WORKING PAPER

Facilitators and Barriers to Data Use in Kenya

Learning from the MEASURE Evaluation PIMA Associate Award

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ABBREVIATIONS

CHMT	county health management team
CHP	county health profile
CHRIO	county health records and information officer
DDU	data demand and use
HRIO	health records and information officer
M&E	monitoring and evaluation
MECAT	Monitoring and Evaluation Capacity Assessment Tool
MEval-PIMA	MEASURE Evaluation PIMA
RMNCH	reproductive, maternal, newborn, and child health
TWG	technical working group

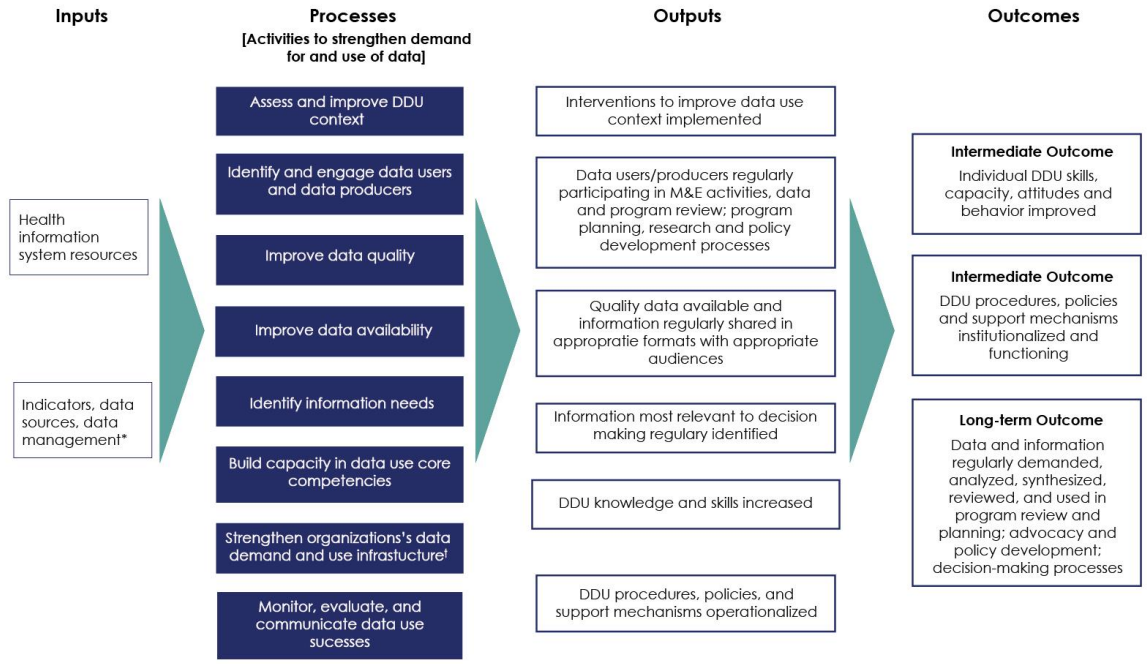
BACKGROUND

MEASURE Evaluation works to strengthen capacity in developing countries to gather, interpret, and use data to improve health. High-quality data are essential for effective and efficient decision making in health, to promote transparency and strengthen the accountability of decision makers. MEASURE Evaluation developed an organizing framework that maps how data use intervention inputs and activities influence the outputs and outcome of regular sustained use of data in program review, planning, and policy (Nutley & Reynolds, 2013). This framework provides a comprehensive and practical strategy for developing interventions to strengthen the demand for and use of data in decision making. The interventions cover eight domains of activities that were identified in the literature and by MEASURE Evaluation's implementation experience as critical to affect the technical, behavioral, and organizational determinants of data-informed decision making. The intervention is tailored to specific country and program contexts, such that it may not be necessary to implement each intervention area to improve the demand for and use of data.

The domains are (Figure 1):

- Assess and improve the data use context
- Engage data users and data producers
- Improve data quality
- Improve data availability
- Identify information needs
- Build capacity in data use core competencies
- Strengthen the organization's data demand and use (DDU) infrastructure
- Monitor, evaluate, and communicate DDU successes

Figure 1. Logic model for strengthening an organization's use of health data in decision making



*Defined as processes by the Health Metrics Network

†The data demand and use approach broadly defines an organization as a division of the ministry of health at the national, state, or district levels; a specific program within the ministry; or a nongovernmental organization or program.

Source: Nutley & Reynolds, 2013

This framework has been used to guide the design of interventions to improve data-informed decision making, which were implemented as part of larger health information system and monitoring and evaluation (M&E) strengthening projects in Kenya, South Africa, and Tanzania (the MEASURE Evaluation associate awards). To understand the progress made by each associate award in improving data use, MEASURE Evaluation explored the facilitators and barriers contributing to the effectiveness of specific DDU interventions implemented at the *subnational* level in Kenya, South Africa, and Tanzania. MEASURE Evaluation established the following objectives for this learning exercise:

(1) To describe the results of DDU intervention activities.
(2) To understand the factors that contribute to successful data use in country health information systems.

This report presents the results of the Kenya follow-up investigation. Findings for South Africa and Tanzania are presented separately. These reports are meant to be shared with country governments, programs, and donors implementing DDU interventions to sustain a culture of decision making in health programs.

MEASURE Evaluation PIMA

MEASURE Evaluation PIMA (MEval-PIMA) was a five-year project (2012-2017), funded by the United States Agency for International Development. Its overall objective was to build sustainable M&E capacity of health decision makers in Kenya to use quality health data for evidence-based decision making and programming. Because the 2010 Constitution of Kenya created a decentralized system of government, county governments are responsible for the planning and the promotion of health services. At the county level, the county health management team (CHMT) is responsible for providing leadership and stewardship for overall health management; developing strategic and operational plans; monitoring and evaluating health services; providing linkages with the national Ministry of Health; collaborating with state and non-state stakeholders at the county level and between counties on health service delivery; mobilizing resources for county health services; establishing mechanisms for referrals in and between counties and between the different levels of the health system in line with the sector referral strategy; and coordinating and collaborating on county health issues with county health management boards, faith-based organizations, nongovernmental organizations, and civil society. The new devolved system meant that CHMTs increasingly required information to guide decision making and planning for health services.

MEval-PIMA developed a comprehensive DDU intervention adapted to the local context and specific needs of the project. Data quality was not a priority for the project and was therefore not included in its data use strategy. An initial DDU assessment was conducted to understand the priority needs to tailor the DDU intervention approach. MEval-PIMA's data use strategy consisted of the following priority activities:

- Assess and improve the data use context.
- Engage data users and producers.
- Improve data availability.
- Identify information needs of data users and data producers.
- Build capacity in data use core competencies.
- Strengthen the organization's DDU infrastructure.

Table 1 describes the DDU interventions implemented in Kenya. The number of dots (1 to 3) represents whether the intervention area was a priority for the project's DDU intervention approach (3=high priority and 1=low priority).

Table 1. DDU activities implemented by MEval-PIMA

	Kenya	Description	Activities implemented in Machakos county, MEval-PIMA
Assess and improve the data use context	●	Assessing the organizational, technical, and behavioral factors that affect decision making.	Group self-assessment using the Monitoring and Evaluation Capacity Assessment Tool (MECAT). The tool assesses capacity in the 12 functions of an M&E system, including DDU.
Identify and engage data users and data producers	●●●	Improving the interaction and collaboration between data producers (i.e., those who design and manage information systems) and data users (i.e., those who use data in program improvement and development).	Institute collaborative data review forums (data review meetings and performance review meetings) for joint data review and interpretation.
Improve data quality		Ensuring that data are accurate, complete, and timely.	Not applicable.
Improve data availability	●●●	Improving data synthesis and communication such that information is available in easily interpretable formats responding to the information needs. Ensuring that data users can access and share data easily outside of regular dissemination processes.	Development and institutionalization of information products, such as the county health profile (CHP) and the reproductive, maternal, newborn, and child health (RMNCH) scorecard.
Identify information needs	●●	Focusing on the practical questions that data users have to effectively run their health programs and their upcoming policy or planning decisions.	Development of a data use plan identifying priority questions of interest and how relevant data will be generated to address the information needs.
Build capacity in data use core competencies	●●●	Data use core competencies include skills in data analysis, interpretation, synthesis, presentation, and the development of data-informed programmatic recommendations.	Conduct training on Fundamentals of Monitoring and Evaluation and Data Demand Concepts and Tools. Technical assistance and mentoring to county health records and information officers on data mining, analyses, visualization, and interpretation.
Strengthen the organization's DDU infrastructure	●●●	The rules, processes, values, and systems of an organization that support an individual's ability to use data in decision making.	Development of data-informed health sector strategic plans, M&E plans, and data review guidelines.

Across the three associate awards, few activities were implemented in monitoring, evaluating, and communicating the results of the DDU interventions. This learning exercise helps respond to this need.

METHODS

To select a region for inclusion in Kenya's DDU learning exercise, a mapping exercise was conducted to identify the geographic areas that had participated in the largest number and variety of DDU activities across the DDU intervention areas (Appendix A). Based on this mapping, Machakos county was selected for inclusion in this assessment.

Seventeen interviews with individuals who had experience and exposure to MEval-PIMA's DDU interventions were conducted, including program and/or M&E staff at the county level, partners, and MEval-PIMA staff (Appendix B). Each key informant interview was conducted in English by a lead researcher and lasted between 30 and 75 minutes. One focus group discussion was conducted with community health volunteers. For all interviews, the researcher used a semi-structured interview guide designed to explore stakeholder views on how the DDU interventions were implemented; the expected and unexpected changes seen because of the interventions; and to capture the contextual factors that may have shaped the uptake and impact of the interventions. All interviewees provided verbal informed consent, and the interviews were audio recorded using digital recorders. Audio recordings of the interviews were transcribed and analyzed using NVivo 11. An index code book with a priori themes was created prior to data collection to identify and categorize responses. Codes were developed based on the questions and themes in the interview guide. Two independent coders initially coded one transcript, to test the reliability of the coding scheme and recommend changes to the coding structure. Subsequently, each interview was coded by one researcher. Both researchers analyzed the data, updated the codebook based on emerging themes, and agreed on salient themes and common patterns.

FINDINGS

The following sections describe the activities implemented by MEval-PIMA in each DDU intervention area and the factors that facilitated or hindered the effectiveness of the activities to strengthen demand for and use of data.

Assess and Improve the Data Use Context

An initial baseline assessment was implemented at the start of MEval-PIMA project activities to understand Machakos county's data use context and identify priority technical, organizational, and behavioral barriers to data use. DDU was assessed as part of the MECAT assessment exercise, which measured M&E capacity across the 12 components of a well-functioning M&E system. For data use measures, district and county teams rated themselves according to the existence, quality, and sustainability of an organizational data use plan, information products, and data analysis and presentation guidelines (MEASURE Evaluation, 2017a). The MECAT provided a common language for the CHMTs to understand M&E capacity, and facilitated an open, participatory approach for the self-identification of strengths and weaknesses. Results from the assessment of capacity areas informed priority capacity building needs to strengthen, and the development of an action plan to strengthen M&E systems, including making better use of health data for decision making.

In general, this baseline assessment highlighted the lack of a uniform framework to monitor performance in the implementation of the strategic plan. For Machakos county, the MECAT assessment indicated the lack of a county M&E plan, and the lack of a data use plan, information products, and guidelines for data analysis and use (MEASURE Evaluation, 2015).

We did not include specific questions about the MECAT in this learning exercise because the outcomes of an endline assessment using the MECAT in two other counties was previously published (MEASURE Evaluation, 2017b; MEASURE Evaluation, 2017c).

Build Capacity in Data Use Core Competencies

To build sustainable capacity for using data in decision making, core competencies to demand and use data should exist at all levels of the health system. Data use core competencies include skills in data analysis, interpretation, synthesis, and presentation, and the development of data-informed programmatic recommendations and policies. Both data users and data producers should be targeted for capacity-building activities.

In Machakos, county health managers were trained in DDU concepts and were introduced to DDU frameworks and tools, such as the "Fundamentals of Monitoring and Evaluation" and the "Seven Steps to Use Routine Information" tool, which provides stepwise guidance on how to use data in decision making (MEASURE Evaluation, 2009; MEASURE Evaluation, 2013). The project also provided training and mentorship to health records and information officers (HRIOs) on understanding indicator definitions, data mining, analysis, visualization, and interpretation in the production of information products, such as the CHP and dashboards, as discussed below.

Capacity building generated an increased appreciation and ownership for data-informed decision making. Respondents described an increased appreciation of the need for high-quality data and were more likely to see data as a responsibility in their day-to-day jobs. Respondents also discussed how capacity-building efforts contributed to a positive shift in attitudes and ownership of data, describing a change in focus from data reporting to valuing data quality and analysis. One HRIO respondent noted that they used to "only feed data into the computer and then send. I have now learnt that before I do anything, I am supposed to rectify my data and after that, I not only send the data, but I sit down and make a presentation and give feedback to the facility regarding where we are in terms of performance."

Practical skills gained from capacity-building activities were applied to improve work functioning. Capacity building on data use competencies focused on the development of practical skills that could be applied in people's regular work settings. Following the training, respondents described instances where they ensured that collected data were used at the facility level and further increased data demand from CHMT members and program managers. For example, a data producer from a Level 5 hospital in Machakos described using the skills learned during a training session to produce wall charts illustrating service trends for their medical superintendent. Having seen the applicability and usefulness of the wall chart, the medical superintendent now requests that this visualization is regularly updated when new data are available.

Respondents also described how they further developed the value for DDU among their teams by "mentoring and coaching others, especially at the facility level" during supportive supervision visits. One respondent noted:

> *In maternal and child health, once you mentor them on the importance of putting the correct data and filling all the entries in the registers, you find that the data that they give you are accurate, not data that have gaps. You find that they fill the registers. Initially they would fill the register and not fill the totals, but I told them about the importance of filling the register with the correct data and filling all the entries that are required in the register. And once you mentor them, they do that and you find that next month, once you go and pick the data, they are correct. And before you collect the registers, you verify with the person who is in that department.* (HRIO)

Facilitators

Interactive and participatory training sessions facilitated open discussions about data use. Respondents described the training sessions as interactive and participatory, providing the opportunity to share experiences and challenges openly. Adult learning techniques were used to encourage trainees to practice and internalize new skills. As one stakeholder stated: "It was very interactive. You have to be really into it for you to understand. And then it was a step by step, we do it, we re-do it, you do something wrong, you re-do it until you get it right. That is the best thing that I found with the training."

The strong relationship between MEval-PIMA and county leadership ensured buy-in and support. Respondents noted that MEval-PIMA was able to establish, cultivate, and maintain a positive relationship with the county leadership. The buy-in from the health leadership ensured that, for example, staff were "released to go for the training" and that time was allocated to enable staff to engage in training and other capacity-building activities regularly.

Individual motivation was a driver to sustain skills gained in the DDU training sessions. Individual commitment to learn and willingness to engage in capacity-building activities were identified as

facilitating factors. One respondent noted that "zealousness to learn" was a crucial factor to the success of the training because people were open to understanding how they could approach their work in a better way.

Barriers

Limited capacity in the DHIS 2 inhibited the ability to apply new DDU skills. The DDU training sessions were not closely linked with training on the DHIS 2. Therefore, despite the training on data analysis, visualization, and presentation, respondents stated that there was still low capacity among many staff to access and extract information from the DHIS 2. As one respondent noted: "Although the CHMT members and subcounty managers have log in credentials to the DHIS, not all of them are accessing that data because of the literacy levels and competing priorities." The inability to create pivot tables and to export data from the DHIS 2 into Excel inhibited further data analysis and visualization.

High staff turnover inhibited sustainable capacity building in DDU core competencies. Respondents noted that high staff turnover and human resource shortages affected the number of individuals trained in DDU core competencies. They emphasized the need for continuous and ongoing refresher training opportunities to ensure that the capacity of new and inexperienced staff is built. Respondents also noted the need to closely mentor and follow up with others who may not have been trained by "sitting with them, calling on others, and bringing those who have not gone through the training on board."

Improve Data Availability

For data use to occur, data needs to be accessible, synthesized into easily understandable formats, and communicated to different target audiences. To facilitate the review and monitoring of program progress and targets, MEval-PIMA provided ongoing technical assistance for data sharing and review forums to make data available at the moment they are needed (see below).

MEval-PIMA supported Machakos county to strengthen information systems (such as the referral system, community health information system, and the civil registration and vital statistics system – see Appendix C for further information) to improve data availability by easing the process of data retrieval and report generation, allowing users to access relevant data for decision making. As a technical officer noted: "The compilation of vital statistical information has become simpler…once they key in the data, the data are compiled automatically." Stakeholder fora and review meetings were also held to improve the dissemination and communication of these data to a broad range of actors. Because the outcomes of these interventions were previously published, we did not extensively focus on these interventions for this learning exercise.[1]

To improve data availability, MEval-PIMA supported the development, production, and dissemination of information products, including quarterly CHPs that highlight county status on key health service delivery indicators and a RMNCH scorecard. MEval-PIMA supported county and subcounty HRIOs to mine data

[1]MEASURE Evaluation PIMA. (n.d.) Fact sheets. Retrieved from https://www.measureevaluation.org/pima/fact-sheets.

from the DHIS 2 and other sources (e.g., the logistics management information system), analyze and interpret the data, and present it in an easily digestible format.

Information products facilitated data review and action planning. CHPs were disseminated and reviewed in data review meetings, where they were used to track progress on priority indicators identified in the county health sector strategic plan (CHSSP), identify areas of weakness, and follow up with suggestions for corrective action, where necessary. (Further information is provided below.) Information products were widely distributed to subcounties and facilities to disseminate data on program performance to encourage action. As a county health records and information officer (CHRIO) noted: "I am seeing people coming up with innovative ways or interventions to address the challenges that they are facing as a result of using the data or the health information product that they have read." The respondents cited an example in which a comparative analysis from an information product illustrated the poor performance of a subcounty on the number of deliveries at a health facility, even in the presence of a major hospital. Once this problem was identified, they conducted further investigation and discovered that traditional birth attendants in the subcounty were referring patients to a Level 5 hospital farther away. They then developed an intervention to address the issue. At the community level, the project supported the preparation of community chalkboards, which are used by community units to display their performance to all stakeholders (including community members and decision makers) in a transparent manner.

Information products increased stakeholders' access to and demand for data. Respondents described how the information products increased access to data, especially because data users found it difficult to log in and use the DHIS 2. Respondents described the usefulness of packaging key information in a manner that people can easily understand, using simple visual graphics without excessive jargon and tables:

> *One of the skills is presenting data in a manner that they can be easily understood. Previously I did not know much about scorecards… presenting many indicators and in a way that can be easily understood by the managers who don't have time to look at graphs and to look at other things, but they only see red, yellow, and green and they get it right… The scorecard can be used to identify gaps and inform decisions on interventions to address them. The visual representation (color-coding) of performance has even helped the lowest cadre of health workers to understand in which areas they are lagging and on what they must focus to improve their performance on a quarterly basis.* (CHRIO)

Respondents noted that the production of the quarterly CHP had increased the demand for data because program staff are now aware of the profile and expect it to be updated quarterly:

> *When PIMA came in, we didn't have a picture of how our health in the county is, but after we did the first, the second, the third, now people even demand for it. People anticipate for it, because I don't have to go back into the DHIS and pull data, the data are available in the County Health Profile... you just need to update it regularly.* (HRIO)

Facilitators

Integrating the development of information products with capacity-building efforts ensured sustainability. Information products were developed with ongoing mentoring and support from MEval-PIMA. HRIOs were trained to access, mine, analyze, and communicate data to develop the CHPs. This helped sustain the development and practice of skills introduced in the capacity-building activities.

Multiple respondents described being able to prepare their own visualizations (e.g., charts, maps) in response to data demands from, for example, facility managers or county nurses, on returning to their work settings after the training.

Communicating county successes motivated interest in information products. Using information products to disseminate county progress can promote their continued production and use. During the Annual Health Congress, Machakos County used the CHP to showcase its performance, deliverables, and targets to other counties and national policy makers. One respondent noted that Machakos County was seen as a benchmark for others because their health indicators performed well compared with the national average. Using data to communicate successes can be a motivating factor for the continual demand for and use of data.

Barriers

Difficulties in data compilation and analysis inhibited regular production. The production of the RMNCH scorecard relied on data producers to first extract information from the DHIS 2; before manipulating and formatting it in the scorecard. Respondents described difficulties in producing the RMNCH scorecard, as "there is a lot of manual work of extracting…I wish the scorecard was able to, at a click of a button, extract information from the DHIS and it comes straight away." A tool that can quickly integrate and streamline data automatically from the DHIS 2 without heavy data extraction and manipulation could potentially improve the regular generation of information products.

Reliance on project support for the development of information products inhibited sustainability. Many respondents noted that they had not seen a recent issue of the CHP and were uncertain whether the profile would continue to be developed after MEval-PIMA support ended. The project supported the county and subcounty HRIOs to mine data for the profiles, and also helped design, print, and disseminate the finalized products.

Identify and Engage Data Users and Producers

Meaningful engagement between data users and data producers is essential for improved and strengthened data-informed decision making. Their interaction facilitates the interpretation of data, conversations about data quality, requests for additional analysis, and the clarification of existing data sources. In Machakos, MEval-PIMA supported data review meetings, which brought together data users and data producers to regularly review performance indicators, jointly analyze and interpret data, and develop action plans. The project also supported data users and data producers to jointly engage with data during semi-annual and annual performance reviews in preparation for work planning processes and budget allocations.

Performance review meetings engendered a shared understanding of data collection processes and data quality issues. Performance review meetings were an effective way to allocate dedicated time to engage data users and data producers to discuss data collection and quality issues, and to link data back to program improvement efforts. Data review meetings improved data users' understanding of the extent of data quality issues. As a CHRIO noted, they are now able to defend the quality of data that are presented and compel others to recognize issues as performance gaps rather than make assumptions about the quality of data.

I know the strengths and weaknesses of these data….for example, there were reported cases of clinical malaria in Machakos county. The malaria person believed the data were wrong, as we have no malaria in Machakos county. I was able to tell her that the data was telling her something…it was telling us that people don't understand and there is a disconnect between the prescribing habits and the management and documentation of fever cases [being misdiagnosed as malaria]. *I told her don't take it that these data are wrong, the data are telling us that people need to have training and she took it up. We got a training from the national level on malaria case management. We have been following the data closely and we have very low, almost zero reported clinical malaria cases.* (CHRIO)

Collaborative data review improved open communication among the teams about program performance. Respondents noted the importance of bringing data producers and data users together to jointly interpret the information. This allowed for open and honest conversations, fostering a shared understanding of poor performance issues to better plan services and management processes.

You know the people who collect the data and the people who use the data, sometimes to bring them together is very important. I am the person who generates the data and as much as I will make meaning out of them, the program person will make more meaning out of that data because they understand more about the program implication of the data...there has been improvement in the understanding of the indicators because the way you understand an indicator by reading here is not the same way the program person will understand it. So that has brought about understanding of the indicators and also has brought about managers to know how they are performing and also comparing their performance with other program areas…. We have been able to come up with solutions to integrate…for example, when you go out in malaria you are supported for supervision, when you go out also look at some other data. So, they are able to link up and say when you are going for supervision, can we also go together, can we also look at this. Even then, they also have an opportunity to understand other indicators, they are also able to collaborate and be able to work out together. (CHRIO)

For records people...there was some kind of disconnect in terms of sharing data among the CHMT members. But now, it seems like they are more open to sharing data because it doesn't feel like a threat. I think before people would be reprimanded if some indicators are not doing well or if you find they don't have the complete picture for the statistics. Now, you find there is a sense of openness and willingness to interrogate the information and discuss it more as a team…rather than before when data were maybe on one person's laptop and even trying to get that information was very hard. (DDU Advisor, PIMA)

Performance review meetings improved the availability of data and accountability. The data review meetings increased the availability of data by providing a regular platform for data to be presented (in tabulations, visualizations, or information products) for discussion and interpretation. This served as a motivation for people to ensure that data were available in time for data review meetings.

You know people are motivated by seeing results of what they do…sometimes when we started with the data review and we reached to a certain point, you realize we are missing data for some indicators and people are like, now here we are not doing much. So, the fact that we have continued to make sure that data are available, then they have been able to be motivated to come to the data review meetings and the performance review meetings and be able to participate. (CHRIO)

Capacity building generated increased accountability and appreciation of the value of data-informed decision making. Due to the review meetings, data were more systematically and frequently used to understand progress and identify areas for improvement in both data quality and program

performance. As one respondent said, "data review meetings enable us to use data to evaluate our performance. We see where we are going low, and where we are doing better, where to put more effort or to maintain our level...also to know whether we are really working or whether we need to pull up our socks to help us plan more." The regularity of these meetings promoted accountability for following up on commitments and decisions from action plans. Respondents noted that they also made county health planning easier, compared with the previous situation where the "county government was planning without knowing whom they were planning for." For example, a data review meeting indicated that early sexual debut was increasing in Machakos compared with other counties, prompting the development of youth-friendly information, education, and communication materials covering sexual and reproductive health topics.

Respondents discussed how data review meetings changed attitudes about the value of data-informed decision making. For example, one key informant noted that "the meetings have awakened people to look at their data and identify gaps, and health managers have become increasingly aware that they cannot make effective decisions without timely and accurate data/information." Respondents also noted that the data review meetings enabled people to appreciate that every decision must be based on data. As a result, it was recognized that all officers at all levels should regularly analyze and interpret available data, rather than relying on the CHRIOs to make presentations or give them the data.

Facilitators

Enabling competition between teams can be motivation for performance improvement. Multiple respondents noted that performance review meetings facilitated comparison between counties and subcounties, enabling the identification of high and low performers. In the context of devolution, collegial competition between counties can be a motivating factor to improve performance. As one respondent noted:

> *After every three months, we* [hold a data review] *meeting and we see it actually brings about some level of competition. Once we see Subcounty A's achievement, Subcounty B will discover that they did not achieve as much as Subcounty A. And now from this meeting, they will come up with other strategies to improve and even to perform better than Subcounty A because you shared and found that you were lagging behind.* (Nursing Coordinator)

Buy-in and participation from leadership promoted the importance of the performance review meetings. Leaders and senior management prioritizing participation in data review meetings was perceived as critical to the success of the meetings. With leadership support, the process was taken more seriously and perceived as valuable by others. In Machakos, the county director for health actively attended the regularly scheduled meetings, where his participation was described as "hands-on" and "constantly pushing." His participation demonstrated the importance of the meetings to other staff and increased accountability of the programs under review at the meetings.

Including supervisors and decision makers in these meetings also helped build accountability for performance and support for the implementation of data-informed recommendations. For example, data review meetings on civil registry and mortality systems data included assistant chiefs responsible for collecting and reporting data, and their supervisors and deputy county commissioners. As one respondent noted, "the aim of this meeting is for people to take responsibility with the seriousness that it

deserves….no county commissioner wants his subcounty to be seen as not performing well. The beauty of it is also that their [assistant chief's] boss is there, that is the county commissioner, so they will not want their boss to see if their subcounty is not performing." In one data review meeting, it was revealed that low home birth rates observed were in fact owing to late monthly reporting of home births. Because county commissioners attended the meeting, a solution was proposed that reports would be submitted directly to deputy county commissioners. This change raised the value of data for the county commissioners and instituted a role for the county commissioners in the data reporting process, resulting in more timely submission of data.

However, decision makers often had inconsistent attendance at review meetings. Respondents noted that program managers and other members of the health management team did not regularly attend data review meetings due to competing priorities or tasks. As a data manager explained, ". . . they don't feel that the review meetings are as important as what they are doing in the offices, so they decide to not show up."

Performance review meetings built capacity in data analysis and communication. Data producers, especially HRIOs, noted that the data review meetings greatly improved their knowledge and skills about accessing, analysing, and presenting data. This was attributed to the guided support and assistance with data analysis and the development of information products provided by MEval-PIMA in preparation for and during the meeting.

Barriers

Poor data quality can inhibit the use of data for program improvement. Issues with untimely and the perceived low validity of data were reported to negatively influence individual motivation to attend data review meetings. Some respondents also reported that a large component of the data review meetings still focused on rectifying data quality issues, such that there was little opportunity left for interpretation, identification of the programmatic implications of the data, and the development of plans for program improvement.

Exclusion of lower level staff can inhibit discussion, data interpretation, and the identification of corrective actions. The exclusion of health facility managers and in-charges during the review meetings was identified as a barrier. Respondents noted that inviting facility staff to participate in the data review meetings would greatly enrich the discussion, given their significant role in data collection and quality assurance processes.

> *Most of the time you find that in the data reviews, we leave out very important people in the system: like hospitals have records and information officers… they know the intricacies of getting that data and how hard it is, so more involvement of the facility health records and information officers would really assist on making [data/performance review meetings] a success.* (HRIO)

Reliance on project support for the meetings inhibited sustainability. Many stakeholders noted that the performance review meetings could only be held because of the technical and financial support of MEval-PIMA. The lack of sustainable funding for data review meetings is an ongoing challenge. In Machakos, without MEval-PIMA or other partner support, the meetings are held less frequently.

Identify Information Needs

Information systems can produce an overwhelming quantity of data that may not necessarily respond to the specific information needs of all potential data users. To facilitate data use, focus should be placed on the priority data that decision makers need to effectively manage their health programs and the upcoming decisions they must make. In Machakos, a DDU plan was developed to enable the identification, availability, and application of information during decision-making processes (Figure 2). This plan outlines the priority programmatic questions identified by different stakeholders and how relevant data will be generated for each question (e.g., associated indicators, data sources, and timeline for analysis, proposed types of decisions and decision makers for each question). As one respondent noted, "for each question, it guides you in terms of the types of data you want to have, or to receive at the end of the day."

The development of a data use plan helped increase demand for the generation of new data. For example, one respondent noted that the plan helped them identify questions of interest related to viral load testing, which led to the modification of their reporting forms to ensure that specific viral load testing data (e.g., stage of testing) were adequately captured at the facility level.

Figure 2. An excerpt from the data use plan for Machakos County

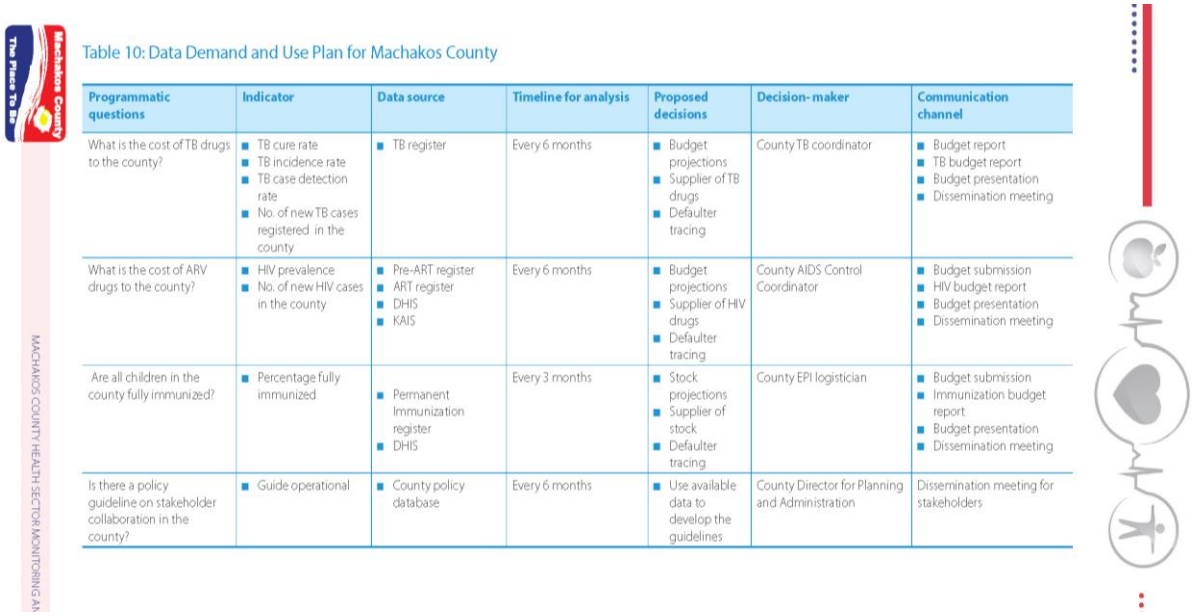


Table 10: Data Demand and Use Plan for Machakos County

Programmatic questions	Indicator	Data source	Timeline for analysis	Proposed decisions	Decision-maker	Communication channel
What is the cost of TB drugs to the county?	▪ TB cure rate ▪ TB incidence rate ▪ TB case detection rate ▪ No. of new TB cases registered in the county	▪ TB register	Every 6 months	▪ Budget projections ▪ Supplier of TB drugs ▪ Defaulter tracing	County TB coordinator	▪ Budget report ▪ TB budget report ▪ Budget presentation ▪ Dissemination meeting
What is the cost of ARV drugs to the county?	▪ HIV prevalence ▪ No. of new HIV cases in the county	▪ Pre-ART register ▪ ART register ▪ DHIS ▪ KAIS	Every 6 months	▪ Budget projections ▪ Supplier of HIV drugs ▪ Defaulter tracing	County AIDS Control Coordinator	▪ Budget submission ▪ HIV budget report ▪ Budget presentation ▪ Dissemination meeting
Are all children in the county fully immunized?	▪ Percentage fully immunized	▪ Permanent Immunization register ▪ DHIS	Every 3 months	▪ Stock projections ▪ Supplier of stock ▪ Defaulter tracing	County EPI logistician	▪ Budget submission ▪ Immunization budget report ▪ Budget presentation ▪ Dissemination meeting
Is there a policy guideline on stakeholder collaboration in the county?	▪ Guide operational	▪ County policy database	Every 6 months	▪ Use available data to develop the guidelines	County Director for Planning and Administration	Dissemination meeting for stakeholders

Facilitators

Embedding the data use plan in county strategic documents institutionalized its use. The data use plan was embedded in the county M&E plan, which was developed with MEval-PIMA support to monitor the implementation of the county health sector strategic plan (see below). The county M&E plan also identified priority indicators needed for performance measurement and was designed to: (1) provide a framework for tracking and measuring progress toward the realization of priority health targets set in the health sector strategic plan; and (2) enhance data use to inform programmatic decisions and practices. Respondents noted that embedding the data use plan in the county M&E plan helped strengthen the institutionalization of the plan. According to a respondent, "the M&E plan has helped us get to know the

indicators that are of concern by the county, and because of that, we have been able to make sure that data collected (which is of interest as identified in the data use plan) are available for people to use."

Barriers

A substantial number of respondents could not recall using or referencing the data use plan. This suggests that there were challenges with its dissemination and communication about the use of this plan for decision making.

Lack of engagement with non-technical stakeholders may have inhibited the uptake of the data use plan. The technical nature of the M&E and data use plans may have been a barrier to its uptake with a diverse group of users. Although the M&E plan was well received, one respondent noted that due to its technical content, only those closely involved in its development (i.e., the M&E technical working group) would refer to it and use it in their work. Other potential users, especially those at the service delivery level, were not engaged during the development of these plans.

Strengthen the Organization's Data Demand and Use Infrastructure

An organization that clearly supports data use in its values, mission, and organizational infrastructure is more likely to develop and sustain a data use culture. Clear guidance, policy, tools, and processes for data use are necessary to promote data-informed decision making.

The development of data-informed strategic documents and guidelines highlighted the value of data for decision making. In Machakos, MEval-PIMA strengthened governance forums for M&E and worked to develop key plans and strategies to institutionalize M&E and data use practices at the county department of health. Data-informed normative health sector guidance documents were developed, such as the County Health Sector Strategic Plan (2013-2017), which details data-driven investments in health, and its associated County Health Sector Monitoring and Evaluation Plan (2013-2018). The M&E plan outlines standard operating procedures for data collection, data collation and reporting, data cleaning and validation, data quality assurance, data analysis and synthesis, and data dissemination. These documents clearly state the importance and value of data-informed decision making, highlighting the county's commitment to data strengthening initiatives.

These strategic documents were used to track program performance, develop annual workplans, and guide resource allocation decisions. As one respondent noted: "The strategic plan is giving us direction toward the way we are supposed to deliver services….in our strategic plan, our vision is to make sure that Machakos County is offering the best services. So, they use the strategic plan and the data to monitor their performance, and data have been accessible to people through the DHIS or some other products like the County Health Profile." The plans were used to advocate and mobilize resources for improving the accessibility and availability of data. For example, one respondent described how the strategic plan was used to develop and submit a proposal to the World Health Organization for support to establish an electronic health medical records system.

The project also institutionalized guidelines for data review meetings with the Ministry of Health and Civil Registration Department, providing a common framework that outlines the components, participants, roles and responsibilities, frequency, and structure to ensure that data review meetings result in tangible

actions for follow-up and capacity building. At the county level, CHMTs used DDU checklists during data review and performance review meetings to track and document instances of data-informed decision making. However, most respondents did not make reference to these guidelines. Data use checklists and tracking tools at the county level were not institutionalized due to the lack of follow-up by stakeholders.

Formation of technical working groups and stakeholder forums improved coordination and collaboration on data use activities. MEval-PIMA also supported the formation of an M&E technical working group (TWG) to coordinate partners and spearhead M&E activities in the county. This TWG helped improve collaboration and information sharing across government agencies and departments, and other development partners. For example, a deputy CHRIO described using these TWGs to clarify indicator definitions and request population size estimates from the National Bureau of Statistics for use as denominators in the calculation of performance indicators and targets related to the coverage of services. Stakeholder coordination forums, which include government ministries, county commissioners, churches, private hospitals, partners, and nongovernmental organizations, were also used as a mechanism to review data, assess areas of need, and coordinate regarding activities to support and collaboration.

Facilitators

The promotion of strategic documents in regular review meetings facilitated their uptake. The strategic plan and M&E plans were frequently referenced and reviewed during regular performance review meetings, at which the aims and targets outlined in the plans were regularly measured. As one respondent stated: "Every time we meet, we have to consult these documents. They are the basis of why we exist and why we operate…they become our reference points." Another respondent stated that due to a greater emphasis on data review, they "scrutinize data more often, and feel the need to look at these documents because they impact the way we collect and use data."

Strong leadership increased the value of data-informed strategic documents. Leadership can promote the value of data-informed strategic documents and ensure their use. Respondents stated that leaders promoted the use of data-informed documents among their staff.

> *Our director was always challenging us [and asking]: do we read these documents, do we implement them? We made it [part of the agenda] when we hold meetings and discuss the M&E documents and strategic plan, so that we can look at it genuinely. We are not just given a document and you keep it at your desk….instead we hold meetings where we discuss the strategic plan, the M&E plans, and ways of improving the areas that were highlighted. The Director was very key in driving this.* (Subcounty AIDS and STIs Coordinator)

A political environment emphasizing increased accountability and devolution can enable organizational change in DDU. Organizational change is a complex and long-term process; "shocks" to the system can be one way to catalyze actions to better support data-informed decision making. The political context in Kenya brought about by devolution provided an opportunity for the development of organizational policies, plans, and procedures that clearly support data-informed decision making. Increased pressure for accountability and responsibility for budgeting, planning, and prioritizing health services at the county level increased the demand for data by decision makers, a crucial step for communicating the role and value of data in county processes.

Barriers

Lack of dissemination and follow-up on strategic documents inhibited their use. Some respondents did not think the county strategic documents were used frequently. This could be due to limitations in disseminating and orienting stakeholders to the documents, especially at the subcounty level and below. As one respondent stated: "After it is published, most departments will shelve it and forget about it…Personally I don't think I got a copy, and don't know what the contents are." Some respondents also felt that there was not adequate follow-up regarding the use and implementation of the strategic documents: "After it is developed, we never came back to say, of all the things that have been listed in the strategic plan, how are we going to make them happen? I don't think we had such a meeting."

Factors other than data often influenced decision making. Respondents noted that it was daunting to cultivate a culture in which data-informed strategic documents were valued because decision makers are often driven by factors other than information, such as political interests or public opinion. As one respondent noted: "the document enforced the work to be done well, but for [the decision makers], they might value something to be seen by the public. Let me construct a dispensary there [because of public opinion], instead of following the data-informed recommendation. The professionals have a plan to follow and use information to guide decisions, but [decision makers] may not follow that plan." It is important to engage the highest levels of decision makers in building a culture of data use and build the capacity of others to advocate for data-informed recommendations.

Data Use in Action

We identified several examples of data use in action in Machakos, Kenya.

- Data on the burden of cancer cases were presented at a data review meeting, indicating an increase in the number of in-patient cancer cases referred to one institution (a Level 5 hospital). During the discussion, it was noted that the hospital could not handle this patient load, and did not have a proper referral mechanism to link to other cancer centres. This prompted the county to advocate with the Kenya Medical Research Institute to establish a cancer registry.
- Patient-inflow data were presented at a data review meeting, indicating that the in- and outpatient caseload at one facility was low compared to other facilities. A decision was made to refer in-patients from a Level 5 hospital that was previously overcrowded to this health facility to better manage bed capacity.
- Immunization coverage data were presented at a data review meeting, indicating that coverage had dropped from 80 percent to 65 percent for a specific vaccine. This was flagged as an issue for discussion. On further investigation, they realized that immunizations were only being administered once a week, in conflict with the policy that stated that they should be done daily. This was due to a problem with the availability of gas at health facilities without electricity, and led to actions to streamline the process for the procurement and distribution of gas.
- Targeting of interventions:
    - A medical officer was posted to a specific facility after the review of data indicated a large number of maternal referrals for minor cases originating from the facility.
    - Peer educators were assigned to trace pregnant women who tested positive for HIV who were not linked to care after a review of the data indicated higher numbers of mothers lost to follow-up.
    - A data review indicated that maternal death rates were high. The disaggregation of the data indicated some service delivery gaps in one facility, which was targeted for reorientation on emergency obstetric and neonatal care and basic emergency obstetric and newborn care.
- MEval-PIMA worked with the World Provision Centre and participated in the county family planning TWG to provide evidence to develop a five-year county family planning costed implementation plan. The plan relied on data to ensure the baseline and targets for their key performance indicators were evidence-informed. For example, the plan aims to increase the county's modern contraceptive prevalence rate from 68 percent to 83 percent. This county document was also used to advocate for a specific budget line for family planning in the county health budget.

LESSONS LEARNED AND CONSIDERATIONS

Based on these findings, we present lessons learned for country governments, programs, and donors implementing DDU interventions.

- **Leverage the political context and enabling environment to advocate for data-informed decision making.** Devolution was a substantial political event that changed county priorities and developed new organizational structures to deliver priority health services. It was important for the county government to showcase its dedication to strengthening M&E systems, increase accountability, and support data-informed decision making to manage programs and inform policies. MEval-PIMA built on this momentum to help institutionalize strategic documents and processes that clearly communicated the value of data for health decision making at the county level. It will be important to ensure full dissemination of the new policies, strategies, and guidelines to all levels of the health system to build shared responsibility for the use of data.
- **Develop organizational supports as a foundation for subsequent data use activities.** It was important to phase in data use interventions due to the political context in Kenya. The development of data-informed strategic plans was prioritized to act as a foundation and rationale for other data use activities. Subsequent interventions were able to reference these plans and reinforce the value of data-informed decision making. For example, CHPs included key health indicators from the CHSSP, and data review meetings were used to track progress against targets in these strategic plans.
- **Build in mechanisms to ensure the sustainability of data use interventions.** Developing a sustainability plan for data use activities, such as data review meetings and the development of information products, are essential to maintain the momentum of demand for data. Although the project built the capacity of HRIOs to develop county health briefs and helped institutionalize guidelines for performance review meetings, respondents noted that these data use activities still required resources to be continually implemented (e.g., meeting costs for convening individuals, printing and distributing profiles). There is a need to better communicate the resources needed to sustain data use interventions and build skills in budget advocacy to ensure that these activities are included in county budgets.
- **Create strong platforms for data sharing across stakeholders.** MEval-PIMA's data use interventions helped improve information sharing behavior across all levels of the health system. Data reviews were embedded with the introduction of new information systems. For example, data dialogue days were used to promote increased access to and the availability of data from the community health information system, using a community chalkboard to share relevant data with a wide group of stakeholders, including community health workers, community units, and health facilities. Bringing together groups of stakeholders, such as the M&E TWG and other coordination forums, can help promote a culture of data use for decision making. Creating strong feedback loops among stakeholders helps ensure that data meet the needs of stakeholders, add value to ongoing planning priorities, and build demand for data across various types of users.
- **A comprehensive, integrated approach to data use is effective.** MEval-PIMA used an integrated approach, with mutually reinforcing data use activities addressing multiple intervention areas to support the institutionalization of data use. For example, capacity building in data analysis, data mining, and interpretation facilitated the development of information products. The

information products were then used to facilitate the constructive review and interpretation of data during performance review meetings. This ensures that these products are used in forums at which data will be reviewed, discussed, and interpreted, and increases demand for the production of these products to regularly align with the structures and forums at which data are reviewed. This strengthened the concept of data use as an ongoing cycle and allowed CHMT members to practice and build their skills through multiple avenues.

- **Provide ongoing support for capacity building.** Training alone is insufficient to build capacity in data use core competences. Continuous mentoring and follow-up are needed to reinforce skills learned during training and ensure that trainees can apply and hone new skills in their workplaces. Data use capacity building requires dedicated time to practice and apply skills in one's day-to-day context. Ongoing mentoring and coaching were targeted to CHRIOs; however, other CHMT members (especially data users) would have also benefited from long-term follow-up and supervision to support the practical application of skills.
- **Involve health facility staff in capacity building and data review.** There was a recognized need to involve health workers in the data review meetings, rather than providing generalized feedback to them. Multiple respondents noted the need to advocate for the importance of data at lower levels, where data are primarily collected and documented. Data quality issues still persist, and there is need to address the completeness, accuracy, and timeliness of data collected at the lower levels. Involving health care workers in data reviews would help communicate the importance of data for decision making and increase motivation for improved data quality and use. One respondent noted that a peer-to-peer approach could be a mechanism to enhance learning and understanding, helping health workers build skills with the guided support of a credible mentor.
- **Buy-in from leadership is integral to fostering change.** The technical leader of the CHMT (the county director of health) in Machakos was integral to championing the use of data in decision making. This individual had training as a public health specialist, and clearly supported data-informed decision making, indicating "if you play football, you do not just kick the ball. You kick the ball to a target. As a public health specialist, I want to see the output and the outcome achieved….when I wake up, I want to hear how the sector is doing, I want to hear the coverage and what we can do to improve coverage." The county director of health exhibited strong leadership and advocacy skills to encourage his team to improve their work by "developing a culture of accessing data, looking at data, whenever they are free." Leaders can catalyze the data use cycle by demanding data regularly to inform their program and policy decisions. The county director of health recognized the importance of data review meetings as a platform to critically make sense of data, to identify the implications for health service delivery, and promote their importance among team members with multiple responsibilities. The sustained engagement of leaders in data use activities will be important for further advocating for the importance of data use in larger county structures.

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APPENDIX A. MAPPING OF DDU INTERVENTIONS IN THE COUNTIES IN KENYA

	Assess DDU context	Engage data users and producers			Info needs	Improve data availability							Capacity building			Org DDU infrastructure		
Activity	**MECAT**	**Stakeholder mapping**	**M&E TWG**	**Data review meeting**	**Data use plan**	**Program/ performance review**	**TWG meeting**	**Annual work plan meeting**	**Stake-holder forum**	**Community dialogue day**	**Health sector strategic plan**	**Info products**	**DDU tools and approaches**	**Data analysis, presentation, and interpretation**	**M&E capacity building plan**	**Support development of strategic plans**	**Support leaders to develop M&E and leadership skills**	**Total**
Garissa	X	X		XX	X	X			XX	XXX	X	XXXX			X	XXX	X	12
Kilifi	X	X		XX		XXX	XX		XX	XXXX		XXXX	XX	X		XX	X	12
Kitui	X			X							X	XXX			X	XX		6
Machakos*	X	X	X	XXX	X	XXX	X	X	XXX	XXXX	X	XXX	XXX	X	X	XXXX	X	17
Mombasa	X			X		X		X	X			XXX				XX	X	8
Narok	X		X	X		X	X	X	XX			XXX				X	X	10
Nyeri	X	X	X		X	X			XX		X	X			X	XX		10
Kirinyaga	X	X	X	X					XXX	XXXX	X		X			XX	X	10
Siaya	X		X	XX		X		X	XX	XX		XXX	X		X	X	X	12
Nakuru	X		X			XX	XX		XX	XX		XX	X				X	9
Bungoma	X	X	X	X		X	X	X	XXX		X	XXX	X	X			X	13
Kakamega	X	XXX	X	XXXX		X	X		XX	XX	X	XXX	X		X	XX	X	14

*Selected for this activity

	Assess DDU context	Engage data users and producers			Info needs	Improve data availability							Capacity building			Org DDU infrastructure		
Activity	**MECAT**	**Stakeholder mapping**	**M&E TWG**	**Data review meeting**	**Data use plan**	**Program/ performance review**	**TWG meeting**	**Annual work plan meeting**	**Stake-holder forum**	**Community dialogue day**	**Health sector strategic plan**	**Info products**	**DDU tools and approaches**	**Data analysis, presentation, and interpretation**	**M&E capacity building plan**	**Support development of strategic plans**	**Support leaders to develop M&E and leadership skills**	**Total**
Kisumu	X	X	X	XXXX		X	X				X	XXXXXXXXX	XX	X	X	X	X	13
Nairobi	X		X	XX		XXX	X	X	X	XX	X	XXXXX	X	XX		XXXX	X	14
Vihiga											X	X						2
Kericho						X			X									2
Embu		X		X					XX								X	4
Busia				X								XXXX		X				3
Homa Bay		X	X	XXX	X	XXX	X					XXXX	X					8
Migori			X	XXXX	X	XX	XX					XXXX	X	X	X			9
Meru	X	X	X	X		X			X			XXXX					X	8
Uasin Gishu	X	X	X	X		X		X	X		X	XX	X	X		XX		12
Wajir	X	X	X	X								XXXX				X		6
Murang'a		X		XX		X	X					XXXX						5

APPENDIX B. LIST OF RESPONDENTS

Interview	Position	Level	Data User, Data Producer, Other
1	Health Records and Information Officer, Machakos Level 5 Hospital	Facility	Data Producer
2	Subcounty AIDS and STI Coordinator	Subcounty	Data user
3	Health Records and Information Manager, Kathiana Subcounty (Level 4) Hospital	Facility	Data producer
4	County Health Records and Information Officer	County	Data producer
5	Deputy County Health Records and Information Officer	County	Data producer
6	Comprehensive Care and Counselling Health Records and Information Officer, Kathiana Subcounty Hospital	Subcounty	Data producer
7	Chief Officer of Health	County	Data user
8	Focus group discussion with Community Health Volunteer, Mutituni Community Health Unit (n=6)	Community	Data user
9	County Coordinator, Civil Registration Services	County	Data user
10	Clinical Officer, Machakos Level 5 Hospital	Facility	Data user
11	Community Health Extension Worker, Mutituni Centre of Excellence	Community	Data user
12	Data Manager, Department of Civil Registration Services	Country	Data producer
13	County Nursing Coordinator, Clinical Services	County	Data user
	County Coordinator, Clinical Services	County	Data user
14	Technical Officer, Civil Registration Department	County	Data user
	Technical Officer, Civil Registration Department	County	Data user
15	Senior Nursing Officer, Kathiana Subcounty Hospital	Facility	Data user
	Clinical Officer/Subcounty AIDS and STI Coordinator	Subcounty	Data user
16	World Provision Centre / FP2020	N/A	N/A
	World Provision Centre / FP2020	N/A	N/A
17	PIMA DDU Advisor	N/A	N/A

Note: Some small group interviews with two respondents were conducted, as well as one focus group discussion with 6 respondents.

APPENDIX C. INFORMATION SYSTEMS SUPPORTED BY MEVAL-PIMA

System	Activity
Civil registration and vital statistics	• Deployment of electronic civil registration and vital statistics system. • Train civil registration officers on data quality assurance, management, and analysis, and local registration agents to ascertain causes of death at the community level. • Forums to review the quality of data on civil registration and vital statistics; continuing medical education training for hospital staff on mortality documentation and reporting. • Stakeholder forums with actors from ministries of health, education, and interior; local administration; faith-based organizations and nongovernmental organizations; implementing partners to review and improve performance on birth and death registration.
Community health information system	• Revising and simplifying data collection tools to meet health program information needs. • Promote the use of data at the community level by holding data dialogue days to review and discuss data quality issues and key indicators with community unit and identify/prioritize issues for action.
Referral system strengthening	• Train health workers on referral practices, management, and performance monitoring through collection, analysis, and use of referral data. • Data use forums with data users (departmental heads, facility and nursing officers and counsellors) to review HIV referral and linkages data and discuss challenges affecting the referral system.

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