2017, annual vital statistics reports, assessment reports, and technical documents such as training curricula and job aids were conducted. Reference was made to international sources.
- Structured interviews were held with key informants, including CRS, select county registrars, MOH (county and health facility staff), KNBS, WHO, UNFPA, UNICEF, Plan Kenya, and CDC. A list of contact persons is provided in Appendix B.
- Focus group discussions were held with assistant chiefs for Kakamega County to document outcomes of the assistant chiefs' training and stakeholder engagement.
- Field visits were conducted in select CROs (Kakamega, Kisumu, Machakos, and Nakuru) to assess implementation of the electronic system and to review birth and death registration forms.
- Quantitative data were analyzed to estimate indicators enlisted in the project's performance monitoring plan and determine trends. Sources of the data include CRS vital statistics reports, CRS routine monitoring reports, and DHIS 2. Additional indicators on the availability of civil registration services were estimated from secondary data sources.

Quantitative data were analyzed using Microsoft Excel, and the analysis involved computation of basic descriptive indicators defined as proportions. Qualitative data from the key informants and focus group discussions were conceptualized, summarized, and incorporated in the different sections of the report by thematic areas. Views of the national MOH team were not sought due to the United States Agency for International Development's suspension of activities and assistance to the Ministry.

This assessment reveals the situation at central and county levels as informed by the select CROs. It provides documentation of the project's achievements and lessons learned. It demonstrates the improvements in the system and the statistics it now produces.

RESULTS

Collection and Flow of Vital Statistics

Availability of Civil Registration Services

Currently, CRS has 109 CROs, each serving on average three subcounties out of the 321 subcounties countrywide. Using 2015 projections from the KNBS 2009 population census, a CRO serves an average of 367,300 people, ranging from 123,000 in Lamu County to 4.2 million in Nairobi County. This shows that the average size of population (density) served by a local CRO in Kenya remains high. Similar to 2012 (see Table 2), the distribution of the 109 CROs in 2015 indicates that almost a quarter of them serve populations greater than a half million (see Table 3). This distribution is illustrated visually in Figure 2a. Of note is Turkana County in the north-western part of the country, one of the largest counties with a population in 2015 of more than 1 million and served by only one CRO. From 2012 to 2017, the number of CROs has increased by three, from 106 to 109. This increase has had no impact on the percentage of the population living in districts with at least one CRO. Based on the 2009 census, projections showed that by 2015, 39 percent of CROs (42 out of 109) could potentially register 20,000–40,000 births annually, compared to 20 percent who registered this number in 2012 (MEval-PIMA & Civil Registration Department, 2013b). In 2015, 36 percent of CROs could register more than 40,000 births (see Table 4). The expected number of annual deaths per county is about 35 percent the number of expected births.

The distribution and volume of services performed at CROs depicts an unmanageable workload that could potentially hamper availability of civil registration services (see Figure 2). CRS recognizes the need to bring services closer to the people and targeted to have a CRO functioning in 178 subcounties by 2017 (Civil Registration Department, 2013).

Regarding for registration agents, there are more than 7,000 assistant chiefs in the 6,612 sublocations countrywide. More than 3,000 health facilities notify births and deaths. The volume of expected notifications is not uniform, but it is also not as high per registration agent. It is, therefore, possible to achieve 100 percent coverage as long as the local registration agents fulfill their tasks well. This requires close support supervision, continuous monitoring, and sensitization from the CROs.

Table 2. Distribution of local CROs by the size of population served, 2012

	CRS administrative regions								
Population	Nairobi	Central	Coast	Eastern	North Eastern	Nyanza	Rift Valley	Western	Total
1,000,000+	1	0	0	0	0	0	0	0	**1**
500,000-999,999	0	2	2	4	3	1	8	3	**23**
300,000-499,000	0	6	3	1	0	9	8	2	**29**
200,000-299,000	0	4	2	6	0	3	5	5	**25**
50,000-199,000	0	2	4	6	2	4	5	2	**25**
Unknown	0	2	0	0	0	1	0	0	**3**
Total	**1**	**16**	**11**	**17**	**5**	**18**	**26**	**12**	**106**

Source: CRS and as documented in the MEval-PIMA baseline CRVS system assessment report, 2013

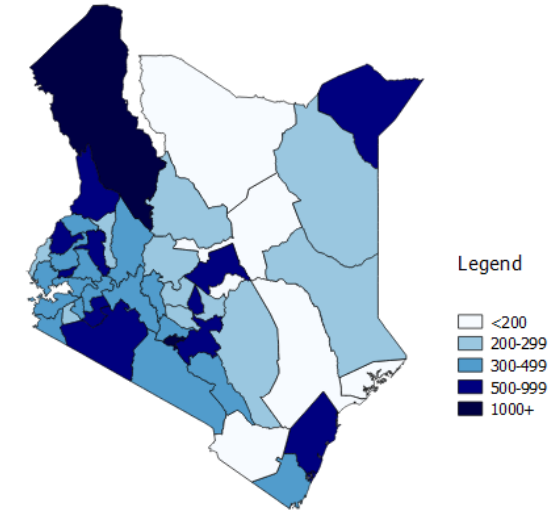
Table 3. Distribution of local CROs by size of population served, 2015

	CRS administrative regions								
Population	Nairobi	Central	Coast	Eastern	North Eastern	Nyanza	Rift valley	Western	Total
1,000,000+	1	0	0	0	0	0	1	0	**2**
500,000-999,999	0	1	4	6	1	0	8	5	**25**
300,000-499,000	0	8	2	0	0	13	11	5	**39**
200,000-299,000	0	4	0	6	4	5	7	3	**29**
<200,000	0	4	5	5	0	0	0	0	**14**
Total	**1**	**17**	**11**	**17**	**5**	**18**	**27**	**13**	**109**

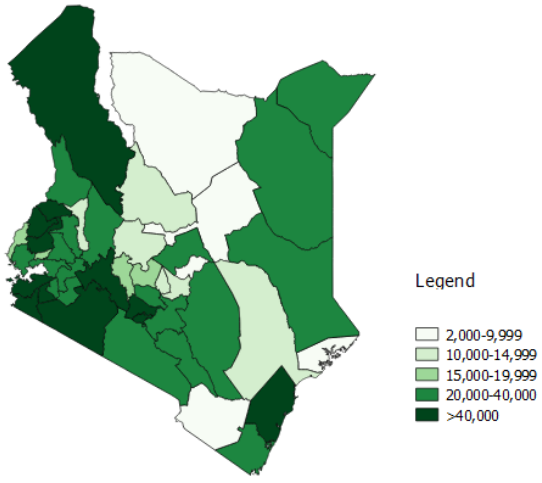
Source: CRS and KNBS

Figure 2. Distribution of CROs and volume of services at CRO

2a. Average population (in thousands) per CRO, 2015



2b. Expected number of births per county, 2015



Source: Map—MEASURE Evaluation PIMA; data—2015 projections from the KNBS 2009 population census

Table 4. Distribution of local CROs by the expected number of annual births, 2015

	CRS administrative regions								
Expected births	Nairobi	Central	Coast	Eastern	North Eastern	Nyanza	Rift valley	Western	Total
>40,000*	1	6	2	0	0	11	10	9	39
20,000-40,000	0	4	4	10	5	7	12	0	42
15,000-19,999	0	6	0	0	0	0	2	4	12
10,000-14,999	0	1	2	2	0	0	3	0	8
2,000-9,999	0	0	3	5	0	0	0	0	8
Total	**1**	**17**	**11**	**17**	**5**	**18**	**27**	**13**	**109**

* Nairobi County has the highest number of expected births at 128,040 in 2015 (Department of Civil Registration Services, 2016).

Source: CRS and KNBS.

Digitalization of Civil Registration Processes

The CRS strategic plan 2013–2017 admits low achievement of performance targets by staff due to inefficient service delivery brought about by a lack of automation of business and civil registration

processes. Manual processes result in unsuccessful or time-consuming searches and retrieval of records, duplicate registrations, and unreliable vital statistics. For instance, the source of vital statistics is a summary of monthly returns submitted to the CROs by the registration agents (health facilities and assistant chiefs). The summaries are compiled in pre-formatted Microsoft Excel templates based on a tally of number of events categorized by place of occurrence, age, sex, and other covariates. The baseline CRVS system assessment highlighted the existence of gaps in the monthly reporting tally sheets such as the missing date of event occurrence and omission of the place of usual residence for the deceased, both of which are recommended data elements in basic UN tabulations (UNESA, 2014). The monthly summaries were reported in a table format and not in a database, thus posing challenges for data processing. Specifically, the merging of the tables into one data file for analysis was highlighted as time consuming, labor intensive, and with potential for poor data quality due to transmission, transcription, and data entry errors. The report also indicated that, with manual processes, registration and issuance of certificates could only be done at the place of birth or death occurrence. Automation of the business processes and civil registration functions necessitated the development in 2010 of a web-based electronic system, the civil registration and vital statistics system (CRVSS). The CRVSS is designed to link to and update IPRS automatically. IPRS assigns a unique person identification number to a birth record and uses this number to link information from other national registries to the individual throughout their lifetime. A death registration inactivates the individual's record in IPRS. The baseline assessment indicated that a functioning CRVSS would:

- Make individual-level information readily available for analysis and derivation of most indicators including internationally recognized vital statistics outputs.
- Make cause-of-death data easily available for compilation and analysis including at the individual level.
- Enhance data sharing among government departments and other users.
- Ease search and retrieval of records.
- Reduce the potential for duplicate records or entries by facilitating search capabilities and issuing an alert if duplicate information is entered.
- Improve data quality and availability and reduce time needed for data transmission.
- Enable task shifting, making staff more productive as manual and tedious, time-consuming compilation processes are alleviated.
- Eliminate incidences of record losses and provide efficient data storage.
- Instill integrity, fidelity, efficiency, and confidence in registration processes and documents.

CRVSS Assessment

At the time of the baseline CRVS system assessment in 2013, the CRVSS was functioning under a "test environment." A pilot conducted at a few registration sites indicated that the system could not be used due to an inherent system limitation that made it possible to capture only about 10 percent of each record. The system required redesign and upgrade to be able to capture all fields on a registration form.

In 2015, MEval-PIMA sought to strengthen the CRVSS to address gaps in data flow and data quality needed to ensure reliability of data being used to inform decision making. A system gap analysis was conducted to understand the CRS ICT platform, to document issues identified in the pilot phase, and to determine the requirements for system upgrade and deployment (MEval-PIMA, 2015). The assessment included an analysis of the political, economic, social, and technological factors that would impact the strengthening of the CRVSS (see Figure 3). The assessment pointed out the political goodwill that could be gained by the government by improving the system, especially the digitization of government business

and improvements in national security through creation of the IPRS. The report listed technological aspects that needed to be addressed, key among them the need for improved security for data in transit and data at rest. This necessitated a system security assessment that was facilitated by MEval-PIMA to identify potential gaps and security threats before system deployment. Findings from the system analysis and the security assessment were discussed in a meeting between CRS, MEval-PIMA, and Plan International in Kilifi in June 2015. The outcome of the meeting was an agreement on the requirements of a mobile application to be used for notification of birth and death events, which Plan International indicated that it would support. MEval-PIMA implemented some of the system upgrades recommended by the security assessment as part of training of system administrators. Upgrades included system architecture redesign, development of a Real Application Cluster database, implementation and setup of the database server, configuration of the application on two application servers for high availability, implementation of Oracle Automatic Storage, configuration of the virtual local area network for different components of the system and its users, implementation of a backup policy, separation of duties among system users, masking of passwords, enabling audit, and implementation of an audit data vault to prevent modification of audited data. The government undertook to develop an offline copy of the system that allows for basic searches of records in the electronic database and represents a great step in ownership and sustainability.

Figure 3. Political, economic, and technological reasons for strengthening the CRVSS

Source: MEASURE Evaluation PIMA

CRVSS Functionality

As at the time of this assessment, the system was functioning optimally at CRS headquarters, with minimal issues and changes and improvements made as needed. MEval-PIMA provided continued technical assistance, beyond system deployment, to identify challenges in system functionality and debug as necessary. Deployment at the initial six sites with the support of MEval-PIMA was significant because it enabled testing of the system in the field—documenting and correcting bugs and addressing other challenges in preparation for the next phase of rollout. In five of the six sites, CROs were able to scan and capture data, search and retrieve records, assess and review applications, approve applications, make payments for applications, and print birth and death certificates. Kakamega County had a challenge with the infrastructure (e.g., Internet connectivity), and thus the use of CRVSS was not optimal. Scanning of historical records and current records in sites where the system has not been deployed is ongoing. With support from the World Bank, scanned paper records are converted into data by keying them in an electronic document management system and then uploading to the CRVSS.

In the CRVSS, ICD codes are embedded as a table within the system to enable classification and coding of the causes of death; however, the revised death registration form needs to be adopted to meet the international standards of certifying and coding causes of death. The system has a reporting module that provides standard reports including the monthly summaries from CROs. When fully automated, the CRS statistics unit will obtain real-time and complete information, improving timely reporting of quality vital statistics data. The system will also help with the timelier computation of indicators that require analysis of individual-level data.

CRVSS Rollout

MEval-PIMA supported CRVSS deployment in six registration sites: Bondo, Kakamega, Machakos, Nairobi County CRO, Nakuru, and Siaya. The deployment involved system installation and configuration, training of registrars and their assistants as system end users, training of CRS national ICT staff as system administrators, provision of Internet connectivity, training of the statistics team in generating reports and extracting data for additional analyses, and technical assistance to troubleshoot system bugs and monitor and document system functionality. The training covered five days: three days of hands-on practical experience using the test environment, a one day "dry run" session using the live system, and one day of user support at the site. CRS made available the hardware infrastructure, including computers, scanners, printers, and local area network. Rollout was a five-week phased approach beginning with the Nairobi County CRO because of its proximity to CRS headquarters. The technical team was able to closely monitor system implementation, troubleshoot, and make the necessary modifications before rollout to the other sites. The Nairobi County CRO and CRS headquarters received internet connectivity for 12 months from March 2016 to May 2017. The other sites had a minimum of nine months of Internet connectivity. System use at the six sites was reported at 70 percent; unreliable connectivity and resistance to change management among some staff were reasons cited for non-use.

CRS planned a two-day training session in Nairobi, targeting an additional 12 sites for system rollout in 2017, bringing the total number of CROs using the system to 18. The remaining 91 CROs have been provided with infrastructure to enable access to the servers via modems and the offline system. This access allows for basic searches of records in the electronic database. CRS is in the process of equipping the sites with scanners to enable seamless automation of the records in all sites. CRS has also benefited from the government's expansion of local area network cabling, enabling 80 CROs to connect, an improvement from the baseline 28 CROs that were able to connect in 2012. The ICT Authority is undertaking an assessment to inform implementation of shared Internet services in all government

offices, which will optimize infrastructure at minimal cost. This service is available via fiber connectivity in Machakos, Meru, Embu, Isiolo, Malindi, Tana River, Garissa, Marsabit, and Kiambu Counties. All CROs will require full-time Internet connectivity and training to use the CRVSS; this is being provided in a phased approach and targets all major registration sites in the 47 counties by 2018. CRS has adopted MEval-PIMA's approach of system deployment with emphasis on documentation and learning.

The CRVSS makes it possible to retrieve a record from any location; for example, a birth that took place in Kisumu can be accessed in Nakuru and a birth certificate issued. This has been used by the *huduma centers* countrywide to provide birth and death certificates and has improved the efficiency of issuing certificates by making them available everywhere. The improved search and retrieval of records has, in turn, assisted in identifying duplicate registrations, reducing fraudulent cases, and cutting down the travel costs of applicants.

Challenges during deployment included reluctance on the part of some end users to adopt to technology-driven business processes, unreliable Internet connectivity, and clerical errors emanating from the automation of historical records. Some of the connected sites reverted back to manual processes whenever they experienced these challenges. A few, such as the Bahati and Machakos CROs, have set up alternative temporary systems for search and retrieval of records. CRS should continue with the documentation of technical challenges raised by system users. Routine site visits and continued user support will be critical in this process to enhance users' capacity through on-the-job training, ensuring that staff are updated on new developments, continuously debugging system errors, and optimizing functionality. There is a need to extend the system to mobile devices and provide this technology to local registration agents including the assistant chiefs. Discussions with other government agencies need to happen to enable interoperability with the health information system and activation of the link to other core government systems besides IPRS.

Technical Skills to Implement the System

Every CRO has at least one staff member with skills in information technology, putting the department in a competent position to implement the system. The CRS ICT core team at the national level receives support from staff seconded by the ICT Authority. Before the rollout, MEval-PIMA provided hands-on training to four of the five core ICT staff on technical aspects of the system, including the database, application, and system environment, which has enabled ICT staff to administer the system and offer maintenance services without the constant need of support from the programmers. The programmers come in only when substantive development work requiring skill sets beyond those of the core team are required. The 45 days of training for this team covered modules in Redhat System Administration, Oracle Database Administration, and Oracle Database Development, and included sessions working with Linux and Oracle for software infrastructure setup. The team successfully completed Linux environment setup; administration, networking, storage portioning, and database installation; security setups; Real Application Cluster setups; database and audit vaults setups. Details of the training are provided in the training report (MEval-PIMA, 2016). In addition, 100 staff were trained as system users at the different sites during rollout (see Table 5). Ten statistics-unit staff were trained in the reporting module and given the appropriate user rights.

Table 5. Number of staff trained as users of the CRVSS

Registration site	Male	Female	Total
Nairobi County CRO	17	11	28
Machakos	8	12	20
Bondo	5	0	5
Siaya	7	5	12
Nakuru	12	11	23
Kakamega	10	2	12
Total	**59**	**41**	**100**

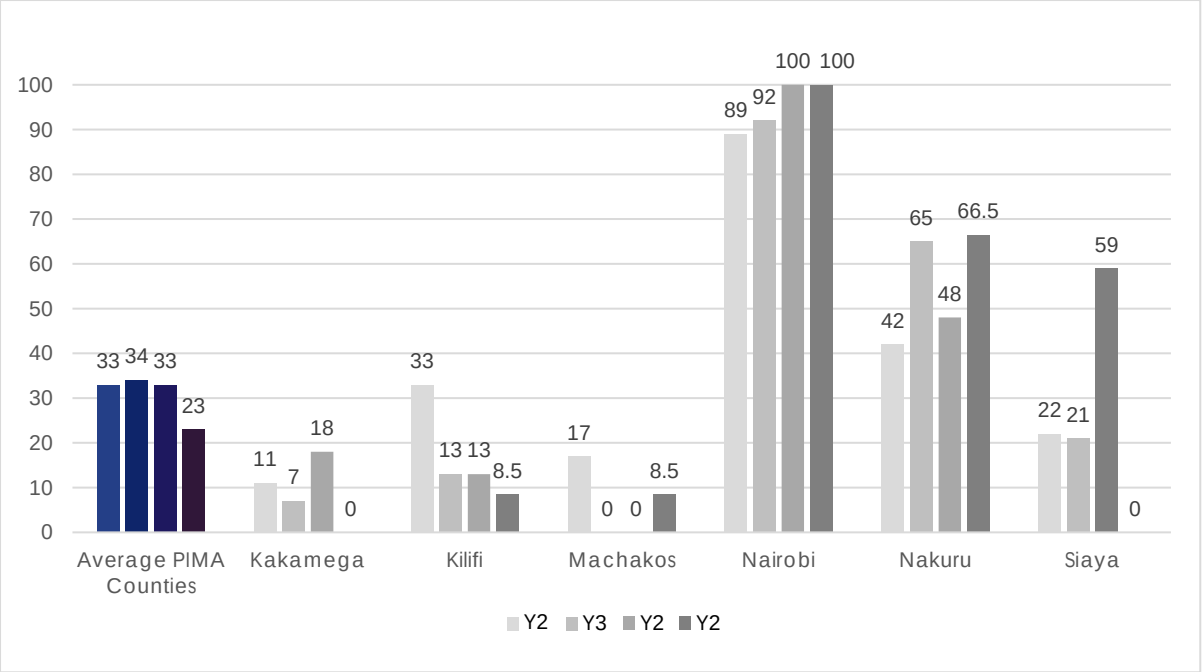
Source: MEASURE Evaluation PIMA

Timely Submission of Data

The CROs rely on local registration agents (assistant chiefs and health facilities) to carry out birth and death notifications in an accurate, complete, and timely manner. By law, the birth and death registration process must begin within six months of the date of the event. A vital event registered after this prescribed period is considered a late registration. Local registration agents register the events and submit completed registration forms to registrars who in turn compile vital events data and submit CRO-level summaries to CRS headquarters by the 15th of every month. To ensure up-to-date vital statistics at CRS, timeliness of report submission is an important indicator. The project's baseline CRVS system assessment suggested indicators of timeliness (see Appendix A). MEval-PIMA monitored the percentage of CROs submitting birth and death registration summaries to CRS by the 15th of every month. This indicator shows the project's firm support of CRS to improve timeliness of reporting and subsequently enhancing the use of current data.

From the assessment of this indicator, timeliness of reporting varied across target counties and remained low, with only about one-third of CROs submitting reports on time (see Figure 4). Submission of summary reports to CRS is an ongoing challenge due to delays in submission of completed registration forms from local registration agents. Reasons for delays include lack of a transport allowance for local registration agents, weak accountability mechanisms, and lack of systemized structures for support supervision. In Murang'a and Kirinyaga Counties, through the county commissioner's office, MEval-PIMA helped establish a feedback mechanism between assistant chiefs and the registrar through assistant county commissioners during their monthly meetings. This process requires that the assistant chief's reporting form (CRDP-6) summarizing the number of forms being submitted must be signed by the assistant chief, the assistant county commissioner, and the registrar. Initially, this form was signed by the assistant chief and registrar as an acknowledgement and proof of submission of the forms. In addition to receiving the forms, the registrar would review the completed forms and advise on the quality of the records. Forwarding the forms through the assistant county commissioners represents additional work and responsibility, which most assistant county commissioners have not found tenable.

Figure 4. Percentage of CROs submitting summaries by the 15th of every month



Source: MEval-PIMA

Birth and Death Registration Coverage

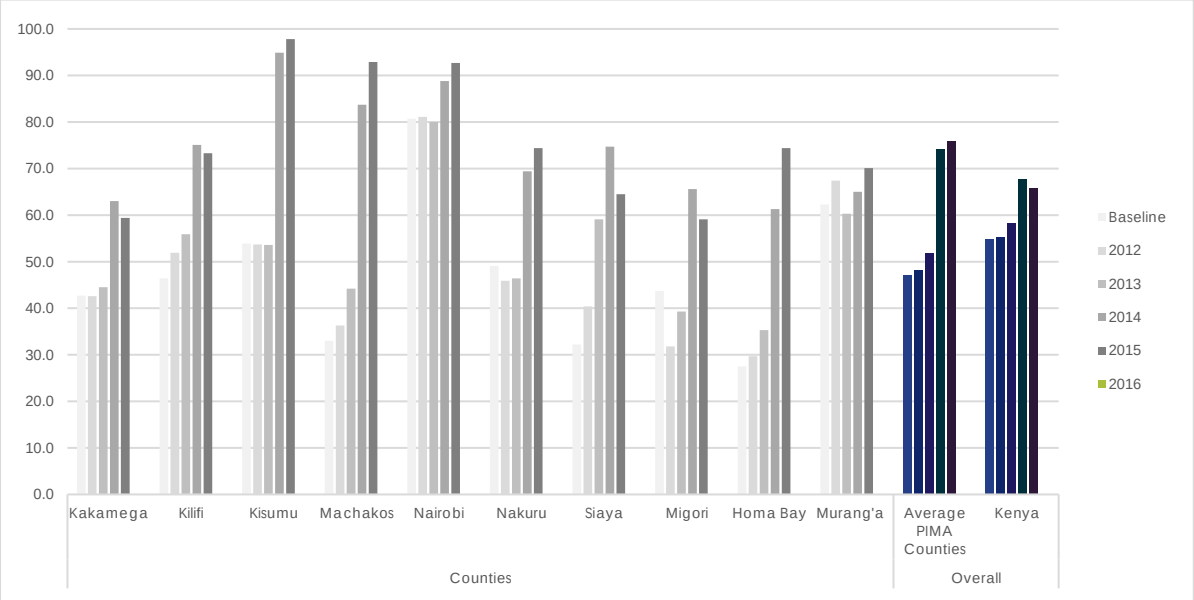
The CRS strategic plan 2013–2017 commits to achieving comprehensive registration targeting 100 percent coverage of births and deaths by 2017. Coverage is estimated using the number of events in a given year that are registered within six months after occurrence in the numerator, and the expected number of events in the denominator. At the time of strategic plan development in 2013, low registration was attributed to the following: low public awareness of the requirements and benefits of immediate registration of births and deaths; cultural and religious beliefs, such as the practice of immediate burial among Muslims; low commitment by registration agents; inadequate monitoring of registration agents; budgetary constraints and inadequate funding; coverage difficulties caused by poor terrains, vast geographic areas, nomadic lifestyle, and hard-to-reach slum areas; incomplete decentralization of civil registration services; weak legislation and non-enforcement of the law; and low demand for civil registration products. The strategic plan outlined strategies to address the challenges and improve registration such as rolling out the maternal and child health (MCH) strategy on birth registration to capture births that occur at home during routine immunization or child health clinics; capturing unregistered births data as part of the government's rapid results initiative programs; outlawing late registration; investigating and responding to barriers in timely registration of births and deaths; enhancing capacity of local registration agents; promoting registration through mobile outreach; and benchmarking best practices for learning at all levels. MEval-PIMA intervened in the following areas:

- Implementation of the MCH strategy through sensitization of MCH staff and health management teams in Nairobi County and two subcounties (Garissa Township and Fafi) in Garissa County. Nationally, the MCH strategy has been rolled out in 15 counties. The rollout involved sensitization of health workers and members of NGAO,[4] the reporting of births at MCH by health facilities, and in some counties support from UNFPA to monitor implementation of the strategy.
- MEval-PIMA supported monitoring and documentation of implementation of the MCH strategy in Garissa, Nairobi, and Siaya Counties.
- Sensitization of assistant chiefs in Wajir County in 2014 and two subcounties (Mbeere South and Mbeere North) in Embu County in 2015.
- Discussion on the challenges and barriers to registration during county-level stakeholder forums in all the target counties in 2014 and 2016.
- Training of assistant chiefs in Kisumu and Kakamega Counties in 2016.
- Development and dissemination of a job aid for assistant chiefs in nine target counties (Siaya, Migori, Homa Bay, Kisumu, Kakamega, Nakuru, Machakos, Murang'a, and Kilifi) to further reinforce local registration agents' capacity in civil registration.

According to the Kenya Vital Statistics Report (KVSR) 2015, national birth coverage has increased from 55 percent in 2012 to 65 percent in 2015. This rise has occurred in a number of counties, including the 10 MEval-PIMA target counties, which on average recorded a rise from 48 percent in 2012 to 76 percent in 2015 (see Figure 5). The MCH strategy was launched in 2012 and rolled out in 15 counties by 2017. The government implemented a rapid results initiative program in 2014. In 2014, the free maternity services policy was launched that saw increases in health facility deliveries. The 2014 Kenya Demographic and Health Survey indicated that in the five years preceding the survey, more than one-third (37%) of births took place at home, compared to 56 percent in the 2008–2009 survey. However, only about 10 percent of births registered by CRS in 2015 (Department of Civil Registration Services, 2015) were registered at home by the assistant chiefs (see Figure 6). Only about one-fifth (18%) of births occurring at home in 2015 were reported by assistant chiefs (see Figure 7). The results show that health facilities consistently register a larger proportion of births. The evident rise in overall national birth coverage is the result of an increase in health facility deliveries and channeling notification of unregistered births through MCH clinics.

[4] NGAO includes a county commissioner, deputy county commissioner of every subcounty, assistant county commissioner of every ward, a chief of every location, and an assistant chief of every sublocation.

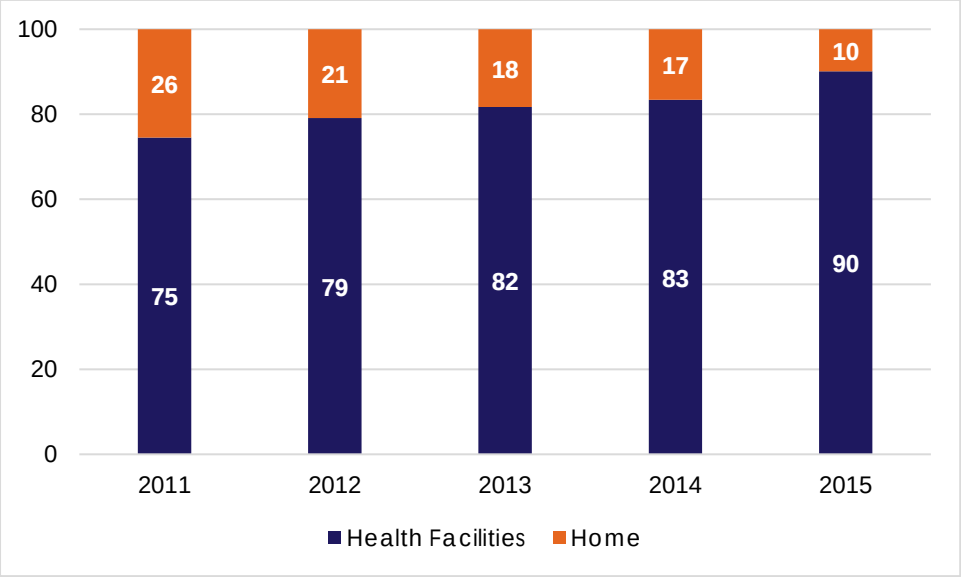
Figure 5. Birth registration coverage for MEval-PIMA target counties



Note: Project Year 1 estimates correspond to Kenya's vital statistics for the year 2012. Year 5 would correspond to the 2016 data, which have not been analyzed. Estimates of birth coverage incorporate all births, live and stillbirths, b these are not disaggregated in the monthly reporting tally sheets. The UN recommends tabulation for only live births.

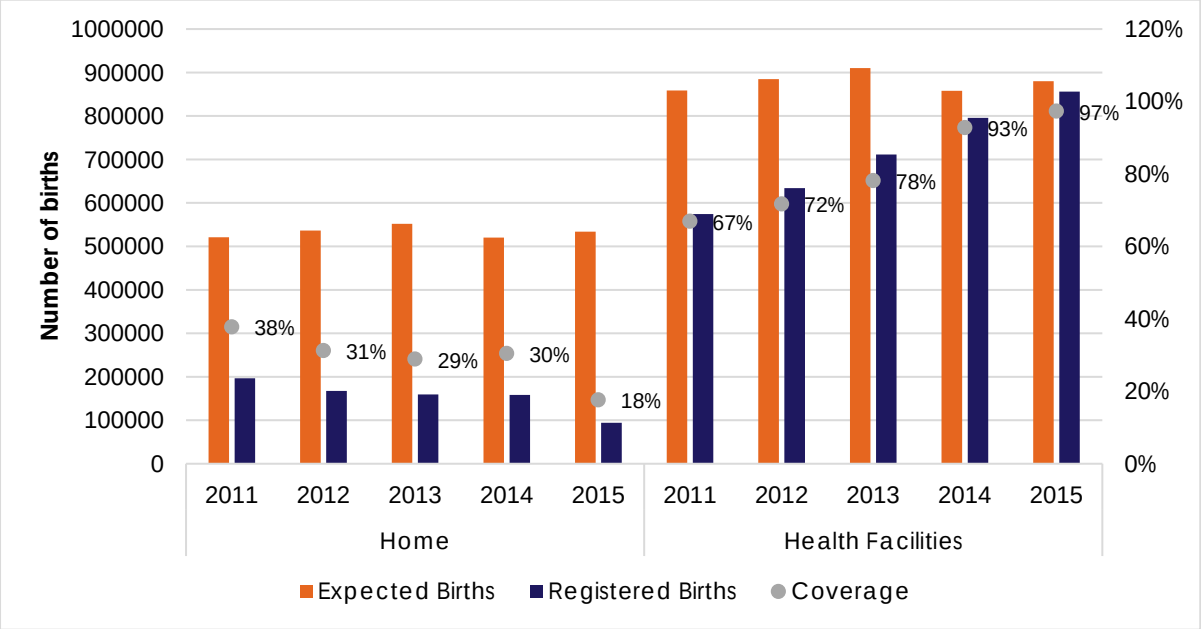
Source: Kenya Vital Statistics Report, 2015

Figure 6. Percentage of births registered by place of registration



Source: Kenya Vital Statistics Report, 2015

Figure 7. Birth registration coverage by place of occurrence, 2011–2015

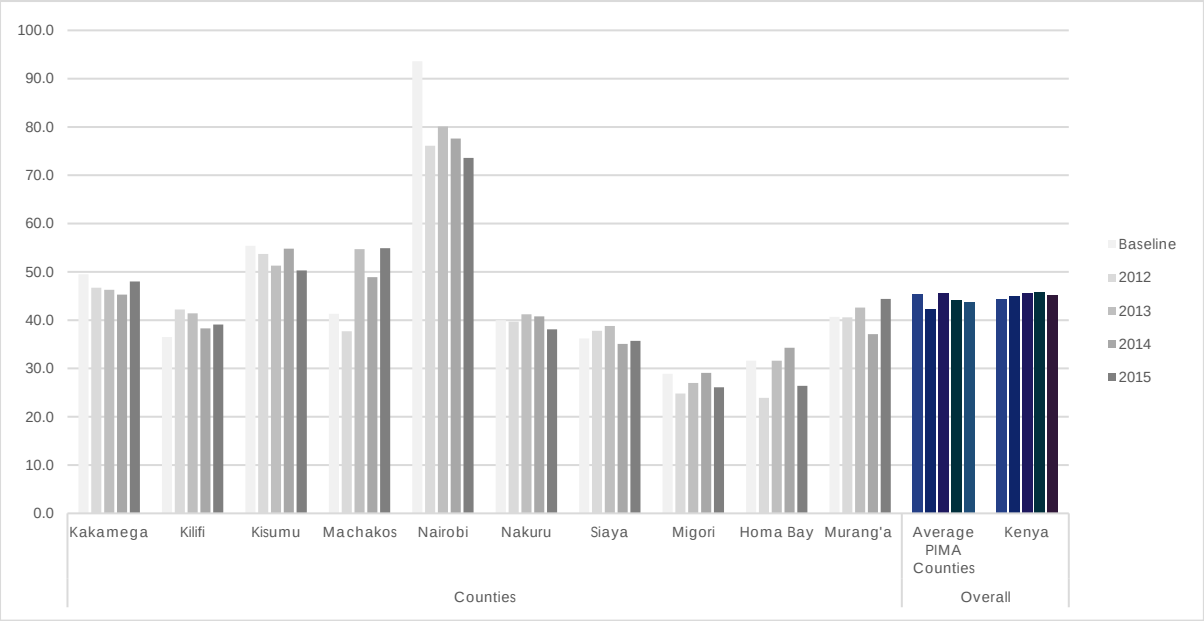


Note: The expected births by place of occurrence was computed by using the 37 percent of births taking place at home and 61 percent of births occurring in health facilities (2014 Kenya Demographic and Health Survey)
Source: MEASURE Evaluation PIMA; data—Kenya Vital Statistics Report, 2015, and 2014 Kenya Demographic and Health Survey

Death coverage, on the other hand, has remained low at 45 percent in the period 2012–2015. Counties have registered varied rates over time, with MEval-PIMA counties recording an average increase from 42 percent in 2012 to 44 percent in 2015, but with a declining trend between 2013 and 2015 (see Figure 8). Slightly more than half of all deaths registered are reported at the health facilities despite the majority of deaths occurring at home. In 2016, CDC through the CRVS improvement project in Homa Bay County piloted implementation of a community-based verbal autopsy toolkit and its integration with civil registration to inform national rollout. The first phase of the pilot has shown that the tool is acceptable and feasible as a data collection platform. During this exercise, the community health volunteers documented all deaths that occurred in their assigned households in the previous six months and shared the details with the community health extension worker for completion of the verbal autopsy tool. The local registrar was also notified of the death event. Recommendations from this pilot suggested that an increase in death registration coverage can result if community health volunteers are incorporated in the civil registration process as the third registration agent. The pilot is in its second phase, testing the proposed sample selection method to inform sample representativeness at the county and subsequently national levels.

Discussions with the registrars in Nakuru, Kisumu, Kakamega, and Machakos Counties and a select number of assistant chiefs in Kakamega County suggest that all deaths are reported as part of enforcing the burial permit requirement. The head of the CRS statistics unit has indicated the need to review the projected number of deaths in light of the current changes in population characteristics and epidemiological shifts.

Figure 8. Death registration coverage for MEval-PIMA target counties



Source: Kenya Vital Statistics Report, 2015

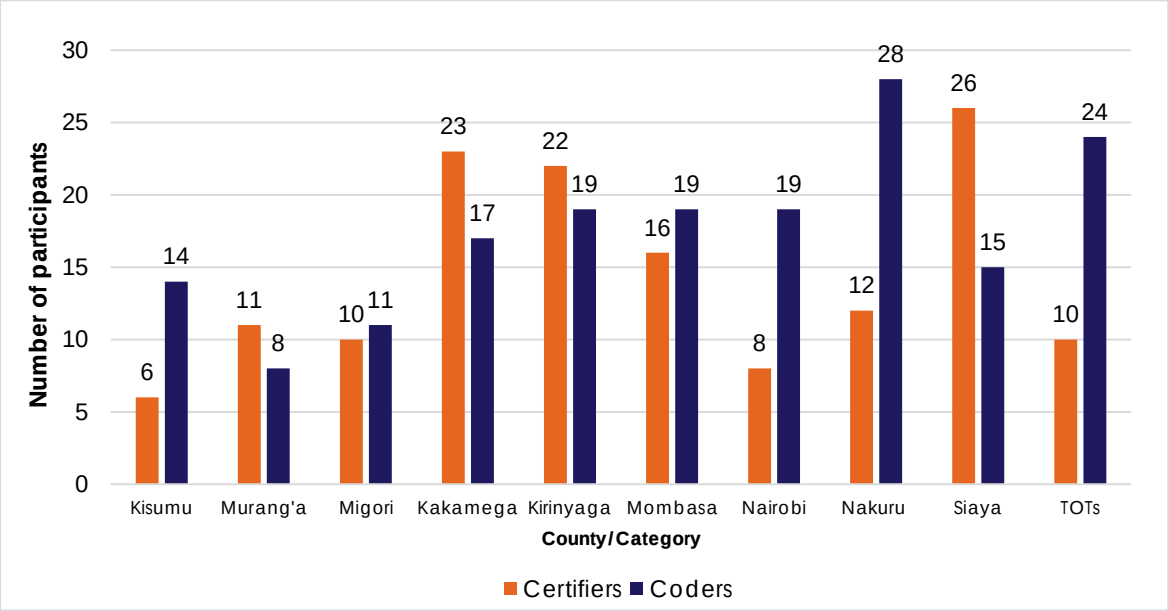
Accuracy of Cause-of-Death Information

Cause-of-death information is collected on two registration forms: (1) form D1, which is completed by a medical practitioner and used to report deaths that occur in health facilities; and (2) form D2, which is used to register deaths that occur at home. Information on form D2 is based on a cause of death selected from a list of probable causes and is not medically certified. During MEval-PIMA's baseline CRVS system assessment, the quality of medical certification on form D1 was questionable due to the lack of up-to-date systemized training in certifying deaths according to ICD standards. The assessment indicated that the process of aggregating monthly summaries on cause of death was problematic because the registrars were not trained in ICD and were therefore not able to read and interpret the medical diagnosis and determine the underlying cause of death. Compilation of this information at CRS involved tallying the causes of death (from both the health facilities and communities) according to a list of 46 specified causes of death which did not correspond to the WHO list for mortality. The tallied data did not distinguish between lay-reported and medically certified causes for deaths occurring at the health facilities. At the MOH, cause-of-death information was tallied on a monthly basis on index cards by health facility making data processing and analysis tedious and time consuming. MOH data were also different from CRS data because of the different methods of data compilation.

In 2013, through the Division of Monitoring and Evaluation, Health Research Development and Informatics (DivMEHRDI), MOH prioritized strengthening ICD certification and coding. With financial and technical assistance from MEval-PIMA, DivMEHRDI partnered with CRS, WHO, and CDC to develop guidelines and a curriculum that would provide national standards for ICD implementation and training to ensure consistent and uniform approaches for data compilation. Using these guidelines and training materials, in 2014 MEval-PIMA supported the training of trainers in 12 counties: Wajir, Garissa, Embu, Machakos, Mombasa, Kilifi, Nairobi, Nakuru, Kirinyaga, Siaya, Kakamega, and Bungoma. The training, successfully facilitated by 34 trainers in six counties (Mombasa, Siaya, Kakamega, Nakuru, Kirinyaga, and Nairobi), was conducted between February and June 2015, and targeted health records and information officers and clinicians (medical and clinical officers) at 72 high-volume health facilities.

Following rollout of ICD training in 2015, DHIS 2 was revamped to enable capture of individual patient morbidity and mortality data, including ICD-coded causes of death. Health facilities were requested to use the platform and enter data, including the 2014 backlog. This resulted in improved quality of facility-level mortality information, and enhanced reporting in DHIS 2. With this success DivMEHRDI worked closely with MEval-PIMA between March and April 2016 to train health workers from three additional counties: Migori, Murang'a, and Kisumu. Overall, with the support of MEval-PIMA, a total of 318 health workers (34 training of trainers, 134 certifiers, and 150 coders) (see Figure 9) were trained from 104 health facilities (see Appendix C). Civil registrars participated in the training in order to understand the process of certification and coding at the facility level, to introduce them to facility staff, and to respond to issues regarding civil registration. MEval-PIMA supported post-training follow-up in the form of mentorship facility visits and quarterly ICD sensitization with continuous medical education sessions in five targeted high-volume facilities in each county. CDC has implemented ICD in Homa Bay County, and WHO has trained health workers in Kilifi, Nakuru, and Bungoma Counties. MOH, with support from the Global Fund, has implemented training in Garissa, Bungoma, Machakos, Embu, Kericho, and Kisumu Counties.

Figure 9. Number of certifiers and coders trained in ICD



Source: MEval-PIMA

The D1 form was revised to meet ICD standards and is awaiting adoption by CRS. Meanwhile, MOH has designed a data capture tool that is aligned with the international medical certificate of death form which is in use in all health facilities. The tool is used to capture cause-of-death data in DHIS 2. However, because electronic death records from DHIS 2 are not integrated into the CRVSS, deaths reported from health facilities must also be reported on D1 forms and submitted to the registrar's office.

The baseline CRVS system assessment determined that only 1.3 percent (46 out of 3,412) of health facilities reported ICD coded deaths in 2011. The 46 health facilities had reported 9,497 deaths, with most of the deaths concentrated in a few health facilities (17 reported at least 100 deaths in the year). In subsequent years (reported as project years), the number of health facilities reporting ICD-coded deaths has increased as has the overall number of deaths reported (Table 6).

Table 6. Annual number of deaths reported by health facilities assigning ICD codes

Number of deaths reported	Number of health facilities reporting			
	2011	Project year 2014/15	Project year 2015/16	Project year 2016/17*
1-9	23	27	48	50
10-99	6	41	59	66
100-999	14	23	43	42
1000-1500	3	1	2	1
>1500	0	2	2	0
Total health facilities reporting	**46**	**94**	**154**	**159**
Total deaths reported	**9,497**	**16,211**	**23,664**	**15,715**

* This is eight months of data for the period October 2016 to May 2017.

Note: Post the baseline values in 2011, annual refers to MEval-PIMA project years. All years reflect a 12-month cycle except for 2016–2017.

Source: DHIS 2 data downloaded on June 5, 2017

ICD training has resulted in better availability of cause-of-death information from health facilities. ICD-coded data are monitored and evaluated by the MOH, and the MOH has put in place mechanisms to supply cause-of-death data by age and sex to WHO on an annual basis. Submission of cause-of-death data to the WHO mortality database has been hampered by delays in validating data quality and incomplete reporting nationally. This has limited their use at the international level.

ICD coding is taught in medical training, but certification is not required for clinicians in pre-service training. Discussions with medical institutions have been initiated to incorporate ICD implementation guidelines and training curriculum into medical training institutions' curricula.

Production and Use of Vital Statistics

The baseline assessment determined that vital statistics reported by the CRS on an annual basis were not consistent due to poor data quality in CRO monthly summaries, lack of verification and correction of statistics reported by CROs, and failure to explain or point out inconsistent numbers in the annual report. In addition, vital statistics from KNBS were not harmonized with those reported by CRS due to delays in submission of summaries to CRS headquarters, and CRS staff lacked capacity in data processing and analysis. Recommendations from the assessment included:

- Strengthening CRS technical capacity to process, analyze, and report vital statistics
- Developing procedures for and conducting regular reconciliations and verifications of data
- Harmonizing reports between CRS and KNBS

Production of Annual Vital Statistics Reports

At the time of the 2013 baseline assessment, CRS was producing an annual vital statistics report that was primarily for internal use within the department. Reports from CRS and KNBS differed (MEval-PIMA & Civil Registration Department, 2013b), with discrepancies partly attributed to the time when KNBS requested the information. For example, if information was requested before the CRS annual report was available, the information provided by KNBS would not include data from CRO summary reports that were submitted late. With the support of MEval-PIMA, the development of the KVSR 2013 improved the content in the annual vital statistics report and provided a template that has been used in subsequent publications. The report has been cited internationally and informed the "guidelines and template for

developing a vital statistics report" by the Statistics Norway team as requested by the UN Economic Commission for Africa and the UN Economic and Social Commission for Asia and the Pacific.[5] These guidelines are still under review.

The KVSR 2013 report-writing workshop ensured multi-stakeholder participation, resulting in a joint collaborative effort. During this workshop, there was agreement on the periodicity of publishing the vital statistics report and its content, as follows:

- Publish the vital statistics report every year in tandem with the statistical abstract and economic survey report produced and published by KNBS.
- In the annual report, reference should be made to the year of analysis with comments on the trends observed over time. Detailed analysis is to be carried out every five years using the 2013 report format.
- Recalculate the expected number of births and deaths whenever there is new evidence.
- Set every March as the month the stakeholders are to conduct data analysis and report writing.

Formation of the analysis team and agreement on timelines for producing the annual vital statistics report has enabled timely availability of information for sharing with KNBS and subsequent harmonization of vital statistics between KNBS and CRS. The technical competency of the analysis team has improved the quality of analysis and reporting. Suggestions to further improve vital statistics data have been documented in the KVSR and include the following:

- Statistics tabulated may not be representative of the general population due to low coverage and issues related to accuracy, especially of cause-of-death information. However, KVSR is an important source of data that can be used to monitor improvements in quantity and quality of civil registration.
- Quality assurance procedures need to be established as regular and routine activities.
- Capture as much information in monthly reports as is provided in the registration forms to enable tabulation of statistics as per the UN standards.
- Tabulate cause of death from form D1 and form D2 separately.

Dissemination and Use of Vital Statistics

Information in the KVSR, which has been printed and distributed annually since 2013, is incorporated in the annual economics survey report that highlights the country's economic performance and informs the national budget. This information is also published in the UN Demographic Yearbook through the UN Statistics Division. At the county level, information from the report has been shared during the stakeholders' forums. In 2015, MEval-PIMA supported development of county vital statistics briefs. There was a suggestion to incorporate this information in county health profiles rather than have separate information products for the counties.

The vital statistics in the KVSR have also been used to inform County Integrated Development Plans, evaluate MOH programs, update the country's voter register, and inform research by the Kenya Institute for Public Policy Research and Analysis and university students.

[5] http://getinthepicture.org/system/files/event/documents/%5BDRAFT%5D%20Guidelines%20and%20Template%20for%20Developing%20a%20Vital%20Statistics%20Report.pdf (downloaded on June 10, 2017)

As an example of the use of CRVS information to improve data quality and inform decision making, CRVS information disseminated during a stakeholder forum in Garissa County in April 2014 prompted a data management workshop to address disintegration of host and refugee birth and death registration data for 2010–2013. This provided revised and more accurate birth registration coverage for the county from the documented 85 percent to 30 percent. The high coverage originally reported was the result of registration in the enclosed refugee camps (Hagadera, Ifo, Kambioss, and Dagahaley), where most deliveries were happening in health facilities. Births from such populations are not normally included in estimates of expected number of births.

DISCUSSION

The civil registration system is the best source of vital statistics and the most reliable approach for monitoring levels and causes of death. Government and national stakeholder investments to ensure the production of high-quality vital statistics has focused on strengthening the capacity of local registration agents; implementing ICD through training and the capture of ICD-coded causes of death in DHIS 2; implementing the strategy of reporting community births through MCH clinics; monitoring data quality at the health facility and county levels for CROs; enhancing stakeholder coordination and engagement; strengthening technical capacity to process, analyze, and interpret vital statistics; producing and disseminating vital statistics; and automating records and digitalizing civil registration services. This assessment reveals improvements on various fronts, including:

- Stakeholder forums at the county level enhance coordination and engagement and serve as avenues for sharing vital statistics and increasing visibility of the CRVS agenda in county governments. However, these forums have been held only in MEval-PIMA and UNFPA target counties.
- CRS capacity in M&E has improved with the availability of an M&E plan, a data use plan, and a research agenda that provide linkage between data collection and its uses. The department also has a support supervision guide and tools. Staff capacity for M&E has been enhanced following the training conducted. In addition, the training led to the development of a curriculum that can be used by CRS and other partners to create a critical mass with the requisite skills and establish a link to training institutions.
- Standardized ICD training curriculum and implementation guidelines have been used to train certifiers and coders across the country. The MOH is also using a reporting tool that is aligned with the international medical certificate of cause of death. ICD-coded data on causes of death are captured in DHIS 2, and improvements in the quality of cause-of-death information and in the number of health facilities reporting ICD-coded data have been observed over time. However, these issues remain to be addressed:
    - The legal death registration form D1 was revised to conform to sequencing of cause of death as per ICD standards and includes ICD-coded information; however, it has not been adopted for use.
    - ICD codes are embedded as a table in the CRVSS to enable classification and coding of causes of death. However, the revised D1 form has not been adopted for use in health facilities. In addition, electronic cause-of-death records in DHIS 2 are not integrated into CRVSS, requiring that deaths from health facilities must be reported separately on D1 forms and submitted to the registrar.
    - Discussions to incorporate the training curriculum into curricula of medical institutions have been initiated; however, continuous follow-up is required to check progress for implementation.
    - The assistant chiefs continue to use the D2 form that provides lay-reported causes of death. Verbal autopsy implementation, which is expected to improve the quality of cause-of-death data at the community level, has been slow and is still in the pilot phase. Data from the pilot program suggest that an increase in death registration coverage can happen if community health volunteers are incorporated into the civil registration process as the third registration agent.

- The collaborative production of the vital statistics report has improved the content and quality of the report. The source of vital statistics has been defined and harmonized. However, CRS has experienced delays in production, printing, and dissemination, which hamper its use for informing strategies and policies. Additional areas for improvement include:
    - CRS still uses summary tables that capture aggregated data and miss important data elements such as the place of usual residence. This limits tabulation of the data according to UN-recommended guidelines.
    - Quality assurance procedures need to be established as regular and routine activities.
    - Although information in the KVSR has been disseminated at stakeholder forums and the printed report has been distributed widely, there is room to scale up dissemination of vital statistics data to more users, including policymakers within the country and globally.
- Health facilities have consistently registered higher proportions of births. There has been an increase in the number of facility deliveries, partly due to free maternity services policies. The MCH strategy is also effective in capturing unregistered community births. However, its implementation is not universal in all health facilities. This requires some level of scale-up and continued follow-up.
- CRVSS is functioning optimally and contributes to reduced turnaround time for legal certification in sites where rollout has been completed. However, this has been accomplished in only 16 percent of the 109 CROs. Digitization of government business provides opportunities to scale up CRVSS to all CROs and local registration agents.
- Timeliness of reporting is an ongoing challenge within CRS. The options tried and suggestions made to improve submissions of reports have not been tenable and do not provide sustainable results. CRVSS is an institutional mechanism to improve timely notification of vital events and efficient flow of data to CRS headquarters.

To achieve optimal information on vital statistics requires a successfully functioning national system and broader legal and administrative investments should be considered. The assessment reveals gaps in these aspects; in particular:

- Weak legislation and lack of appropriate policies continue to hamper achievement of 100 percent coverage. The process of reviewing the legal framework began but has been slow and has not been translated into policies that can be implemented. For example, there is no policy outlawing late registration, which would ensure timely notification of all vital events.
- Reorganization of government structures and business processes is a significant boost for CRS. In addition, CRS has the requisite governance structures that are strategic for fostering improvements in CRVS. These structures include the TWG, stakeholder meetings, strategic plan and M&E plans, annual planning and budgeting, and an enabling environment with good leadership.
- The number of informants and volume of expected notifications per informant suggest that it is possible to achieve 100 percent coverage as long as they fulfill their tasks well. This requires close support and supervision, continuous monitoring, and sensitization from CROs.

CONCLUSION AND RECOMMENDATIONS

This assessment reveals commendable efforts to strengthen the CRVSS, which has resulted in improvements in the quality of statistics it produces. Vital statistics are readily available, and reporting between CRS and KNBS is harmonized. Implementation of guidelines for certifying and coding causes of death has resulted in better availability of cause-of-death information from health facilities. However, data quality assurance procedures need to be heightened to increase reporting and achieve use of mortality statistics at the international level. Additional recommendations from this assessment are as follows:

- Fast track review of the legal framework and development of the necessary policy documents.
- Stakeholders should consider establishing an interagency coordinating committee pitched at a level higher than the TWG. The committee would create leadership linkages with other government agencies, advocate for policy formulation, and lobby for funding, among other roles.
- Sustain stakeholder coordination at the national level to maintain momentum in strengthening CRVS. Stakeholder forums at the county level have been used as platforms for information sharing and defining strategies to improve coverage. Scale up this stakeholder engagement in all counties and at the community level.
- Speed up testing of verbal autopsy implementation and develop guidelines to roll out nationally.
- Use the community health strategy to strengthen reporting of vital events and recording of accurate cause-of-death information at the community level.
- Adopt the revised D1 form that is aligned to the international medical certificate of cause of death.
- Cascade training of clinicians in ICD certification to create a critical mass with the requisite skills. The MOH should follow up progress in mainstreaming ICD in medical training institutions and offer support where needed.
- Conduct regular data quality assurance assessments at all levels.
- Continue interaction between data producers and users of vital statistics to enhance utilization. In addition, implement the research agenda and data use plan to ensure that the information needs of decision makers are adequately represented.
- In addition to deploying CRVSS in the remaining 91 CROs, extend the system to mobile devices and deploy to local registration agents as a way to improve timely submission of data. Full deployment of the system will enable analysis of individual-level data and allow tabulation of statistics per UN-recommended standards.
- Continuously monitor CRVSS functionality. This should include routine site visits and continued user support.
- Continue technical support for the CRVSS to address pending improvements. Formation of an ICT governance committee may be crucial in spearheading discussions to explore interoperability with DHIS 2.

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APPENDIX A. LIST OF INDICATORS FOR MONITORING AND EVALUATION OF VITAL EVENTS

Indicator	Indicator definition	Type of indicator/notes	Value	Period
Availability of services				
Percentage of the population living in districts that have at least one civil registration office (CRO)		Output	70%	2012
Average size of the population served by local CRO (density)		Output	360,000	2012
Average number of births and deaths the CRO is expected to process in a year	Assumes 100% coverage of births and deaths	Input	13,000 births; 3,600 deaths	2010
Number of CROs		Output	107	2012
Average number of informants per CRO	Average number of assistant chiefs and average number of health institutions	Output	73 assistant chiefs; 32 health institutions	2012
Number of local registration agents (assistant chiefs) per 10,000 population	Total number of assistant chief informants divided by population, multiplied by 10,000	Output. 2012 projected population from 2009 census not available, so used 2009 population in denominator	2.1	2012
Number of local registration agents (medical and other) per 10,000 population	Total number of health institution informants divided by population, multiplied by 10,000	Output. 2012 projected population from 2009 census not available, so used 2009 population in denominator	0.9	2012
Completeness				
Percentage of births that are registered in the civil registration system		Outcome	57.4	2010
Percentage of deaths that are registered in the civil registration system		Outcome	48.0	2010
Percentage of infant deaths registered in the civil registration system		Outcome	26.3	2009

Indicator	Indicator definition	Type of indicator/notes	Value	Period
Availability of services				
Timeliness of submission of monthly summary sheets	% of months that CROs submit timely birth registration data (i.e., by 15th of each month)	Output. Not measured in the assessment. CRS subject estimate is 70-90% of CROs comply with timely submission	NA	
Percentage of late registrations	% of registered births and deaths that are registered after six months following the event	Outcome. Not measured in the assessment	NA	
Number of 'delayed registrations'	% of registered births and deaths that are registered after one year following the event	Outcome. Not measured in the assessment	NA	
Percentage of registered births for which a certificate has been issued	% of registered births and deaths that are registered after six months following the event	Outcome. Not strictly a 'timeliness' indicator. Information not currently compiled to measure from the CRVS system, only through nationally representative surveys	24%	5-years prior to 2008–09 (KDHS)
Cause of death				
Number of medical certifiers trained in International Classification of Diseases (ICD) using the World Health Organization (WHO) ICD-10 Interactive Self Learning Tool		Output	NA	
Number of coders trained in ICD using the WHO ICD-10 Interactive Self Learning Tool		Output	NA	
Medical school curriculum revised and reviewed by independent experts, e.g., WHO-Family of International Classifications network		Input	NA	

Indicator	Indicator definition	Type of indicator/notes	Value	Period
Number (or percentage) of health institutions reporting medically certified deaths for which the ICD code was assigned	The percentage of institutions using 2011 cause-of-death data and 2012 information on total possible number of reporting institutions	Outcome; could also be defined as the percent of institutions that report mortality	46 (1.3%)	2011
Cause of death use of death				
Percentage of all deaths notified by institutions that have an ICD code		Outcome	10%	2011
Median number of deaths reported by institutions that report cause of death with ICD codes		Outcome	9.5	2011
Percentage completeness of reported deaths with ICD cause of death assigned		Outcome	2%	2011
Number of ICD-10 codes used		Outcome	498 males; 419 females	2011
Percentage of invalid codes		Outcome	11-12%	2011
Percentage of ill-defined codes		Outcome	15%	2011
Mortality levels indicating usefulness for monitoring mortality				
Crude death rate (both sexes) per 1,000 population		Outcome Impact (Once cause of death completeness is 85+% and ill-defined causes are <10%, then statistics can be reliably used to monitor mortality)	0.2	2011
Life expectancy (males) in years		Outcome Impact (see above)	263	2011
Life expectancy (females) in years		Outcome Impact (see above)	334	2011
Infant mortality per 1,000 live births		Outcome Impact (see above)	1.4	2011
Under-five mortality per 1,000 live births		Outcome Impact (See above)	2.1	2011

Indicator	Indicator definition	Type of indicator/notes	Value	Period
Other cause of death				
Ratio of deaths due to non-communicable diseases to communicable diseases			0.6	2011
No. counties with trained personnel to certify ICD cause of death			NA	
Other cause of death				
No. districts with trained personnel to code ICD cause of death			NA	

NA=not available

Dissemination: The international community requests annual, national-level information on vital events (births, deaths, infant deaths, fetal deaths, and cause of death). Births, deaths, and infant deaths have been reported in recent years; fetal deaths and cause of death have not been reported.

	2005	2006	2007	2008	2009	2010
Annual registered births are reported to the United Nations Department of Economic and Social Affairs (UNESA) (e.g., Demographic Yearbook and bi-annual Vital Statistics Reports)	No	No	Yes	Yes	Yes	NA
Annual registered deaths are reported to UNESA (e.g., Demographic Yearbook and bi-annual Vital Statistics Reports)	Yes	Yes	Yes	Yes	Yes	NA
Annual registered infant deaths reported to UNESA (e.g., Demographic Yearbook and bi-annual Vital Statistics Reports)	No	No	No	Yes	Yes	NA
Annual registered fetal deaths reported to UNESA (e.g., Demographic Yearbook and bi-annual Vital Statistics Reports)	No	No	No	No	No	NA
Annual population, birth and death, including cause-of-death data, submitted to the World Health Organization Geneva, in requested format	No	No	No	No	No	NA

NA=not available

APPENDIX B. LIST OF CONTACT PERSONS FOR KEY INFORMANT INTERVIEWS

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		Email	Telephone
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APPENDIX C. LIST OF HEALTH FACILITIES WITH AT LEAST ONE STAFF TRAINED IN INTERNATIONAL CLASSIFICATION OF DISEASES

SNo.	County	Health facility	Type of training
1	Kakamega	Aga Khan Hospital	Health workers training
2	Kakamega	Butere Hospital	Health workers training
3	Kakamega	Kakamega County General Referral Hospital	Health workers training
4	Kakamega	Iguhu Hospital	Health workers training
5	Kakamega	Likuyani Hospital	Health workers training
6	Kakamega	Lumakanda Hospital	Health workers training
7	Kakamega	Mukumu Hospital	Health workers training
8	Kakamega	Navakholo Hospital	Health workers training
9	Kakamega	St. Mary's Mumias Hospital	Health workers training
10	Kakamega	Malava County Hospital	Health workers training
11	Kakamega	Matungu Subcounty Hospital	Health workers training
12	Kakamega	Manyalla Hospital	Health workers training
13	Kirinyaga	Kirinyaga County Referral Hospital	Health workers training
14	Kirinyaga	ACK Mt. Kenya Hospital	Health workers training
15	Kirinyaga	Kianyaga Subcounty Hospital	Health workers training
16	Kirinyaga	Kimbimbi Subcounty Hospital	Health workers training
17	Kirinyaga	Sagana Subcounty Hospital	Health workers training
18	Kirinyaga	Mutithi Health Centre	Health workers training
19	Kirinyaga	Our Lady of Lords Mwea Mission Hospital	Health workers training
20	Mombasa	Aga Khan Hospital	Health workers training
21	Mombasa	Bomu Hospital	Health workers training
22	Mombasa	Coast General Hospital	Health workers training
23	Mombasa	Jocham Hospital	Health workers training
24	Mombasa	Jomvu Health Centre	Health workers training
25	Mombasa	Likoni Subcounty Hospital	Health workers training
26	Mombasa	Mewa Hospital	Health workers training
27	Mombasa	Miritini CDF Dispensary	Health workers training
28	Mombasa	Mlaleo CDF Health Centre	Health workers training
29	Mombasa	Pandya Memorial Hospital	Health workers training
30	Mombasa	Port Reitz District Hospital	Health workers training
31	Mombasa	Sayyida Fatimah Hospital	Health workers training
32	Mombasa	The Mombasa Hospital	Health workers training
33	Mombasa	Tudor Subcounty Hospital	Health workers training
34	Nairobi	Aga Khan Hospital	Health workers training
35	Nairobi	Getrude Children's Hospital	Health workers training
36	Nairobi	Kenya National Spinal Injury Hospital	Health workers training
37	Nairobi	Kenyatta National Hospital	Health workers training
38	Nairobi	Kenyatta University funeral home	Health workers training
39	Nairobi	Langata Hospital	Health workers training
40	Nairobi	Mama Lucy Kibaki Hospital	Health workers training
41	Nairobi	Mater Hospital	Health workers training
42	Nairobi	Mathari Hospital	Health workers training
43	Nairobi	Mbagathi District Hospital	Health workers training
44	Nairobi	Nairobi Coptic Hospital	Health workers training
45	Nairobi	Pumwani Maternity Hospital	Health workers training
46	Nairobi	South B Hospital	Health workers training
47	Nairobi	St. Francis Community Hospital	Health workers training
48	Nakuru	Bahati Subcounty Hospital	Health workers training
49	Nakuru	Egerton University Hospital	Health workers training
50	Nakuru	Elburgon Subcounty Hospital	Health workers training
51	Nakuru	Gilgil Subcounty Hospital	Health workers training
52	Nakuru	Mogotio Subcounty Hospital	Health workers training
53	Nakuru	Molo Subcounty Hospital	Health workers training
54	Nakuru	Naivasha Subcounty Hospital	Health workers training

SNo.	County	Health facility	Type of training
55	Nakuru	Nakuru Provincial General Hospital	Health workers training
56	Nakuru	Nakuru Provincial General Hospital—Annex	Health workers training
57	Nakuru	Olenguruone Subcounty Hospital	Health workers training
58	Nakuru	Valley Hospital	Health workers training
59	Siaya	Akala Health Centre	Health workers training
60	Siaya	Ambira Subcounty Hospital	Health workers training
61	Siaya	Bama Hospital	Health workers training
62	Siaya	Barndege Health Centre	Health workers training
63	Siaya	Bondo Subcounty Hospital	Health workers training
64	Siaya	Got Agulu Subcounty Hospital	Health workers training
65	Siaya	Madiany Subcounty Hospital	Health workers training
66	Siaya	Matibabu Foundation	Health workers training
67	Siaya	Pap Kodero Health Centre	Health workers training
68	Siaya	Siaya County Referral Hospital	Health workers training
69	Siaya	Sigomere Health Centre	Health workers training
70	Siaya	Ting Wangi Health Centre	Health workers training
71	Siaya	Ukwala Subcounty Hospital	Health workers training
72	Siaya	Yala Subcounty Hospital	Health workers training
73	Murang'a	Maragua Subcounty Hospital	Health workers training
74	Murang'a	Kiwrara Subcounty Hospital	Health workers training
75	Murang'a	Githumu Subcounty Hospital	Health workers training
76	Murang'a	Murang'a County Referral Hospital	Health workers training
77	Murang'a	Muriranjas Subcounty Hospital	Health workers training
78	Murang'a	Kiiraini Mission Hospital	Health workers training
79	Kisumu	Aga Khan Hospital	Health workers training
80	Kisumu	Kisumu County Hospital	Health workers training
81	Kisumu	Manyuanda Subcounty Hospital	Health workers training
82	Kisumu	Kombewa County Hospital	Health workers training
83	Kisumu	Lumumba Subcounty Hospital	Health workers training
84	Kisumu	Miranga Subcounty Hospital	Health workers training
85	Kisumu	Jaramogi Oginga Odinga Teaching and Referral Hospital	Health workers training
86	Migori	St Camilus Mission Hospital	Health workers training
87	Migori	Rongo Subcounty Hospital	Health workers training
88	Migori	Migori County Referral Hospital	Health workers training
89	Migori	Kegonga Subcounty Hospital	Health workers training
90	Migori	Karungu Subcounty Hospital	Health workers training
91	Migori	Awendo Subcounty Hospital	Health workers training
92	Migori	St. Joseph Mission Hospital	Health workers training
93	Migori	Macalder Subcounty Hospital	Health workers training
94	Migori	Uriri Subcounty Hospital	Health workers training
95	Migori	Kuria West Subcounty Hospital	Health workers training
96	Bungoma	Bungoma County Referral Hospital	Training-of-trainers
97	Embu	Embu Provincial General Hospital	Training-of-trainers
98	Garissa	Garissa County Referral Hospital	Training-of-trainers
99	Kilifi	Malindi Subcounty Hospital	Training-of-trainers
100	Kilifi	Mariakani Subcounty Hospital	Training-of-trainers
101	Kirinyaga	Kerugoya County Hospital	Training-of-trainers
102	Machakos	Kangundo Subcounty Hospital	Training-of-trainers
103	Machakos	Kathiani Hospital	Training-of-trainers
104	Wajir	Wajir County Referral Hospital	Training-of-trainers

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MEASURE Evaluation PIMA is funded by the United States Agency for International Development (USAID) through associate award AID-623-LA-12-00001 and is implemented by the Carolina Population Center at the University of North Carolina at Chapel Hill, in partnership with ICF International; Management Sciences for Health; Palladium; and Tulane University. The views expressed in this publication do not necessarily reflect the views of USAID or the United States government. TR-17-220

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