

Considerations for the Use of Routine Data for Evaluation of Public Health Programs



A routine health information system (RHIS) collects and provides data about standard health and vital events at regular intervals to support the decision-making process at each level of the health system. Use of data from RHIS for evaluation has grown as more resources are dedicated to improving these systems. Secondary data, including routine data, are not collected by the data user but have appealing advantages over primary data collected for specific research. They are typically collected more frequently or over a longer period; boast greater cost efficiency, in some cases; and may be available more quickly.¹⁻² However, routine data are not appropriate for all evaluation questions or all contexts. Evaluators must carefully consider aspects such as data quality, usability, and accessibility before deciding to use these data.

MEASURE Evaluation, which is funded by the United States Agency for International Development (USAID), has used RHIS data in numerous evaluations over the past 20 years. This brief shares field experiences from this work and key considerations for the use of RHIS data in evaluation.

Data Quality

Careful evaluation of RHIS data quality should precede their use. Because RHIS data, like other secondary data, are typically collected by a separate agency whose data collection procedures may not be known to the evaluator, the quality of data collection and resulting data may be unknown.³ Although improving, RHIS data are frequently found to

be incomplete. Consequently, use of one type of RHIS data—from District Health Information Software, version 2 (DHIS2)—has resulted in limitations related to internal validity for several evaluations, in part because not all facilities report into the system each month. Alternatively, reports may be delayed, and as a result, the data may vary dramatically from month to month. Data quality checks built into the DHIS2 system focus on completeness and identifying out-of-range values, which are of limited use in gauging the accuracy of data. In some cases, assessing the number of missing values may not be feasible, owing to the way in which the data are recorded. For example, in Tanzania's DHIS2 system, missing values and values of zero are both recorded as zeros, and there is no way to tell which values are truly missing or zero. Using a longer time series of data may provide a more accurate picture of the trend. Another challenge arises from the fact that RHIS frequently collect service statistics, making it difficult to represent coverage or utilization measures that require a population-level denominator. For example, estimating the percentage of women of reproductive age using family planning (FP) would be difficult using RHIS data because the RHIS data provide information only on the number of FP clients served. Thus, the RHIS data could be used as the numerator and another source of data would be needed as a denominator to produce a percentage. Even so, RHIS data sources typically do not collect unique identifiers, so some women might be double-counted in the example above, resulting in an overestimate.

A consideration that affects retrospective evaluations is that older data are frequently of poorer quality than more recent data, and more data may be missing from these older data sets. Programs increasingly focus on improving the quality

¹ <https://www.ncbi.nlm.nih.gov/pubmed/9119571>

² <https://www.scholars.northwestern.edu/en/publications/criteria-for-evaluating-secondary-data>

³ <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4311114/pdf/sap-26-06-371.pdf>

of RHIS data (e.g., DHIS2). Although this focus may improve data quality in program facilities, it leaves the overall system with heterogeneous data quality, and data quality lags in facilities where little effort has been made or programs do not exist to improve it.

Assessments of the quality of other RHIS data in facilities in Uganda have shown that completeness of facility registers and patient charts may vary. In one evaluation, the patient charts were more complete than the facility registers, although use of patient charts may have its own drawbacks, such as the time required to find records. If patient charts exist, they may be disorganized and found in different places in the organization (e.g., filed on shelves or stored in boxes).

Data collection forms may also change over time, leading to inconsistent RHIS documentation. Thus, evaluators may need to **partner with someone who has intimate knowledge of the RHIS documentation procedures** and, perhaps, a clinical background. For example, if facility registers change, facility staff do not always adopt new coding conventions, forcing evaluators to discard information that is inconsistently documented and triangulate the needed information based on other data fields. However, an experienced RHIS user may know whether the old format is still being used (e.g., because of the presence of text codes as opposed to new numeric codes) and be able to help the evaluator understand the data.

Further, a public-sector RHIS does not usually count services provided and/or received in private-sector facilities, so research using these data may underestimate total services received.

Usability of Data

RHIS data are, by definition, collected for a purpose other than evaluation and are not typically set up for research. The structure and content of RHIS data are predefined, so an evaluator using these data does not have control over what variables the RHIS data set contains or at what level the data were collected (e.g., at the individual or facility level), limiting the questions the evaluator may address.

First, one must **consider whether the RHIS data can be obtained in an appropriate format for the evaluation.** Extracting data can be cumbersome, and if the electronic data are not set up in a way that facilitates extraction, the time-consuming effort required to make the data useable can negate any cost benefit of using existing data. Data recorded in hard-copy format, such as paper-based registers or patient charts, can also be costly and time-consuming to extract. Moreover, any local partners helping with data extraction must have the capacity to conduct the task with high quality, and identifying a local partner to carry out a complicated extraction may take time.

Desired indicators should be precisely defined in ways that allow consistent measurement over time.

In several evaluations we conducted, key indicator definitions changed over time, creating problems with consistent measurement. In other evaluations, the program activities or strategy changed over time, as is common with interventions that include a continuous quality improvement or developmental evaluation component. The resultant changing intervention can also make consistent measurement of treatment challenging over time, creating limitations for evaluation results. If programs change in ways that are not captured in RHIS, another source of data or evaluation approach may be necessary. Cross-country evaluations can be especially challenging in cases where countries' RHIS use indicators that are defined differently or disaggregated by different subpopulations. This problem can occur even among countries that use DHIS2, making comparison of service statistics across countries difficult.

When evaluators must link different RHIS data sets, they must consider **how unique identifiers are created.** In one activity, we encountered issues with unique identifiers when linking different HIV-related data sets to generate estimates of 90-90-90 targets.⁴ One RHIS data set contained HIV testing data, another contained testing results, and another contained information on treatment for HIV. Because of the way the unique identifier was created in the data set (i.e., with a name and town of birth), the same person could end up with inconsistent identifiers in the different data sets or could even have duplicate entries within the same data set.

⁴ These global goals state that, by 2020, 90 percent of all those who are HIV-positive will have been diagnosed, 90 percent of those diagnosed will be on antiretroviral therapy (ART), and 90 percent of those on ART will be virally suppressed (<https://www.unaids.org/en/resources/documents/2017/90-90-90>)

The result was that a very low percentage of records could be linked across data sets, and the linked data were no longer considered representative of the patient population. For these and other reasons, **being well-informed about the unique identifiers and linking process can be critical both to understanding the possible biases represented in RHIS data estimates** and to making a judgment about the quality and usability of the data.

Access to Data

Obtaining permission to use the RHIS data is critical and may be time-consuming. Building time into the evaluation agenda for obtaining requisite approvals is wise because processes and requirements may vary by country and by the agency that owns the data. For example, one activity in Tanzania required access to the databases of several sectors and agencies. Each agency had different data-sharing practices, and although permissions for some routine data were easy to obtain, others were more complicated and required substantially more time and resources to request.

Evaluators may be required to work with a local partner to gain access to RHIS data. One approach to ease challenges related to data restrictions is to include a coprincipal investigator (co-PI) from the agency or organization that owns the data. For some studies, this approach has worked well, but in others, it has caused delays. Thus, it is important to carefully vet a potential co-PI to ensure a good fit and smooth collaboration.

Other

Understanding any other contextual factors that may be relevant for use of the data is important but may be difficult to achieve. For example, in Tanzania, administrative boundaries changed during programs under evaluation. In one case, a district was split into two during the evaluation. Areas that were in the original district in Year One were in a different district the following years. In another case, lower-level administrative units were split during the evaluation period, and using knowledge of this split to inform the analysis strategy for the affected administrative units was important.

Another example is that although publicly funded survey data are often provided with comprehensive documentation that includes data collection processes, documentation for

RHIS data is frequently scarce and incomplete. **A reliable contact within the data collection agency may be able to shed light on any contextual factors to consider when using the data.**

Summary

The lessons outlined in this brief guide researchers wishing to use RHIS data for evaluation and raise important considerations related to data quality, usability, and accessibility. As described, many dimensions of the data must be considered, and the information necessary to do so may not be available in the absence of first-hand knowledge of the data collection agency. As demand for RHIS data in evaluation grows, standards may improve to make assessment more straightforward. In the meantime, careful evaluation of data quality, usability, and access issues is necessary, as are contacts or relationships with stakeholders involved in data collection and documentation.

Evaluation Summaries

Assessing Training Approaches and a Supportive Intervention for Managing Febrile Illness in Tanzania – Tibu Homa Performance Evaluation Report
(Read the summary [here](#).)

Integrated management of childhood illnesses is an approach to case management that includes a detailed algorithm for how to assess a child, classify the child's illness, determine if referral is necessary, treat the child, counsel the mother, and provide follow-up care (World Health Organization [WHO], 2014). Although under-five (U5) mortality in Tanzania has declined over the past two decades, socioeconomic disparities in child mortality persist and are especially prominent in rural areas. To reduce U5 morbidity and mortality owing to diseases that cause severe febrile illness, the USAID mission in Tanzania established a project called Tibu Homa (Swahili for “treat fever”) in the Lake Zone. USAID/Tanzania asked MEASURE Evaluation to conduct a performance evaluation of the association between the project's training modalities (and supportive components) and quality of care. The evaluation used a retrospective, mixed-methods approach and the following data sources: a cross-sectional quantitative health facility survey, qualitative and costing data collection, secondary time series data from RHIS, and project document review.

Legacy Evaluation of the Partnership for HIV-Free Survival: Kenya, Lesotho, Mozambique, South Africa, Tanzania, and Uganda

(Read the summary [here](#).)

The Partnership for HIV-Free Survival (PHFS) was designed to use basic quality improvement practices to reduce mother-to-child transmission of HIV and increase child survival through improvements in (1) ART uptake and retention among HIV-positive pregnant women and mothers, (2) breastfeeding practices, and (3) overall mother-baby care. PHFS was implemented between 2012 and 2016 in six countries in eastern and southern Africa: Kenya, Lesotho, Mozambique, South Africa, Tanzania, and Uganda. PHFS was a joint effort among the United States President's Emergency Plan for AIDS Relief (PEPFAR), USAID, UNICEF, the World Health Organization, and ministries and departments of health in the participating countries. MEASURE Evaluation—which is also funded by PEPFAR—conducted a legacy evaluation of PHFS in 2017–2018 in all six countries to review the project's effects on prevention of mother-to-child transmission (PMTCT) programs and to better understand the critical factors that contributed to improved PMTCT performance in participating health facilities.

HIV Testing and Pregnancy Delay among Adolescent Girls and Young Women Enrolled in the DREAMS Initiative in Northern Uganda: Quantitative Report

(Read the summary [here](#).)

In 2015, PEPFAR launched a targeted initiative—Determined, Resilient, Empowered, AIDS-free, Mentored, and Safe Women (DREAMS)—to reduce HIV incidence among adolescent girls and young women ages 10–24 years in 10 sub-Saharan African countries, including Uganda. DREAMS currently operates in 11 districts in Uganda. In 2018, three years after program launch, USAID/Uganda asked MEASURE Evaluation to conduct secondary analyses of routinely collected program data to assess the impact of the DREAMS initiative in four districts in Northern Uganda: Gulu, Lira, Omoro, and Oyam. This study assessed the impact of the DREAMS initiative on delay of subsequent pregnancies and contraceptive uptake among beneficiaries who had given birth by age 15, quantified the coverage of HIV testing and retesting, and compared HIV

retesting among beneficiaries who were reported to have received FP services with those who were not reported to have received FP services.

Strengthening Tuberculosis Control in Ukraine: Evaluation of the Impact of the TB-HIV Integration Strategy on Treatment Outcomes

(Read the summary [here](#).)

Ukraine is one of 30 countries with the highest tuberculosis (TB) burdens in the world and one of 10 countries with the highest incidence of multidrug-resistant TB. Strengthening Tuberculosis Control in Ukraine (StbCU)—a project funded by USAID—aimed to strengthen the delivery of TB and HIV services, with the goal of improving timeliness of care and enhancing the life expectancy of patients with TB-HIV coinfections. The USAID mission in Ukraine commissioned MEASURE Evaluation to conduct an impact evaluation of the STbCU project. This impact evaluation examined the relationship between the strategy for integration of TB and HIV services and TB-HIV service use and mortality outcomes. The study employed a mixed-methods approach, with a quasi-experimental quantitative evaluation design, complemented by qualitative interviews to inform the findings. Using data abstracted from TB and HIV health facility records at baseline and end line, we employed a Cox proportional hazards model with a difference-in-differences approach to assess the impact of integration on diagnostic testing and treatment for TB and HIV at each health facility.

Assessing HIV Service Use and Information Systems for Key Populations (KPs) in Namibia

(Report not published)

This study aimed to assess the quality of program data for KPs and the feasibility of triangulating these program data with available RHIS data. We reviewed the data collected by KP program case managers at the seven program sites across these elements of quality: completeness, reliability, and accuracy. Data on KPs in Namibia are limited; triangulating existing data with routine data provides more information about the quality of these data, the limitations of the data set, and the ability to measure the cascade of engagement in HIV care for clients enrolled in the program.

Tanzania PS3 Impact Evaluation

(Read the summary [here](#).)

This was an outcome evaluation to examine the extent to which the uptake of health services changed over time in Public Sector Systems Strengthening (PS3) regions and to examine the extent to which the human resources and financial systems of local government areas (LGAs) improved in the same PS3 regions. The study determined whether different changes over time occurred in certain groups of LGAs versus others. Qualitative approaches added context for changes observed in different groups of LGAs and assessed stakeholders' perceptions of the performance and impact of PS3 on aspects of service provision, governance, and citizen engagement. Findings informed policy and subsequent systems-level program designs beyond the PS3 program.

Evaluation of Tanzania Hormonal Contraception and HIV Risk Communication Framework

(Report not published)

In 2017, WHO issued revised counseling guidance on the use of progestogen-only injectables by women at high risk of HIV acquisition. The main objective of the pilot intervention and evaluation was to assess the effect of providing the new counseling messages on contraceptive knowledge and behavior. The pilot intervention was conducted from September through November 2018 in 10 healthcare facilities located in the Iringa and Njombe Regions of Tanzania.

Data collection occurred in November and December 2018 to assess the change in level and trend of contraceptive uptake during the intervention. It included 471 client exit interviews, 26 healthcare provider interviews, and extraction of service statistics for 15 months. Univariate and bivariate analyses were used to assess quantitative interview data. Thematic qualitative assessment was used to assess qualitative interview data from healthcare providers. Interrupted time series analysis was used to assess changes in the trend of contraceptive uptake.

Effects of the USAID Geographic Prioritization on Health System Performance in Uganda and Kenya

(Read the summary [here](#).)

In 2014, PEPFAR changed its investment strategy within priority countries. This policy shift increased PEPFAR funds and support to some subnational units (SNU), while leaving investment unchanged or virtually eliminated in others, according to HIV disease burden. We aimed to identify shifts in HIV and non-HIV service delivery outcomes associated with changes in PEPFAR investment at the SNU level between 2015 and 2017 in Kenya and Uganda. MEASURE Evaluation extracted quantitative data from relevant national HIV health information system databases (e.g., DHIS2, TiBU [Kenya], and iHRIS) between 2015 and 2017. Outcomes examined were HIV testing, initiation of and adherence to ART, four or more antenatal care visits, confirmed malaria cases, and TB case detection rate. Qualitative interviews were conducted with SNU health teams to better understand the trends observed. Longitudinal multivariate analyses were conducted to determine the level of statistically significant changes in study outcomes by year, by change in PEPFAR investment, and for an interaction effect between year and PEPFAR investment level.

Secondary data analysis and evaluation plan for Boresha Afya

(Report not published)

This study provided baseline and retrospective time trend data analysis for key reproductive, maternal, newborn, and child health indicators, using available secondary data sources as a baseline, for the Boresha Afya program in the Lake Zone of Tanzania. The study drew from DHIS2, data quality reports, and other secondary data sources to assess the priority indicators.

Assessment of the National Campaign for the Promotion of Family Planning in Mali

(Read the summary [here](#).)

This activity assessed Mali's 2016 national FP campaign and supported the collection of routine data for use in future evaluation of the campaign. The 2016 campaign's long-term goals were to increase the number of FP users and reduce the maternal and infant mortality rate in Mali. The purpose of the assessment—a post-intervention process evaluation—was to identify how well the campaign's activities were implemented and whether adjustments should be made

to improve future FP campaigns and interventions. Three sources of data were used: a document review, key informant interviews, and focus group discussions. The assessment focused on the national level and five health districts targeted by intensive intervention: Diéma, Bougouni, Koro, Nara, and San. Following the assessment, MEASURE Evaluation supported routinely collected data on FP services that can be used for point estimate comparisons and trend analyses to assess the progress of the national FP campaign in increasing contraceptive uptake.

RHIS Strengthening in Côte d'Ivoire

(Report not published)

To evaluate the impact of Ministry of Health and Public Hygiene (MSHP)-implemented strengthening interventions, a Performance of Routine Information System Management (PRISM) assessment was conducted in September 2018, using PRISM tools newly revised by MEASURE Evaluation. The assessment concerned 234 health facilities, 24 districts, 12 health regions, and the central level, represented by the Directorate for Information Technology and Health Data. MEASURE Evaluation also used document review and qualitative interviews to learn how MSHP strengthening interventions improved data quality and use.

Evaluation of Population Services International Youth-Friendly Health Services Training

(Report not published)

This evaluation assessed the effects of three Population Services International (PSI)-sponsored youth-friendly health services training packages on voluntary uptake of FP among youth and perceptions of service quality by youth and trained healthcare providers. In 2018, a retrospective review and analysis of relevant monitoring and evaluation documents and service statistics from PSI Madagascar, PSI Malawi, and PSI Mali were conducted. Qualitative data on perceptions of service quality from Malawian youth and healthcare providers were also collected and assessed through thematic analysis.

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