MEASURING THE PERFORMANCE OF PRIMARY HEALTH CARE

A Practical Guide for Translating Data into Improvement

JOINT LEARNING NETWORK

For Universal Health Coverage

MEASURING THE PERFORMANCE OF PRIMARY HEALTH CARE

A Practical Guide for Translating Data into Improvement

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Preface

This toolkit was developed by the Primary Health Care Measurement for Improvement (M4I) Collaborative, a network of delegates from 15 countries that are committed to improving their primary health care (PHC) systems as a critical foundation for achieving universal health coverage (UHC) and recognize the importance of using PHC performance data to do so.

Supported by the Joint Learning Network for Universal Health Coverage (JLN) in consultation with the Primary Health Care Performance Initiative (PHCPI), the collaborative was launched in April 2016 with the goal of developing tools and approaches to help policymakers, health system managers, and frontline providers use data more effectively for PHC improvement. In support of this goal, M4I Collaborative members collectively produced this toolkit to guide practitioners through the process of measuring performance and using data for improvement, including in difficult-to-measure service delivery areas where little measurement guidance has previously existed.

The toolkit was developed through a combination of in-person workshops and virtual engagement that drew on the practical experiences of M4I Collaborative member countries, including Argentina, Bangladesh, Benin, Cameroon, Chile, Ethiopia, Ghana, India, Indonesia, Kenya, Malaysia, Mexico, Nigeria, Rwanda, and Vietnam. In-person workshops hosted by Ghana, Malaysia, Rwanda, and Vietnam allowed participants to share their experiences with PHC service delivery and performance measurement, identify common measurement gaps and challenges, and explore strategies for improving PHC performance measurement. Country participants worked closely with JLN technical facilitators from Results for Development (R4D), with support from PHCPI partners from Ariadne Labs and the World Bank Group, to document these lessons and combine them with global expertise in PHC measurement and data analytics to produce this toolkit.

Introduction

ACHIEVING UNIVERSAL HEALTH COVERAGE (UHC)—the delivery of high-quality essential health services that are accessible to all without risk of financial hardship—is an important priority for many countries and is included in the Sustainable Development Goals (SDGs) set forth by the United Nations. Globally, there is growing agreement that primary health care (PHC), with its ability to address up to 90% of a population's diverse health needs, is central to the achievement of UHC. Strong PHC is not simply the provision of basic services, however. It is an integrated approach to care that addresses the health needs of the majority of the population—from curative care to prevention and health promotion—and forms the foundation of efficient, equitable, responsive, and resilient health systems.

Despite the promise of PHC, the World Health Organization's *Tracking Universal Health Coverage: 2017 Global Monitoring Report* reveals that at least half of the world's population still lacks access to essential health services. Many countries are taking concrete action toward strengthening their PHC systems and recognize that data on PHC performance are critical to identifying areas for improvement, determining practical solutions, and monitoring progress. But challenges related to the current state of health data systems often hinder improvement efforts. Many countries report that they are "drowning in data" while also struggling with measurement gaps, poor data quality, incomplete information, and fragmentation of data sources. A lack of routine feedback mechanisms often impedes efforts by system managers to take informed action at the community, facility, and national levels. Further, many countries lack the institutional structures and incentives that would enable effective use of data for performance improvement.

The Purpose of This Toolkit

This toolkit provides practical guidance, tools, and links to other resources to support countries in collecting better, more useful data on PHC system performance and using the data to improve performance. Depending on a country's measurement capacity and unique priorities, the toolkit can be used routinely or at strategic points to help with the following:

- Understanding PHC performance measurement across program areas and system functions

- Addressing measurement gaps in important service delivery areas, including technical quality, experiential quality, and community engagement

- Ensuring data quality and linking fragmented data sources to improve the accessibility of PHC performance data

- Communicating data effectively to relevant stakeholders through targeted data analysis and visualization

- Identifying strategies for building the measurement systems, capacities, and organizational culture needed to effectively use data for decision-making

How the Toolkit Is Organized

The toolkit is organized around the six-step Measurement for Improvement Cycle shown below—a framework originally developed by the JLN Provider Payment Mechanisms and Information Technology Collaborative and adapted by the M4I Collaborative. The cycle consists of the necessary steps to identify measurement priorities, select appropriate indicators, collect the right data, improve data quality, analyze and communicate the resulting information, and use that knowledge to make improvements.

Measurement for Improvement Cycle

PART 4 offers guidance on translating data into the information needed to support decision-making and make improvements, with a focus on building a culture of data use.

PART 1 explains how to assess existing measurement systems and select indicators as a foundation for the rest of the toolkit.

USE DATA FOR DECISION-MAKING

IDENTIFY MEASUREMENT PRIORITIES

ANALYZE AND COMMUNICATE DATA

IDENTIFY MEASUREMENT GAPS AND SELECT INDICATORS

MANAGE AND CENTRALIZE DATA

ADDRESS MEASUREMENT GAPS IN KEY AREAS

PART 3 explains how to ensure data quality and how to manage and link data sources.

PART 2 covers how to address measurement gaps in three key areas: technical quality, experiential quality, and community engagement.

Each chapter includes:

- **Guidance** derived from global expertise and country experience
- One or more **tools** developed or validated by country participants
- A list of **common challenges and creative solutions** developed at the country or global level
- **Tips and country examples**
- Links to **additional resources**

Most of the tools are templates that countries can adapt to their own context in the process of building or implementing a PHC monitoring and evaluation (M&E) system. Blank versions of these templates are included in Appendix C. Some of the tools, including the PHC Indicator Inventory and its associated guidance, can be downloaded from the JLN website at www.jointlearningnetwork.org.

How to Use the Toolkit

The toolkit was developed by public-sector practitioners but is relevant to both the public and private health sectors. Some practitioners may choose to implement the entire process laid out in the toolkit, while others may turn to specific chapters for guidance on particular issues. Examples of how policymakers and managers might use the toolkit include:

POLICYMAKERS:
REFINING AN M&E SYSTEM TO ENSURE SUFFICIENT FOCUS ON PHC

As part of a mid-term review of the national M&E system, a country's policymakers want to ensure that the system is collecting all the data needed to assess PHC system performance against priorities set out in the national health strategic plan. Using the toolkit, the policymakers identify measurement domains that align with their goals and map existing indicators to those domains. They discover measurement gaps in several critical service delivery areas and use the toolkit to devise strategies for new data collection to fill them. The resulting revised national M&E framework is more comprehensive and draws greater attention to PHC priorities.

HEALTH INFORMATION SYSTEM MANAGER:
ESTABLISHING A DATA WAREHOUSE AND VISUALIZATION TOOL

Despite the collection of vast amounts of data, a health information system manager lacks a clear view across disease-specific programs and system levels, which limits her ability to comprehensively assess PHC performance. She uses the toolkit to develop a plan for establishing a data warehouse that integrates fragmented data sources and enables the creation of a routine management dashboard with data visualizations. She then develops a proposal for additional investment to create the data warehouse.

DISTRICT MANAGER:
CREATING A MEANINGFUL COMMUNICATION PLAN

A district-level manager knows that a lack of communication between facilities and communities has resulted in low trust in the health system, but he doesn't have good data to show the impact on service utilization and health outcomes. With guidance from the toolkit, he implements a community engagement survey in a sample of communities in his district and informs the regional directorate that facilities with community engagement programs often have higher utilization rates and better outcomes. As a result, the manager receives funding to test the impact of improved community engagement programs across the district.

FACILITY MANAGER:
BUILDING A CULTURE OF DATA USE

A facility manager recognizes that her facility's staff lack the proper training and incentives to regularly record patient-level data, resulting in incomplete data and poor data quality. She also realizes that even though the data are reported to the district level, they are not regularly used within the facility to identify areas for improvement. She uses the toolkit to identify strategies to improve the culture of data use at her facility, implements a training for clinical staff to improve their administrative skills, and organizes a monthly staff meeting to review data and identify improvement strategies.

PART 01

Assessing Existing Measurement Systems and Identifying Gaps

CHAPTER 01	Identifying Measurement Priorities
CHAPTER 02	Identifying Measurement Gaps and Selecting Indicators

Establishing an effective measurement system starts with articulating clear measurement priorities: what questions are you trying to answer, and what do you need to measure? Part 1 addresses these initial steps of the Measurement for Improvement Cycle as a foundation for the rest of the toolkit. Chapter 1 lays out the critical determinants of PHC system performance and how to identify measurement priorities. Chapter 2 explains how to determine whether existing measurement efforts are capturing PHC performance comprehensively by describing how to identify measurement gaps, select indicators, and determine what data should be collected.

IDENTIFY MEASUREMENT PRIORITIES	**OBJECTIVE**	To identify key measurement domains and priorities for assessing the performance of a PHC system
	WHO IS INVOLVED?	Policymakers, M&E officers, planning and implementation teams
	TOOL	» PHC Conceptual Framework

THIS CHAPTER INTRODUCES THE PHC Conceptual Framework, a tool developed by the Primary Health Care Performance Initiative (PHCPI) to help identify key measurement domains and priorities for assessing the performance of a PHC system. It also offers guidance on adapting the framework to a specific country context.

The PHC Conceptual Framework

The PHC Conceptual Framework (Figure 1) can help decision-makers identify their improvement priorities and determine what should be measured in order to support those priorities. The framework is not a replacement for existing measurement efforts; rather, it offers a way to better conceptualize performance by grouping indicators according to five interconnected measurement domains:

- **System components** that affect PHC performance, from governance and policies to financing, surveillance, and priority setting
- **Inputs** that are needed to deliver high-quality PHC services, from drugs and supplies to the health workforce
- **Service delivery elements** that influence the moment when care is delivered, such as community engagement, facility management, and provider competence
- **Outputs** in the form of effective coverage of high-quality preventive, promotive, and curative health services
- **Outcomes** that include improved health status as well as greater efficiency, equity, responsiveness, and health system resilience

The PHC Conceptual Framework can help practitioners organize existing indicators and identify gaps where new or better-quality data are needed (as described in Chapter 2). For more information about strong PHC performance and the development of the PHC Conceptual Framework , including the key performance questions that underlie each measurement domain, see Appendix A .

FIGURE 1.
PHC Conceptual Framework

A SYSTEM	B INPUTS	C SERVICE DELIVERY	D OUTPUTS	E OUTCOMES

A SYSTEM

A1 Governance & Leadership
- A1.a PHC policies
- A1.b Quality management infrastructure
- A1.c Social accountability

A2 Health Financing
- A2.a Payment systems
- A2.b Spending on PHC
- A2.c Financial coverage

A3 Adjustment to Population Health Needs
- A3.a Surveillance
- A3.b Priority setting
- A3.c Innovation and learning

B INPUTS
- B1 Drugs & Supplies
- B2 Facility Infrastructure
- B3 Information Systems
- B4 Workforce
- B5 Funds

C SERVICE DELIVERY

C1 Population Health Management
- C1.a Local priority setting
- C1.b Community engagement
- C1.c Empanelment
- C1.d Proactive population outreach

C2 Facility Organization & Management
- C2.a Team-based care organization
- C2.b Facility management capability and leadership
- C2.c Information systems
- C2.d Performance measurement and management

C3 Access
- C3.a Financial
- C3.b Geographic
- C3.c Timeliness

C4 Availability of Effective PHC Services
- C4.a Provider availability
- C4.b Provider competence
- C4.c Provider motivation
- C4.d Patient-provider respect and trust
- C4.e Safety

C5 High-Quality PHC
- C5.a First contact accessibility
- C5.b Continuity
- C5.c Comprehensiveness
- C5.d Coordination
- C5.e People-centered

D OUTPUTS

D1 Effective Service Coverage
- D1.a Health promotion
- D1.b Disease prevention
- D1.c RMNCH*
- D1.d Childhood illness
- D1.e Infectious disease
- D1.f NCDs and mental health
- D1.g Palliative care

* Reproductive, newborn, maternal, and child health

E OUTCOMES
- E1 Health Status
- E2 Responsiveness to People
- E3 Equity
- E4 Efficiency
- E5 Resilience of Health Systems

SOCIAL DETERMINANTS AND CONTEXT (POLITICAL, SOCIAL, DEMOGRAPHIC, SOCIOECONOMIC)

Source: Primary Health Care Performance Initiative

Adapting the Framework

Before using the framework to help identify measurement priorities, some countries may find it useful to adapt it to more accurately reflect their own context. This process involves engaging relevant stakeholders across the system to review the framework, adapt it, and validate the revised framework.

1. Engage Stakeholders

To ensure that the adapted framework is comprehensive, reflects the priorities of key stakeholders, and will be used across the system, the adaptation process should be inclusive and based on consensus and compromise. Participants in the process will vary by country, but they may include policymakers, directors of PHC departments, M&E officers, planning teams, district and facility managers, managers of vertical (disease-specific) programs, and frontline providers.

2. Review the Framework

Discussions about the framework should be based on a shared understanding of terms and definitions and the aspects of performance that each domain measures.

In these discussions, views and priorities may differ, so it is important to build consensus around how to answer the key guiding question: What do we need to measure to ensure that we are comprehensively assessing the performance of our PHC system? (The Conceptual Framework Mapping Guidance Tool introduced in Chapter 2 can help with these discussions.)

Identify local population health needs and health system priorities early in the adaptation process to ensure that PHC performance will be appropriately evaluated within the existing context.

3. Adapt the Framework

Adaptations to the framework should be based on the national context. Examples of adaptations might include adding greater specificity to the Inputs domain, editing the Service Delivery domain to better align with local organization and management processes, or modifying the Outputs domain to better reflect the country's epidemiological profile.

The following questions may be helpful in the adaptation process. (Answering them may require document review or consultations with relevant health system actors.)

- How is PHC defined in the local context, and what is its scope?

- Does the framework reflect health system priorities laid out in the national health-sector strategic plan?

- Does the framework reflect the national and local structure of the PHC system, including institutional roles and responsibilities for PHC system performance?

- Does the framework align with existing M&E frameworks for PHC?

- Does the framework take into account internal and external sources of health care financing for PHC?

- Does the framework include the inputs required to deliver specific priority health interventions?

- Does the framework reflect national health priorities and disease areas based on the epidemiological profile of the country (particularly for outputs and outcomes)?

When adapting the framework, be sure to retain core components that are critical to evaluating PHC performance. Each of the five subdomains within the Service Delivery domain should be included to comprehensively assess whether service delivery processes are leading to high-quality, people-centered PHC services.

4. Validate the Framework

Once the PHC Conceptual Framework has been adapted, the final step is ensuring that it is approved by and disseminated to key stakeholders who will be involved in its use. This can occur during review and adaptation discussions or as a separate validation exercise with a broader group. This approval is critical to getting buy-in from other key parties involved in PHC performance measurement and improvement and to ensure alignment across measurement efforts.

The Rwandan Ministry of Health and Rwanda Biomedical Center (RBC) adapted an earlier version of the PHC Conceptual Framework to inform the development of a set of performance management dashboards. The adaptation process, which involved all of the relevant agencies and was supported by technical assistance from PHCPI, aligned the framework more closely with areas identified as critical to the effective delivery of PHC in Rwanda and with the national-level management structure of the Ministry of Health and its implementation agency, RBC.

In the Inputs domain, laboratories and diagnostic tests, blood products, and support services were added to align with specific divisions within RBC. The Outputs domain was modified to highlight key health priorities based on Rwanda's epidemiologic context, including HIV/AIDS, tuberculosis, and malaria.

These changes to the framework clearly delineated the role of each division or directorate within the system and identified the relationships among them, including areas where better communication and coordination were needed for both service delivery and data use. For example, the malaria division relies on the National Center for Blood Transfusion to ensure sufficient donor blood supplies at hospitals. The framework also helped highlight reliance on management information systems that support health service delivery and the need to integrate data from those systems into a single system.

A SYSTEM	B INPUTS	C SERVICE DELIVERY		D OUTPUTS	E OUTCOMES
A1 Governance & Leadership Structures	**B1** Drugs & Supplies	**C1** Availability of Effective Services for Communicable and Non-Communicable Diseases		**D1** Effective Service Coverage	**E1** Health Status
A1.a Health policies and regulations	**B2** Laboratories & other diagnosis tests	C1.a Facility readiness and service availability		D1.a Health promotion and disease prevention	E1.a Reduced morbidity
A1.b Health system organization (RH, DH, HC, HP, CHW) and decentralization	**B3** Blood products	C1.b Provider competence		D1.b HIV/AIDS and STIs	E1.b Reduced mortality
	B4 Health Infrastructure *(e.g, building, equipment)*	C1.c Provider motivation		D1.c TB & other respiratory diseases	E1.c Reduced malnutrition
A1.c Quality management infrastructure	**B5** Information Systems *(e.g, HMIS, EMR)*	**C2** Access	**C3** High Quality Person-Centered Care	D1.d Malaria & other parasitic diseases	**E2** Health System Responsiveness
A2 Health Financing	**B6** Workforce *(e.g, staff, PBF)*	C2.a Financial		D1.e Reproductive, MNCH	**E3** Equity
A2.a Government budget	**B7** Funds	C2.b Geographic	C3.a First contact accessibility	D1.f NCDs	**E4** Efficiency
A2.b Partner budget	**B8** Support services *(e.g, corporate, MOF, MLG)*	C2.c Timeliness	C3.b Coordination	D1.g Mental Health	**E5** Sustainability and resilience of Health Systems
A2.c Budget execution		**C4** Demand & Care Seeking	C3.c Comprehensiveness		
A3 Adjustment to Population Health Needs		C4.a Use of PHC service (at all levels)	C3.d Continuity		
A3.a Evidence Based Priority setting			C3.e Safety		
A3.b Epidemic Surveillance and Response		**C5** Organization & Management			
A3.c Innovation and learning		C5.a Organization of care (district engagement and ownership)			
		C5.b Supportive integrated supervision; Monitoring and continuous quality improvement			
		C5.c Community-based approaches and engagement			
		C5.d Information system use			

OTHER DETERMINANTS & CONTEXT (DECENTRALIZATION, SUSTAINABILITY OF DONOR FUNDING, PRIVATE SECTOR INVOLVEMENT, DOMESTIC RESOURCES, ETC.)

Creative Solutions for Common Challenges

- If the priorities of the PHC system or monitoring system are not clearly defined, use a participatory process to identify priorities before adapting the conceptual framework.

- If health system priorities are so broad that defining specific measurement priorities is impossible, work to clarify priorities retroactively with stakeholders, especially if they were not involved when monitoring frameworks were first implemented.

- If stakeholder priorities differ or conflict, promote consensus-building and compromise. Clear communication from leaders about priorities and roles and the creation of a "safe space" for discussing views can help build consensus (as described further in Chapter 9). In some cases, an external, neutral facilitator can help promote compromise.

 Table 1 lists resources developed by the global community to help identify measurement priorities.

TABLE 1.
Additional Resources on Identifying Measurement Priorities

Tool or Resource	Source	Description
Primary Health Care Performance Initiative	Primary Health Care Performance Initiative	A website that provides information on key performance indicators, tools for comparing indicators across countries, helpful PHC literature mapped to the domains of the framework, and other useful tools.
	www.phcperformanceinitiative.org	
Sustainable Development Knowledge Platform	United Nations	An online platform that provides information on the UN SDGs, including global progress made since 2016, targets, and indicators.
	sustainabledevelopment.un.org	
WHO Health Systems Framework	WHO	A World Health Organization (WHO) framework that defines six building blocks of health systems and is frequently used as a foundation for other health system frameworks, including the PHC Conceptual Framework.
	www.wpro.who.int/health_services/health_systems_framework/en/	
WHO Framework on Integrated People-Centred Health Services	WHO	A WHO framework for fundamentally shifting how health services are funded, managed, and delivered, moving from a disease focus to a people focus. This website also includes implementation strategies and links to additional resources, including an online platform for implementers.
	www.who.int/servicedeliverysafety/areas/people-centred-care/en/	
Standards for Improving Quality of Maternal and Newborn Care in Health Facilities	WHO	A WHO framework for improving the quality of care for mothers and newborns around the time of childbirth, based on eight domains of quality of care.
	www.who.int/maternal_child_adolescent/documents/improving-maternal-newborn-care-quality/en/	

CHAPTER 02

IDENTIFYING MEASUREMENT GAPS AND SELECTING INDICATORS

IDENTIFY MEASUREMENT GAPS & SELECT INDICATORS
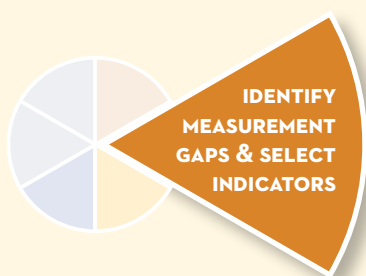
OBJECTIVE		To identify measurement gaps, select indicators, and determine what data should be collected
WHO IS INVOLVED?		Policymakers, M&E officers, information system officers, planning teams
TOOLS		» PHC Indicator Inventory » Gap Analysis Template » Conceptual Framework Mapping Guidance Tool » Indicator Scoring Template

THIS CHAPTER OFFERS GUIDANCE on assessing existing measurement systems and determining whether they are capturing PHC performance comprehensively. It outlines a process for conducting a gap analysis and building an indicator list, which can help determine whether the existing monitoring system covers priority areas and where additional investment is needed to fill gaps or improve data quality.

Many countries are already collecting substantial amounts of data, whether through a routine health management information system (HMIS), regular surveys, or external evaluations. To make effective use of large quantities of data, however, health system managers need a comprehensive view of data collection, information flows, and data quality across system levels.

Practitioners may choose to assess measurement systems to better understand the following:

• Which aspects of PHC performance the system is already capturing and where gaps exist

• Whether the existing indicators are balanced across key domains of the framework

• Whether the existing indicators align with global norms and how to better align with those norms

Conducting a Gap Analysis

Using the PHC Conceptual Framework (with modifications as needed), practitioners can use a gap analysis to develop an indicator list for PHC performance measurement. The gap analysis process is as follows:

1. Create an "ideal indicator" list.

2. Create a list of existing indicators.

3. Map existing indicators to the framework.

4. Identify gaps and excess indicators.

5. Refine the framework.

6. Create a final indicator list.

The following sections walk through this process in greater detail.

1. Create an "Ideal Indicator" List

The first step in the gap analysis is to compile a list of "ideal" indicators—indicators drawn from national and global indicator sets that together will most comprehensively measure PHC system performance in line with the country's measurement priorities. This list should be mapped to the domains and subdomains of the PHC Conceptual Framework.

To help with identifying ideal indicators, the M4I Collaborative developed the PHC Indicator Inventory, a searchable menu of indicators that are mapped to the domains and subdomains of the PHC Conceptual Framework. The PHC Indicator Inventory, available on the JLN website, is drawn from illustrative indicators used by countries that have conducted an indicator compilation and mapping process as well as normative indicator sets from global sources—including core sets of indicators from PHCPI, health-related UN SDG target indicators, and the WHO Global Reference List of 100 Core Health Indicators. These global indicator sets are helpful for filling common gaps, and they increase the international comparability of country data to support tracking against global goals and benchmarking against international standards.

Argentina:
Measuring Basic Effective Health Coverage

In Argentina, Programa SUMAR provides health coverage for nearly 15 million people who lack formal health insurance. The program uses an innovative results-based financing scheme based in large part on the rate of basic effective health coverage (BEHC) at the provincial level. The BEHC indicator is calculated as the number of enrolled patients who have received at least one high-priority health service in the past 12 months out of the total population of eligible and enrolled individuals. BEHC is used to determine the disbursement of performance-based capitation payments, which can be put toward performance incentives for staff, maintenance, or other investments, at the discretion of health facilities and providers. Argentina is in the process of moving from paper-based to digital monitoring and uses BEHC as a planning tool and method of setting performance targets.

Numerator: Number of nominalized and enrolled eligible population of children (0–9 years), adolescents (10–19 years), women and men (20–64 years) with basic effective health coverage

Denominator: Total number of eligible population of children (0–9 years), adolescents (10–19 years), women and men (20–64 years)

Data source: Administrative data

Level of use in the system: Subnational

2. Create a List of Existing Indicators

The next step is to compile a list of existing indicators used to measure PHC performance. The Gap Analysis Template , an Excel tool tool available on the JLN website, can be used to compile and organize the indicators as they are mapped (see step 3) and identify the appropriate indicator elements. (See Box 1 .)

Depending on the national context, the sources of existing indicators may include:

- Routine HMIS

- National M&E frameworks outlined in health-sector strategic plans

- National indicator glossary, reference list, or health data dictionary

- Performance contracts within the government, including in performance-based financing schemes

- Regular surveys, such as national household surveys and national facility assessments

BOX 1.
Indicator Elements to Include

» **Data elements**
(numerator and denominator)

» **Data source**

» **Data format**
(e.g., percent, number, or rate)

» **Level of use**
(e.g., community, facility, subnational, or national)

» **Frequency of collection or current availability**

» **Possible types of disaggregation**
(e.g., geography, income, age, gender)

3. Map Existing Indicators to the Framework

The next step is to map the existing indicators to the PHC Conceptual Framework to determine how comprehensively the existing system is measuring PHC performance. This involves assessing what each indicator is measuring conceptually and how it relates to the key measurement domains.

The Conceptual Framework Mapping Guidance Tool (available on the JLN website) contains definitions of each measurement domain and offers guidance for identifying indicators that map to each domain. The tool helps ensure a common understanding of domain definitions and accurate mapping of indicators. Once the appropriate domain and subdomain are determined for each indicator, the indicator should be recorded in the appropriate section of the Gap Analysis Template .

Sometimes data are not collected for certain indicators in M&E frameworks or data dictionaries. Include those indicators in the mapping exercise and trace the data sources in a later step.

The following guidelines are helpful for mapping indicators:

- Each indicator should be mapped to both a domain (System, Inputs, Service Delivery, Outputs, or Outcomes) and a subdomain (e.g., Drugs and Supplies under Inputs).

- To ensure analytical precision, each indicator should be mapped to no more than two domains. (See Box 2 .)

- If an existing indicator is deemed outside the scope of the PHC system, it should be excluded from the gap analysis. Definitions of PHC system scope may vary from country to country and should reflect the adapted PHC Conceptual Framework .

BOX 2.
Using a Disease-Specific Indicator as a Proxy for a System-wide Function

One commonly used indicator is called "Tuberculosis effective treatment coverage." It measures the performance of national tuberculosis (TB) programs and is expressed as a percentage: the number of new and relapsed TB cases that were recorded and treated in a given year divided by the estimated number of incident TB cases in the same year. In many contexts, this indicator is interpreted as an output, reflecting the coverage of health services. The rate of effective treatment of a complex condition such as TB can also be used as a proxy for several aspects of successful service delivery within a health system, such as diagnostic and treatment accuracy and the system's ability to capture and follow up with patients over time. For this reason, the TB treatment success rate could be mapped to the framework in the following ways:

» Service Delivery: High-Quality PHC: Continuity

» Service Delivery: Availability of Effective PHC Services: Provider Competence

» Outputs: Effective Service Coverage

MALAYSIA:
ASSESSING QUALITY INDICATORS AT THE SYSTEM LEVEL

Malaysia's Quality Assurance Program (QAP), launched in 1985, uses indicators and standards for priority service delivery areas at the national level. The indicators—collected locally and monitored nationally—help detect shortfalls in service quality, pinpoint contributing factors, and identify appropriate strategies for improvement. However, evaluations of the QAP revealed that indicator monitoring was isolated within specific Ministry of Health programs and few of the indicators were representative of overall system performance.

Using a framework shared by the Institute for Healthcare Improvement, a group of state, national, and international stakeholders worked together to compile 364 indicators from a variety of sources and identify gaps that led to an imbalance of indicators across system performance, and palliative and rehabilitative care. For some indicators, information was difficult to obtain due to unknown data owners or irregular tracking. Once data were collected, the group worked to reach consensus on appropriate indicators for each quality domain and made efforts to achieve alignment with international standards (although this was not always possible for diseases that lacked international standards for monitoring, such as diabetes). Developing a data dictionary, another challenging task, was an important step in aligning indicators across programs.

4. Identify Gaps and Excess Indicators

After compiling and mapping existing indicators, the next step is to analyze how those indicators fall within the domains and subdomains of the PHC Conceptual Framework . The Gap Analysis Template , filled out in step 3, will count how many existing indicators fall within each domain and subdomain and help highlight areas that are on the ideal indicator list but are not currently measured. It will also help identify areas of excess measurement—any existing domains, subdomains, or indicators that are not on the ideal indicator list.

Through analysis of the existing indicator list, practitioners should be able to answer the following questions:

Consider the validity of indicators when identifying measurement gaps. If existing indicators are proxies or are imperfect, that may signal a gap area where improved measurement is needed.

- Which domains, from System to Outcomes, are currently well measured? Which have measurement gaps?

- Within each domain, which subdomains are currently well measured and which have measurement gaps?

- At what level of the system (community, facility, subnational, or national) are data for the indicators in each domain or subdomain collected?

- How are the indicators collected? (Are they part of routine monitoring or periodic surveys? Who is collecting the data and how often? Is the collection frequency appropriate?)

- Across each domain, how aligned is current measurement with international standards?

5. Refine the Framework

Based on the gap analysis, practitioners may realize that further adjustments to the PHC Conceptual Framework are needed. For example, excess indicators that are not on the ideal indicator list might warrant inclusion, along with new or expanded domains or subdomains.

6. Create a Final Indicator List

The final step is selecting indicators that together will comprehensively measure PHC system performance, drawing from both the ideal and existing indicator lists. The selection process should be highly participatory and involve key stakeholders. It is important to include those involved in adapting the framework, those who produce the data—possibly including epidemiologists, statisticians, or data technicians—and those who will use the data to make decisions. In selecting indicators, it is critical to identify these data users early in the process and determine what data they will need to inform their decisions. (See Chapter 8 for more on identifying data users; see Chapter 9 for more on using data to support decision-making.)

The process used to select indicators can be similar to that used for adapting the PHC Conceptual Framework (as detailed in Chapter 1).

The selected indicators should:

- Align with measurement priorities and be balanced across the framework

- Have clear utility and ongoing relevance to the appropriate level of the system

- Facilitate easy interpretation

- Be presented with full acknowledgment of any limitations or shortcomings

It is important to limit the indicators to those that meet these criteria. If data collected for existing indicators do not lead to clear actions for improvement or are not used, those indicators should be eliminated from the list. The final indicator list will likely end up somewhere in between the ideal list and the existing list; what is most important is that the final list not leave

significant measurement gaps across the PHC Conceptual Framework . In selecting indicators, practitioners should also consider where collection frequency and data quality may need to be improved and whether any of the indicators themselves will need to be adjusted.

The Indicator Scoring Template (Table 2) can be helpful for evaluating indicators in a transparent, systematic, and participatory way. It suggests seven criteria, some theoretical and some practical, for scoring each indicator.

TABLE 2. **Indicator Scoring Template**					
THEORETICAL CRITERIA			**SCORE**		
CRITERION	DEFINITION	QUESTIONS TO CONSIDER	WEAK *(1 to 5 points)*	MODERATE *(6 to 10 points)*	STRONG *(11 to 15 points)*
Sensitivity	System responses to changes will lead to noticeable changes in the indicator that can be accurately interpreted.	• How does this indicator reveal whether the objectives of the system are being met? • How would you interpret a change (increase or decrease) in the indicator measure? • How much will the value of the indicator change in a short period of time?	Only large changes at the system level will be picked up by the indicator.		Small changes in the system will be picked up by the indicator.
Frequency	Changes in the system will be quickly reflected by changes in the indicator.	• Are changes in the system quickly reflected by changes in the indicator, or is there a significant time lag?	Changes will be reflected in the indicator after a year or longer.	Changes will be reflected in the indicator within 6 to 12 months.	Changes will be reflected in the indicator within 1 to 3 months.
Specificity	Indicator will accurately reflect changes in the system that it is intended to measure.	• Will any factors affect the indicator that do not reflect relevant changes in the system?	Indicator may be heavily influenced by other factors in the system and/or is very unstable.	Indicator may be mildly affected by other aspects of the system.	Indicator will be affected only by relevant changes to the system.
Feasibility	The data for the indicator are feasible to collect over time.	• How difficult/expensive is it to collect the data needed for the indicator? • Are the required data routinely collected? • How reliable are the data?	No existing source of data is available.	Existing sources can provide data, but some action will be needed to make data available.	Existing sources of regularly collected data are available.
Purity	The data for the indicator cannot be manipulated, corrupted, gamed, or adjusted.	• How easy or difficult is it to manipulate or adjust the existing data?	Data are easy to manipulate because they are self-reported and/or collection is not standardized and/or data cannot be easily audited.	There is opportunity for manipulation, but there are ways to mitigate the opportunity and/or uncover it.	There is little opportunity for manipulation, possibly because collection is automated, data are collected by a (trained) third party, collection is standardized, data can be regularly audited, and/or checks and balances are in place.

TABLE 2.
Indicator Scoring Template

CONT'D

PRACTICAL CRITERIA			SCORE		
CRITERION	**DEFINITION**	**QUESTIONS TO CONSIDER**	**WEAK** *(1 to 5 points)*	**MODERATE** *(6 to 10 points)*	**STRONG** *(11 to 15 points)*
Usability	The results of the indicator can (and will) be used to inform decisions.	• How closely does the indicator answer the measurement question? • How easy or difficult is it to translate the results of the indicator into a decision?	Indicator cannot be interpreted without other data and/or a deep dive. The indicator value does not lead to clear interpretation or action.	More information will often be needed to understand the indicator results, but that information is easily obtainable.	Indicator can generally be interpreted without supplemental information. Indicator values clearly point to actions.
Acceptability	Indicator is acceptable to key stakeholders and does not create political risks or concerns.	• Do all stakeholders agree on this indicator? • Will policymakers understand what the indicator conveys? • Are there any political risks associated with reporting this indicator?	Indicator is complex and/or controversial. Reporting the indicator is politically risky.	There is general agreement on the indicator, but there may be lack of understanding among some stakeholders or perceived political risk.	Indicator is generally accepted, easily understood, and not politically risky.
How the Indicators Work Together as a Group				No	Yes
These questions should be asked about the indicators as a group.	• Does the set of indicators cover each measurement priority? • Do any indicators need to be considered together in order to reach the correct interpretation? • Do the indicators as a group provide a good picture of how the system is performing?				

Adapted from: JLN Provider Payment Mechanisms and Information Technology Collaborative

Creative Solutions for Common Challenges

• If it is difficult to identify indicators that meet the needs of all interest groups, select indicators that reflect PHC system performance more broadly rather than a collection of disease-specific measures. Indicators that answer multiple questions are especially helpful, although they should be complemented by indicators that are more specific and easier to act on.

• When indicator selection is more politically than technically driven, such as when partners or funders require specific indicators that are not on the priority list, mapping indicators to conceptual frameworks can be useful for identifying where gaps exist and where data collection is duplicative. Inclusive indicator selection processes are critical for obtaining buy-in and ensuring that indicator lists reflect the needs of users across the system.

• If it is difficult to identify appropriate indicators for certain policy questions, workshops or stakeholder meetings can ensure a common understanding of measurement priorities and facilitate agreement on indicators, definitions, data to be collected, and what the results will be used for. Regularly scheduled meetings to review and revise indicator lists can help ensure that indicators remain relevant and useful.

• If the selected indicators do not provide a comprehensive view of overall performance, it may be helpful to start with a larger number of indicators and winnow the list as priorities become more defined, or to start small and increase the number of indicators to capture the components needed for comprehensive performance assessment.

Table 3 lists resources developed by the global community to help identify measurement gaps and select indicators.

TABLE 3. Additional Resources on Identifying Measurement Gaps and Selecting Indicators		
Tool or Resource	**Source**	**Description**
Global Health Observatory	WHO	WHO's portal for health-related statistics on more than 1,000 indicators across its 194 member countries, organized to monitor progress toward the UN SDGs.
	www.who.int/gho/en/	
100 Core Health Indicators	Health Data Collaborative	This standardized set of core health indicators was developed through a joint effort between multiple global health partners and countries to improve the availability, quality, and use of data for local decision-making and tracking of progress toward the health-related SDGs.
	www.healthdatacollaborative.org/resources/100-core-health-indicators/	
Health Systems Strengthening: A Compendium of Indicators	MEASURE Evaluation	Part of a package of resources on health system strengthening, this tool provides an introduction to indicators, selection considerations, and data sources, as well as tables of indicators based on core health system functions.
	www.measureevaluation.org/resources/tools/publications/tr-17-167b	
Country Monitoring and Evaluation Guidance	WHO	Guidance and tools on measurement, monitoring, and evaluation, including indicators and classifications, data collection tools, and data analysis tools.
	www.who.int/healthinfo/country_monitoring_evaluation/en/	

Kenya:
Working Toward a Single M&E Framework

Kenya's Ministry of Health was motivated to develop a health-sector M&E framework to monitor and assess the country's Health Sector Strategic Plan for 2014–2018 and establish a single monitoring system across Kenya's 47 counties. The health system in Kenya was decentralized in 2013, but the country still needs to report on health-sector progress and international commitments, such as the SDGs, at the national level.

All health-sector stakeholders participated in developing the M&E framework and agreed to use it, and several counties have developed local M&E plans guided by the overall plan. Based on this framework, the ministry conducted a midterm review of the strategic plan in 2016 that revealed the need to review and revise the health-sector indicators manual.

With guidance from the Health Data Collaborative, all players and programs within the health sector at both the national and subnational levels worked together, using the M&E framework, to examine progress on all 144 indicators in the current strategic plan and found that data on some indicators were not being collected. Gaps were identified in critical performance domains, including quality of care, health workforce, access to and demand for services, leadership and management, and social determinants of health. The review also found that subnational analysis of data was lacking, including county and subcounty comparisons.

The effort produced a revised national health indicators reference manual with information on all health indicators used in Kenya. The planning teams are expected to use the revised indicator manual to select indicators for the health sector M&E plan for the next strategic plan (2018–2022) through an inclusive process at the national and county levels, which will be informed by country commitments, sector priorities, and local burden of disease.

Nigeria:
An Inclusive Process for Developing a National Health Indicators List

In 2017, Nigeria embarked on a national indicator selection process involving health institutions at all levels. Program-specific indicators were shared and organized by level of care and topic area. Teams worked in groups to consider the indicators, select those deemed most useful, and develop standardized definitions. With a newly refined list of indicators, participants were asked to present their decisions in plenary sessions, where discussion and debate led to further refinement and resulted in a final group of core indicators.

When the indicator selection began, much of the initial work was dedicated to sifting through indicators that were outside the scope of the measurement priorities—for example, indicators that were used to track contextual or superfluous information, or disaggregated segments of the same core indicator. In such situations, articulating measurement priorities at the start of the selection process can help ensure that participants come to workshops with the necessary materials to participate meaningfully.

PART 02

Addressing Measurement Gaps in Key Areas

| CHAPTER 03 | Measuring Technical Quality |
| CHAPTER 04 | Measuring Experiential Quality |
| CHAPTER 05 | Measuring Community Engagement |

Assessing the quality of health services is an important aspect of understanding how system inputs are translated into outcomes. Part 2 offers guidance on addressing common measurement gaps in three essential aspects of quality of care: technical quality, experiential quality, and community engagement. It also enumerates tradeoffs among data collection methods in these three areas in terms of the following practical considerations:

- **Relevance.** On which aspects of the gap area can the method collect data?
- **Affordability.** Is the overall implementation cost of the method reasonable and affordable?
- **Complexity.** How easy or difficult will it be to capture the data?
- **Reliability.** Does this method produce consistent results?
- **Validity.** To what degree will the method measure what it is intended to measure?
- **Utility.** To what extent will the collected data be useful for decision-making?

CHAPTER 03

MEASURING TECHNICAL QUALITY
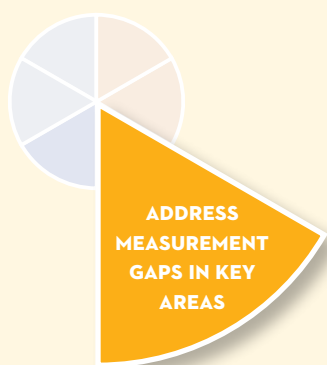
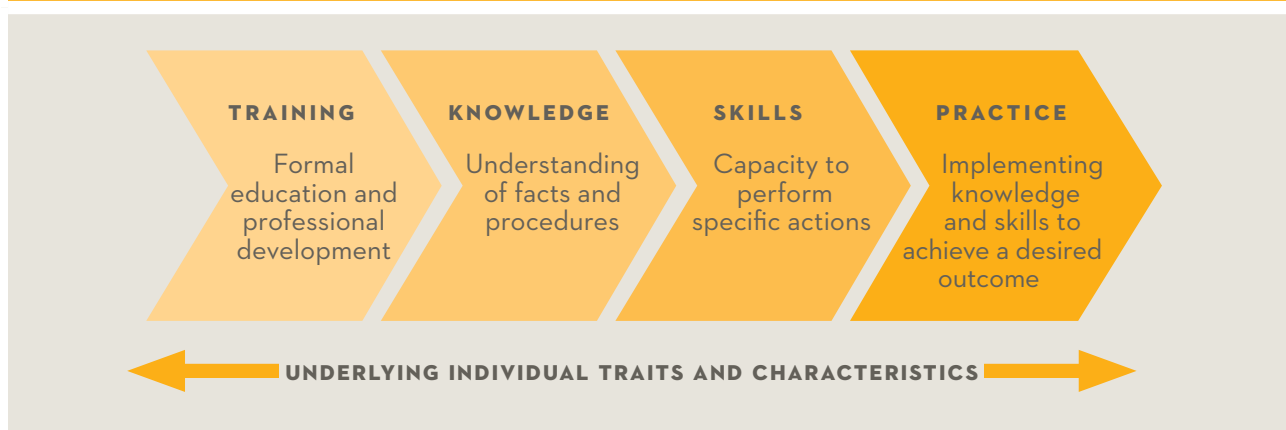|		
OBJECTIVE		To identify context-appropriate data collection methods for assessing technical quality
WHO IS INVOLVED?		Planning teams, M&E officers, system and facility managers, frontline providers, patients, communities
TOOLS		» Data collection methods » Data collection tools

ADDRESS MEASUREMENT GAPS IN KEY AREAS

TECHNICAL QUALITY CAN BE DEFINED as delivery of care that meets standards and guidelines established by a country or a medical practice. The technical quality delivered by a practitioner can be understood in terms of four progressive dimensions: training, knowledge, skills, and practice. (See **Figure 2** .) Although technical quality also depends on structural factors such as supportive supervision—in which supervisors provide mentoring to help staff build skills—and systems that enable providers to deliver care according to standards, these external elements are not the focus of this chapter. Rather, this chapter focuses on measuring the technical knowledge, skills, and practice of individual providers.

FIGURE 2.

The Four Dimensions of Technical Quality

TRAINING	**KNOWLEDGE**	**SKILLS**	**PRACTICE**
Formal education and professional development	Understanding of facts and procedures	Capacity to perform specific actions	Implementing knowledge and skills to achieve a desired outcome

◄ **UNDERLYING INDIVIDUAL TRAITS AND CHARACTERISTICS** ►

Why Measure Technical Quality?

Health workers are the conduit for care that the health system provides to individuals and communities, so it is important to understand how well they are performing their duties. No matter how many resources a facility has or how well it engages the community, outcomes will not improve if the services provided are of poor technical quality. Data on technical quality can help answer important questions related to improvement, including organizational performance, planning for provider trainings, and the effectiveness of trainings.

The technical quality of care that providers know how to deliver, based on their training and experience, does not always match the technical quality of care they provide in practice. This "know-do gap" has been well documented. Contributing factors can include:

- Availability of drugs, supplies, and basic infrastructure

- Provider expectations of patient adherence to care guidelines and likelihood to return for follow-up

- Provider effort or motivation, which can be affected by the practice setting (e.g., facility environment, public vs. private) as well as system regulations

- Level of provider knowledge, based on training and experience

> *The objective of a technical quality assessment has implications for what kind of data collection method can be used. For example, routine data can be useful for evaluating some aspects of technical quality, but other research questions— such as how effective a training program has been—may require additional efforts such as cohort or case-control studies.*

How to Measure Technical Quality

Technical quality can be measured using many different techniques. The most suitable method(s) will depend on the purpose of measurement and the resources and time available. The most commonly used data collection methods include:

- **Standardized patient.** Hired actors or people who are recruited from the local community and extensively trained present themselves to a provider as a patient with standardized complaints of symptoms for a specific illness or condition. Their role as an actor is not known to the provider.

- **Direct observation.** Evaluators or supervisors observe providers during patient visits and record attributes of each interaction, usually using a checklist.

- **Clinical vignette.** Providers are presented with standardized complaints of hypothetical patients and are required to walk through the process of how they would manage each case.

- **Clinical audit.** A comprehensive assessment of the entire process of care delivery—from diagnosis to treatment and follow-up—is conducted to determine the quality of care delivered and resulting outcomes.

- **Chart abstraction.** Patient charts maintained by providers are assessed and graded by expert teams.

- **Case study.** In a simplified version of clinical vignettes, providers are asked specific, typically closed-ended, multiple-choice questions.

- **Simulation.** Clinical events are reproduced in a controlled environment, and the clinician or team manages those events as they would in real life.

- **Exit interview.** Interviews are conducted with patients or caretakers to learn their perspective on the services received.

- **Provider questionnaire.** Providers are given a set of questions that assess their knowledge. This may be included in a routine assessment or conducted on an ad hoc basis.

> *While it can be useful to compare technical quality across regions and between clinics, it is important to consider how the local environment affects quality of care in order to accurately identify obstacles to quality improvement. For example, in a resource-limited environment, technical quality may be limited due to lack of equipment and supplies despite high levels of provider knowledge and skill.*

Table 4 provides an overview of data collection methods for measuring technical quality in terms of relevance, affordability, complexity, reliability, validity, and utility.

	TABLE 4. Methods for Measuring Technical Quality					
	Relevance	**Affordability**	**Complexity**	**Reliability**	**Validity**	**Utility**
Standardized Patient	• Measures: » Knowledge » Skills » Practice	• An expensive method that requires significant training time for those acting as standardized patients.	• Extensive training required. • Requires development of scenarios and selection of explicit evaluation criteria. • May be difficult for actors to remain undetected in physician's offices.	• Research has shown that evaluations and conclusions using standardized patient can be reliable if actors are properly trained. • Determining reliability may require the use of second actors to score the same encounters.	• Recognized as the "gold standard" for quality measurement. • No observation bias, but recall bias is possible (varying ability of actors to recall specific details of the conversations and interactions). • Can be used only for cases that have standard medical protocols for triage, diagnosis, and treatment.	• Enables calculation of case detection rates because the cases are pre-specified. • Allows for valid comparisons across different types of providers because cases are standardized across provider types.
Direct Observation	• Measures: » Knowledge » Skills » Practice • Difficult to measure rare conditions.	• Can be integrated into existing supportive supervision processes.	• Requires standardized training of observers. • Providers must be willing to participate. • Labor intensive for observers. • May be difficult to use in settings with low case volumes.	• A standardized grading rubric can be useful to ensure reliability of results. • Assessments made by second reviewers can be compared to original scoring to determine the reliability of the initial results.	• Subject to observation bias, particularly for sensitive cases. • Cannot measure provider's thought process in capturing patient information and reaching a diagnosis, so reasoning may be underevaluated.	• Frequently used in the context of supportive supervision, allowing supervisors to observe practice and provide immediate feedback and suggestions for improvement.
Clinical Vignette	• Measures: » Knowledge • Does not measure knowledge applied in practice. • Allows testing of rare events that may not be possible to observe.	• More cost-effective for measuring knowledge than standardized patient, but does not capture skills or practice.	• Vignettes must be validated before use. • Allows testing of rare conditions or unique events that may be difficult to observe otherwise. • Selection and development of vignettes should be based on the local health context. • Providers must be willing to participate.	• The use of an "anchoring vignette"—a brief example using standardized terms—can be valuable to ensure that respondents and evaluators are using concepts consistently.	• The research team that develops the vignettes can control for confounding variables in a way that is not possible in real-life situations.	• Can be used as part of provider pre- or post-test evaluations to determine effectiveness of trainings.

		TABLE 4.		CONT'D	
		Methods for Measuring Technical Quality			
	RELEVANCE	AFFORDABILITY	COMPLEXITY	RELIABILITY	VALIDITY	UTILITY

	RELEVANCE	AFFORDABILITY	COMPLEXITY	RELIABILITY	VALIDITY	UTILITY
CLINICAL AUDIT	• Measures: » Knowledge » Skills » Practice	• An ongoing process that requires multiple steps and more than a single ad hoc investment.	• A full clinical audit requires coordination among multiple teams and commitment to reviewing materials.	• Employs multiple methods of data collection, including observation and chart review, which leads to greater reliability compared to single-method assessments.	• Multiple methods of data collection allow for cross-verification of findings, which improves validity relative to single-method assessments.	• Considered a foundational step in the development of an ongoing quality improvement cycle.
CHART ABSTRACTION	• Measures: » Practice • Can be used to assess treatment of rare events.	• Relatively inexpensive, although costs for analysis and review should be considered. • May be combined with supportive supervision visits.	• Can be relatively simple and quick to carry out. • Providers or facilities must agree to allow evaluators to review charts. • Requires evaluators who have clinical understanding and can read the local language. • The evaluator's task is easier if the treatment provided is based on national guidelines or standard operating procedures.	• Incomplete data, illegible handwriting, or incomplete understanding of indicators on the part of health workers can reduce reliability of medical records.	• Data quality spot-checks can help ensure validity. • Health workers may capture some aspects of care accurately (e.g., treatment prescribed) but not whether the diagnosis was correct.	• Allows for identification of systemic errors in recordkeeping and evaluation of diagnostic trends.
CASE STUDY	• Measures: » Knowledge • Does not measure application of knowledge. • Allows testing of rare events that may not be possible to observe.	• More cost-effective for measuring knowledge than standardized patient but does not capture skills or practice.	• Simplified version of clinical vignette but may not capture the same depth as a vignette. • Case studies must be validated before use. • Selection and development of cases should be based on the local health context.	• When constructing a case study, cross-verification of scenarios can be useful to ensure that they are relevant to the local context. • "Anchoring"—the use of a case example with standardized terms—can help ensure that respondents and evaluators are using concepts consistently.	• The research team that develops the case study scenarios can control for confounding variables in a way that is not possible in real-life situations.	• Can be used as part of provider pre- or post-test evaluations to determine effectiveness of trainings. • This simplified, closed-ended method may not provide the same level of depth as a vignette.

	Relevance	Affordability	Complexity	Reliability	Validity	Utility
SIMULATION	• Measures: » Knowledge » Skills	• Evaluators must be trained to properly assess outcomes of simulations and often need some level of clinical knowledge.	• Reproduction of the clinical event is based on typical diagnostic criteria. • Takes place outside regular clinic hours.	• The controlled environment for a simulation may be difficult to replicate in different contexts.	• If prompts are representative of the situations that providers encounter, responses can be considered a true reflection of provider knowledge, clinical reasoning, and skills. • Evaluators may have observation bias.	• Allows testing of procedures that are not possible to mimic or observe (due to the inability to replicate symptoms or infrequent clinical presentation). • Gaps in clinical reasoning can be clearly identified and addressed.
EXIT INTERVIEW	• Measures: » Practice • May be used to simultaneously capture experiential quality.	• Preparing for, conducting, and codifying interview results can be labor intensive, especially if open-ended questions are used.	• Patients are interviewed immediately after seeing the clinician, which simplifies sampling. • Requires the development of standardized questions.	• Interviews conducted by external evaluators are less likely to include bias than those conducted by internal evaluators, thereby increasing the likelihood of reliable data.	• May be skewed by recall bias or patient expectations of how the provider should perform. • Even when patients do not understand technical details, their responses may indicate whether appropriate steps were taken by the clinician. • Respondents are likely to be more candid if they are assured that the results will remain anonymous.	• A high response rate, along with capturing responses immediately after the clinical interaction, can lead to quicker assessment.
PROVIDER QUESTIONNAIRE	• Measures: » Knowledge	• May be implemented on an ad-hoc basis, added to routine assessments, or included as part of periodic trainings.	• Can be relatively simple and quick to carry out.	• Questions may be adapted to the local context.	• Questions should be developed and reviewed by a team of experts to ensure that they are adequately capturing what they intend to measure.	• High response rates are typical. • Does not capture practice and thus may not provide a complete picture. • Implementing questionnaires with standard questions over a time period may be an effective way to observe trends in provider knowledge.

Clinicians are trained to respond to the patient in front of them and to prescribe care suited to the needs of that individual. Treatment depends on myriad factors, including the provider's perception of whether the patient will follow the advice given or return for follow-up. To help account for this, the standardized patient and direct observation techniques can be complemented by knowledge-testing strategies such as clinical vignette or simulation.

Each method comes with tradeoffs, so the use of multiple data collection methods can be important for comprehensively evaluating technical quality—for example, observing a provider performing a delivery as well as examining patient records to determine whether procedures were correctly performed, referrals were properly made, and infection protocols were followed. (See **Box 3** .)

As the number of health personnel using smartphones continues to grow, it may be helpful to develop digital checklists and other data collection tools to allow for easier data collection during supervisory visits and to expedite submission to the central level.

BOX 3.

Tradeoffs in Methods for Measuring Adherence to Malaria Testing Protocols

The best data collection method to use depends on what is being measured and in what context. For example, consider a district health manager who wants to assess the technical quality of community health workers (CHWs) in her district. Specifically, she wants to know whether CHWs are adhering to recommended guidelines when delivering rapid diagnostic tests (RDTs) for malaria to children under age 5 who present with a fever.

Her priorities include:

» Understanding what the community health workers do in practice

» Examining the frequency with which they perform the RDTs

» Selecting an assessment method appropriate for the resource-constrained environment

When considering the options, the district health manager rules out standardized patient because it is not possible to simulate fever associated with malaria. Next, she rules out simulation, clinical audit, case study, and clinical vignette because none of these methods indicates what is done in practice. She determines that patient exit interviews are not feasible because CHWs frequently deliver RDTs in the community rather than in a facility, and the lack of nonclinical personnel to administer the survey might result in courtesy bias. She ultimately chooses direct observation to see what CHWs do in practice, as well as chart abstraction to understand how frequently the tests are carried out, noting that this method could also be integrated into existing supportive supervision processes.

Creative Solutions for Common Challenges

- To assess broad topics with precision, convene multidisciplinary teams of professionals to work together to create multi-dimensional research questions. Argentina used this strategy when creating research questions to assess provider motivation, and it helped generate a more complete picture through the use of different methods and perspectives.

- If field supervisors have limited capacity to support or conduct ongoing assessments of provider knowledge and skills, enlist mentors to observe as well as provide hands-on training. Tamil Nadu, India, created a program that assigned mentor nurses to visit primary health centers to monitor daily activities (using a standard checklist) and help staff nurses improve their skills. Each primary health center is visited by a mentor nurse at least twice a month, and each mentor nurse makes at least 20 visits per month. The data recorded using the checklist are reported to medical officers and district officials.

- When provider staff shortages occur due to absenteeism, transfers, and reshuffling of trained personnel—which can lead to overburdened providers and reduced capacity for making improvements—institutional and political support can be critical. In Ghana, system-wide commitment to keeping trained personnel in their assigned location and to training and coaching new cadres was an important first step in alleviating staffing challenges.

- To ensure the quality of data collected from facility registers, both random and systematic cross-checks can be helpful. In Bangladesh, random cross-checks of health cards against facility registers during supervisory visits have helped validate data.

Countries use different tools and techniques to collect data on technical quality. **Table 5** describes the tools that some JLN countries have used, along with their measurement focus.

	TABLE 5.		
	Tools Used by JLN Countries to Measure Technical Quality		
Country	**Tool**	**Measurement Focus**	**Description**
Argentina	Health Facility Personnel Questionnaire	• Facility organization and management • Provider practice	A questionnaire that examines health provider responses regarding aspects of their activities that are influenced by Plan Nacer / Programa SUMAR incentive schemes. The main topics include resource generation, funds allocation, decision processes, expenses, and use-of-funds reporting. Selected sections have been translated into English; the full questionnaire is available in the original Spanish.
Argentina	Health Facility Director Questionnaire	• Facility organization and management • Availability and adequacy of facility infrastructure • Adherence to guidelines	A questionnaire that examines facility director knowledge related to managerial decisions and perceptions of Plan Nacer / Programa SUMAR. It includes sections related to administrative activities, such as planning and billing, as well as general context, organization of registration activities, resource allocation, decision processes, and funds reporting. Selected sections have been translated into English; the full questionnaire is available in the original Spanish.
Bangladesh	Selection of best community clinic	• Availability and adequacy of facility infrastructure • Facility organization and management • Knowledge management • Adherence to guidelines • Sanitation and patient safety	A brief survey that collects data through health facility visits in which key elements are observed and assessed.
Ghana	Environment and infrastructure evaluation	• Availability and adequacy of facility infrastructure • Patient safety	A brief assessment that uses facility visits to observe and assess the physical clinic environment, with a focus on patient safety and comfort.

	TABLE 5.		
	Tools Used by JLN Countries to Measure Technical Quality	CONT'D	

COUNTRY	TOOL	MEASUREMENT FOCUS	DESCRIPTION
INDIA (TAMIL NADU STATE)	Mentor Staff Nurse Facility Checklist	• Facility management • Provider practice • Continuity of care • Availability of equipment and services • Sanitation and patient safety	A tool that requires in-person visits to health facilities to assess, through observation, their capacity for technical quality, including provider skills and clinic environment.
INDIA (TAMIL NADU STATE)	Obstetric Pre- and Post-Test Questionnaire Complemented by Mentoring Guidelines for Obstetric Skills Assessment	• Provider knowledge • Provider skills • Provider practice	A skills checklist that examines provider knowledge, skills, and practice in routine obstetric services. The checklist is complemented by a mentoring guide that provides a brief overview of best practices for mentorship programs and outlines important norms for the mentor-mentee relationship.
INDIA (TAMIL NADU STATE)	Pediatric Pre- and Post-Test Questionnaire Complemented by Pediatric Skills Assessment Guidelines	• Provider practice • Provider knowledge • Provider skills	A comprehensive checklist for assessing provider adherence to clinical guidelines, using either direct observation or clinical vignettes. The checklist is complemented by a guide that provides an overview of best practices for mentorship programs and outlines important norms for the mentor-mentee relationship.
INDIA (TAMIL NADU STATE)	Skills Assessment of Staff Nurses	• Provider practice • Provider knowledge • Provider skills	A tool that outlines essential skills required of staff nurses and that can be used as a foundation for both observational assessment and consolidating findings across care teams to identify areas of weakness.
KENYA	Primary Care Facilities Data Tool	• Available workforce • Continuity of care • Comprehensive coverage • Time trends	A tool focused on the facility level that draws on historical data related to workforce, continuity of care, and effective service coverage for maternal and child health services and reproductive care.
KENYA	Integrated Primary Healthcare Services Monitoring Tool Complemented by Guidelines on Monitoring and Evaluation of Primary Facilities in Kenya	• Facility organization and management • Availability of drugs and equipment • Availability of services • Provider training • Provider practice • Includes a section on community health services and social accountability	A guide based on the Guidelines on Monitoring and Evaluation of Primary Facility in Kenya that leads evaluators through an assessment of key areas related to management and governance of facility services, provider practice, and patient safety using a combination of direct observation, chart abstraction, and interviews.

TABLE 5.
Tools Used by JLN Countries to Measure Technical Quality

CONT'D

Country	Tool	Measurement Focus	Description
Kenya	Results-Based Financing Quality Assessment Tool Template	• Facility organization and management • Availability of drugs and equipment • Provider training • Sanitation and patient safety • Information management • Includes a section on community health services and social accountability	A comprehensive survey that assesses areas related to facility management, information management, provider training in key areas (such as family planning and HIV care), and availability of drugs and equipment through a combination of direct observation and records reviews.
Kenya	Mentoring Guidelines for Obstetric Skills Assessment	• Provider training • Provider skills • Provider practice	Guidelines that provide a template for clinical mentors to support mentees—through observation, practical training, and consultation—in delivering sustainable, high-quality clinical care.
Kenya	Health Sector Indicators and Standard Operating Procedures Manual	• Facility organization, management, and governance • Provider and service availability • Continuity of care • Provider training	A guide that outlines the minimum data sets needed to implement and report on Kenya Vision 2030 and includes a comprehensive breakdown of indicators, complete with indicator definitions and information on the system level where these data are most applicable as well as where the indicators fit within the Kenyan indicator framework.
Kenya	Hospital Services Monitoring Tool Accompanied by Guidelines on Hospital Services Monitoring and the Hospital Services Data Tool	• Facility organization and management • Availability of drugs and equipment • Patient experience • Provider practice • Hygiene and safety	A tool that integrates technical quality measurement with patient experience assessment. Direct observation and chart abstraction are used to understand the impact of provider practice, facility environment, and organization and management on patient satisfaction.

Table 6 lists resources developed by the global community to support assessment of technical quality.

TABLE 6. **Additional Resources on Assessing Technical Quality**			
TOOL OR RESOURCE	**SOURCE**	**MEASUREMENT FOCUS**	**DESCRIPTION**
SERVICE AVAILABILITY AND READINESS ASSESSMENT	WHO	• Availability of drugs, infrastructure, and services • Workforce availability • Provider training • Provider knowledge • Provider practice	An assessment tool that uses key informant interviews and direct observation to assess the supply and quality of key health services, including drugs, equipment, staffing, provider knowledge, and provider practice. It measures key "tracer" elements to assess system readiness among public and private providers, using a standardized questionnaire that can be adapted to reflect national health system priorities.
	www.who.int/healthinfo/systems/SARA_Reference_Manual_Full.pdf		
SERVICE DELIVERY INDICATORS INITIATIVE	World Bank Group, in partnership with the African Economic Research Consortium and the African Development Bank	• Availability of drugs and infrastructure • Provider knowledge • Provider competence • Provider motivation (level of effort)	A biannual survey implemented in partnership with country governments that uses standardized quality and performance indicators to better understand linkages between investment inputs and performance outcomes and allows for cross-country comparison. Metrics account for user perspective. The survey covers both health and education topics.
	www.sdindicators.org/		
DHS SERVICE PROVISION ASSESSMENT SURVEY INVENTORY QUESTIONNAIRE	Demographic and Health Survey Program (USAID)	• Availability of drugs and infrastructure • Facility organization and management • Sanitation and patient safety • Provider practice	A comprehensive assessment tool for interviewing clinic staff on the availability of essential drugs and equipment within a facility as well as provider practice in a broad array of important health areas, from infectious disease care to maternal and child health. It is used every five years to survey between 5,000 and 30,000 households.
	dhsprogram.com/pubs/pdf/SPAQ1/INVENTORY_06012012.pdf		
CLINICAL AUDIT SUPPORT CENTRE	Healthcare Quality Improvement Partnership	• Provider training • Provider practice • Facility organization and management	A website that offers information on conducting a clinical audit that evaluates quality of care against accepted standards, identifies areas of weakness, and highlights actions needed for improvement. The audit can be used as a foundation for ongoing improvements, with reassessments used to track progress.
	www.clinicalauditsupport.com/what_is_clinical_audit.html		
HQSS COMMISSION WEBSITE	Lancet Global Health Commission on High Quality Health Systems in the SDG Era (HQSS Commission)	• Facility organization and management • Availability of drugs and infrastructure • Quality improvement at a systems level	A resource on strengthening quality in health systems across low- and middle-income countries. The HQSS Commission works to produce empirical work related to health systems quality, global targets, and assessment.
	www.hqsscommission.org/		

DATA COLLECTION METHODS: PROVIDER QUESTIONNAIRE, DIRECT OBSERVATION, CHART ABSTRACTION

To bolster its health workforce, the Indian state of Tamil Nadu has developed an intensive training program for its physicians, staff nurses, and medical officers. Training programs are organized by the state government, and each provider undergoes multiple trainings during the in-service period. Within this system, data on the performance of individual providers are regularly collected and are used to identify areas for improvement and develop targeted trainings throughout the professional development continuum, from initial trainings to on-the-job support.

COLLECTING THE DATA

Provider knowledge, skills, and practice are evaluated using a combination of provider questionnaires, direct observation, and review of administrative data. For each training module, individual providers take a pre-test that assesses their knowledge; the results are used to tailor hands-on curricula to build their skills in gap areas. After the training, a second assessment is conducted to identify how their skills have improved and to serve as a baseline for ongoing assessment and supportive supervision.

USING THE DATA

Field supervisors for district training teams share data from assessments with state-level officials, who can view performance across districts and identify high and low performers as well as emerging trends. Based on these analyses, the officials identify priorities, determine whether mid-course corrections are needed, and plan trainings for the following year targeted at areas for improvement. District-level results are also used to solicit additional governmental funding. Districts with low performance on key health indicators are categorized as High Priority Districts, which receive additional funding and staffing from the national government, as well as ongoing supervision.

GHANA:
USING PEER REVIEWERS TO ASSESS FACILITY PERFORMANCE

DATA COLLECTION METHOD: DIRECT OBSERVATION

An increasing number of health centers and district hospitals in Ghana are implementing a peer review system to track quality of care over time, focused primarily on the facility environment and sanitation. Staff from one facility visit another facility and use a standard questionnaire and checklist to assess performance across several areas.

COLLECTING THE DATA
Each key staff member at a facility is responsible for reviewing the performance of his or her counterpart at a peer facility. Using the checklist, the reviewer assigns a score for each component based on observations.

USING THE DATA
After compiling their findings, the reviewers calculate a total performance score for the peer facility. They present and explain the score to the facility managers and offer suggestions for improvement. During the next round of the program, reviewers can assess how effective improvement efforts have been. Each year, the facility with the highest score is named the best-performing in the region, which creates external motivation for facilities to do well on peer reviews. This process has resulted in dramatic improvements among facilities.

DATA COLLECTION METHODS: DIRECT OBSERVATION, CHART ABSTRACTION

In Bangladesh, community clinics are the first point of service for PHC. The country has nearly 13,000 community clinics, with more being built to improve access to care. Each clinic is staffed by a community health care provider (CHCP).

In recent years, Bangladesh has implemented a structured monitoring and supervision checklist for CHCPs as the primary method of collecting data on quality of care. Use of this checklist is embedded into existing supervisory structures, but an initial evaluation found that district-level supervisors made only 64% of the required supervisory visits. The low level of adherence was attributed to the length of the checklist as well as time constraints. To review and improve the checklist, a workshop was held in early 2017 that brought together health managers, UN organizations, development partners, and nongovernmental organizations to develop a shorter, more streamlined tool that also incorporated new indicators for priority areas.

The revised checklist and supervision process, along with mandatory supervisor orientations, is being implemented nationally.

COLLECTING THE DATA

The revised checklist is a hard-copy tool with two sections: Facility Management and Quality of CHCP Performance. The supervisor observes CHCPs interact with patients and uses the checklist to record whether they are performing their clinical duties correctly. The supervisor also checks the clinic's register to see how often each CHCP has performed various tasks within the last month, such as prenatal checkups and blood pressure measurement, and whether the CHCP has properly recorded the data.

USING THE DATA

The completed hard-copy checklists are sent to the central office of the Community Based Health Care Program in Dhaka. The data are used to identify areas for improvement in CHCP and community clinic performance and to make decisions at the central level about additional in-service training for CHCPs.

ARGENTINA:
ASSESSING PROVIDER MOTIVATION TO IMPROVE QUALITY OF CARE

DATA COLLECTION METHOD: PROVIDER QUESTIONNAIRE

In 2004, Argentina implemented Plan Nacer, an innovative program designed to improve service coverage for mothers and children within the public sector. Plan Nacer has since been scaled up into Programa SUMAR, which has expanded the target population to include older children and adults.

One of the program's distinctive features is results-based financing—monetary incentives for provincial-level facilities to improve basic effective coverage. Incentive payments are linked to results and are credited in a facility's bank account as financial transfers. Under this plan, basic effective coverage is defined by three key elements: enrollment, access, and quality. A partial payment is made for the provision of at least one priority health service to each patient enrolled at a facility; the remaining amount is linked to a set of tracer indicators for quality of care. The program has significantly increased basic effective coverage for priority services across the enrolled population.

The plan recognizes that provider motivation is a critical factor that drives quality of care. In addition to financial incentives, the program uses peer recognition and working environment improvements as incentives to improve the motivation of health teams. The funds transferred are directly linked to the health team's specific health practices, and health teams participate in deciding how to allocate the funds.

To further improve the utilization and quality of health services, the Ministry of Health conducted a study to assess the determinants and levels of motivation of the health teams.

COLLECTING THE DATA
The study used quantitative and qualitative methods to create a composite score called the Index of Human Resource Satisfaction. Tools included interview guides and questionnaires developed by an interdisciplinary team of psychologists, sociologists, statisticians, medical doctors, economists, and members of the Plan Nacer implementation team. The interview guides covered incentive mechanisms as well as organizational changes and additional administrative burdens as a result of implementing Plan Nacer. Focus groups were used to validate the finding that lack of health provider purchasing power for required items hurt staff motivation.
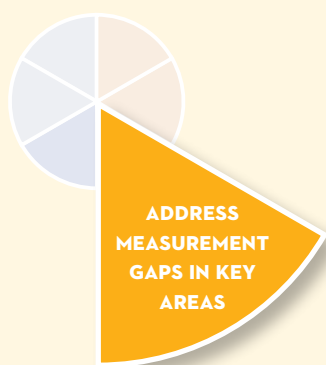
USING THE DATA
Regional meetings were held to identify areas for improvement, with a particular focus on system readiness and timeliness of purchasing activities related to staff motivation. Consultants were hired to monitor progress in each province.

CHAPTER

04

MEASURING EXPERIENTIAL QUALITY

ADDRESS MEASUREMENT GAPS IN KEY AREAS	**OBJECTIVE**	To identify appropriate data collection methods for assessing experiential quality
	WHO IS INVOLVED?	Planning teams, M&E officers, systems and facility managers, frontline providers, patients, communities
	TOOLS	» Data collection methods » Data collection tools

WHO's **working definition of experiential quality** is "the sum of all interactions, shaped by an organization's culture, that influence patient perceptions across the continuum of care." In simple terms, experiential quality is the quality of an individual's experience in interacting with the health system and with providers, in both objective terms and in terms of the patient's subjective perceptions.

Experiential quality can include *patient satisfaction*, which is inherently subjective and includes how well the medical and nonmedical aspects of an interaction met the patient's expectations, and *patient experience*, which can be objectively measured against accepted standards. For example, "I had to wait too long to receive care" is an expression of patient satisfaction, while "I waited 90 minutes before my provider showed up" is an element of patient experience.

If a patient's expectations are low, satisfaction may be high even if the quality of care is poor. Cultural norms, ethnicity, age, socioeconomic status, and prior experience with the health system can affect patient expectations and satisfaction and can lead two patients to rate the same situation or provider interaction in very different ways. Measurements of patient experience can control for some of these factors by focusing on objective aspects of experiential quality. **Figure 3** depicts how the aspects of experiential quality overlap.

FIGURE 3.

Aspects of Experiential Quality

PATIENT EXPERIENCE
Objective experience relative to accepted standards

PATIENT SATISFACTION
Subjective individual perceptions and expectations

Why Measure Experiential Quality?

Information from the patient's perspective is increasingly recognized as valuable data for improving quality and acceptability of care and ultimately achieving improved health outcomes. Experiential quality is positively associated with other quality outcomes, including patient safety, clinical effectiveness, higher utilization of formal health facilities, and adherence to care.

Facility or system managers might measure experiential quality in order to better understand or improve aspects of quality of care, such as organizational performance, provider competence, care utilization and retention patterns, and quality improvement processes.

How to Measure Experiential Quality

Experiential quality can be measured using a number of techniques, both quantitative and qualitative. The most suitable method will depend on the purpose of the measurement and the resources and time available. Some of the most common approaches to measuring experiential quality include:

For any data collection method, especially surveys, reliability is an important consideration. The sample size must be large enough to distinguish genuine differences in experiential quality among providers. Ensuring sufficient sample size can also help mitigate concerns among providers that reports of low quality may point to systematic bias among the patients sampled.

- **Household survey.** A questionnaire is used to collect data from a representative sample of households.

- **Patient exit interview.** Patients are asked about their experience at the facility immediately after they have received services.

- **Post-care patient interview.** This interview is similar to a patient exit interview but is conducted at the patient's home or via phone (e.g., from a call center).

- **Post-care questionnaire.** A paper-based survey is mailed to patients after they have received care.

- **Focus group.** A group is assembled for a guided discussion, allowing for more qualitative and patient-generated responses.

- **Items added to other technical quality data collection methods.** Questions or items about experiential quality can be added to other methods of assessing technical quality (which are detailed in Table 7). For example, patient-provider communication can be assessed through direct observation, simulation, or even videotaping. Some objective measures of patient experience—such as accuracy of diagnosis—can also be assessed using clinical vignettes for providers or through the standardized patient method.

Increasingly, countries are seeking to measure and improve quality of care and patient-centeredness through the use of patient-reported measures, including the OECD's Patient-Reported Outcome Measures (PROMs) and Patient-Reported Experience Measures (PREMs).

» **PROMs** are designed to capture health outcomes from the perspective of the patient and are directly reported by the patient without interpretation by a clinician. PROMs can measure patients' perceptions of their health status, quality of life, symptom burden, physical and social function, and mental health.

» **PREMs** measure patients' perceptions of their experience while receiving care, focusing on the system of care delivery and care process. PREMs can measure concepts such as time spent waiting, involvement in decision-making about care, quality of communication, and access to services.

Both PROMs and PREMs result in data that are meaningful and can be used for multiple purposes, from research to provider performance assessment and quality improvement efforts. Evidence shows that use of PROMs and PREMs to improve quality can lead to better decision-making and communication between providers and patients and can improve patient satisfaction and reported outcomes. Patient-reported data can help improve quality of care for the individual by informing care planning and management, and at the service delivery and system levels they can help identify what is working well within the system and what needs improvement.

Several validated tools—both generic and disease-specific—are available for using PROMs and PREMs. (See Table 9 .) They typically employ surveys or questionnaires. To ensure that PROMs and PREMs result in relevant and meaningful data, they should be co-developed with providers, patients, and experts.

Ethnographic Approaches to Measuring Experiential Quality

In addition to traditional quantitative and qualitative approaches, more innovative methods for collecting information on experiential quality are emerging, including ethnographic approaches that allow researchers to embed themselves in the patient experience. These methods include:

» **Physician shadowing.** Physicians are "shadowed" by a researcher or evaluator who records direct observations of physician-patient interactions. This approach may be combined with physician coaching to help improve experiential quality.

» **Medical mystery shopping.** Also called "secret shopping," this approach is similar to the standardized patient method in that it involves a researcher collecting data in a direct but clandestine way. The "mystery shopper" may collect data by phone or in person, posing as a patient or a patient's relative. Mystery shopping can be used to gain objective data on the patient experience—for example, to determine the availability of appointment times requested by patients.

These methods come with limitations and cost considerations that are similar to those of the standardized patient method.

Table 7 provides an overview of data collection methods for measuring experiential quality in terms of relevance, affordability, complexity, reliability, validity, and utility.

	RELEVANCE	AFFORDABILITY	COMPLEXITY	RELIABILITY	VALIDITY	UTILITY
TABLE 7. **Methods for Measuring Experiential Quality**						
HOUSEHOLD SURVEY	• Measures: » Satisfaction » Experience • Can reach those who have not accessed facility-based care and may be missed by other sampling methodologies.	• One of the most expensive data collection methods due to the time involved in training surveyors and time spent contacting respondents.	• Level of complexity can be affected by the location of clinics and households, regional languages, staff availability, and availability of technical support. • Introduces challenge of patient confidentiality if multiple individuals are home when the interview is conducted. • If patients visit clinics with different levels of frequency, it can be challenging to identify enough respondents whose experiences are recent enough to be relevant. • Multiple attempts may have to be made to reach a respondent at home. • Time period for gathering inputs is typically one to three months.	• Reliability depends on sampling, response rates, and the consistency of the evaluators administering the survey.	• Recall bias may be a factor, depending on the length of time between when services are received and when the interview is conducted. • Survey must be reasonably representative of the geographic area being studied to obtain estimates that are close to true values.	• Allows for complex questions, collection of observations, and use of visual aids when conducting the survey. • Considered the "gold standard" of population-based surveying when rigorous sampling methods are employed and high response rates are achieved, but this must be weighed against reliability and validity concerns.
PATIENT EXIT INTERVIEW	• Measures: » Satisfaction » Experience • Only captures those who have accessed care.	• Time and labor intensive, but transportation costs are eliminated because interviews are conducted at the clinic.	• Method of selecting interviewees and the length of the interview can lead to overrepresentation or underrepresentation of certain patients and their experiences. • Considered the most efficient way to gather information from patients.	• Reliability depends on sampling, response rates, and consistency among interviewers. • Individual interviewers can affect how candid the respondent is willing to be.	• Risk of observation bias (assumption that clinicians may modify their behavior on days when patient exit interviews are conducted). • Not good for longer or more complex questions, due to time constraints. • Reduced risk of recall bias and greater likelihood of high response rates, but includes risk of courtesy bias, in which patients are hesitant to provide honest responses for fear that the results will be linked to them and thereby harm their relationship with the provider.	• Absence of lag time in collecting responses means that feedback is directly applicable to the immediate clinic environment.

TABLE 7.
Methods for Measuring Experiential Quality

CONT'D

	Relevance	Affordability	Complexity	Reliability	Validity	Utility
Post-Care Patient Interview	• Measures: » Satisfaction » Experience • Only captures individuals who successfully interacted with the health system; may miss patient views on why they did not seek or could not access care.	• Conducting interviews at patient homes can drive up costs, especially if multiple visits are required to connect with the patient. • Phone surveys can be used, but this introduces risk that findings will not be representative due to cell phone coverage limitations, shared phones, wrong numbers, etc.	• Level of complexity can be affected by the location of clinics and households, regional languages, and staff availability. • Introduces challenge of patient confidentiality if multiple individuals are home when interview is conducted. • Existing outreach mechanisms, such as CHWs, may be used to improve feasibility.	• The individual interviewer can affect how candid the respondent is willing to be.	• Reduces risk of courtesy bias but may introduce recall bias, depending on how long after the clinic visit the interview is conducted. • Health status of individuals at the time of the interview—especially if their condition has worsened—may affect responses.	• Treatment success rate can be evaluated in the context of patient reports of experiences with the provider.
Post-Care Questionnaire	• Measures: » Satisfaction » Experience • Only captures input from those who have accessed care.	• Mailing surveys to patients reduces costs related to data collection, but costs related to analysis of responses remain.	• Level of complexity can be affected by the location of households as well as regional dialects and patient literacy. • Achieving a sufficient response rate requires more than a single mailing, and pre-work and follow-up are necessary. • Feasible only in contexts with reliable postal services.	• Clarity of questions, layout, and instructions are essential in self-administered forms. • Generally higher rate of nonresponse or skipped questions.	• Reduces risk of courtesy bias but may introduce recall bias, depending on how much time has passed since services were accessed. • Health status of individuals at the time of the interview—especially if their condition has worsened—may affect responses.	• Treatment success rate can be evaluated in the context of patient reports of experiences with the provider.

		TABLE 7.	CONT'D		
		Methods for Measuring Experiential Quality			
	RELEVANCE	AFFORDABILITY	COMPLEXITY	RELIABILITY	VALIDITY	UTILITY

FOCUS GROUP

RELEVANCE	AFFORDABILITY	COMPLEXITY	RELIABILITY	VALIDITY	UTILITY
• Measures: » Experience » Satisfaction • Allows for more qualitative and patient-generated responses.	• Requires less time and fewer resources than individual interviews while still collecting rich qualitative data. • Small stipends or travel reimbursements are sometimes given to participants.	• Generally considered a "quick and easy" method of data collection. • Group size should be between six and 10 participants (who are ideally unknown to each other beforehand). • Moderator must have subject-area expertise in order to interpret responses and must be trained in building trust, ensuring confidentiality, and guiding the discussion toward meaningful responses. • Existing community groups can be used as sources of participants. • Gathering individuals with shared identity (such as women) can be helpful because participants might feel safer about responding.	• Given the open-ended nature of focus group discussions, reliability will depend heavily on the skills of the moderator and the quality of questions presented to the group. • Audio recording is a common method of capturing discussions and increasing the reliability of analysis.	• The group environment can be useful for leading participants to clarify their views and voice agreement and disagreement. • Moderators must ensure that the dominant group opinion does not drown out opposing voices. • Conversation and debate in the guided discussions increase the likelihood of cross-verification of views.	• Can produce concentrated amounts of data on targeted topics of interest. • Conversation will often reveal priorities and topics of importance to the community.

ITEMS ADDED TO TECHNICAL QUALITY DATA COLLECTION METHODS

RELEVANCE	AFFORDABILITY	COMPLEXITY	RELIABILITY	VALIDITY	UTILITY
• Measures: » Satisfaction » Experience • Relevance depends on the methods used, whether patient-provider interaction is observed, and whether the patient provides feedback.	• Integrating experiential quality assessment into an existing data collection methods can be cost effective, but the validity of results can vary depending on whether the method involves assessment of actual interaction (such as with direct observation or standardized patients) versus simulation.	• Greater complexity is introduced to data collection methods when another dimension of measurement is added. • Relatively feasible in nearly all contexts as long as the data collection methods have been validated.	• Reliability will depend on the methods used.	• Validity will depend on the methods used: direct observation and standardized patient are more likely to reflect the average patient experience than methods such as simulation. • Only a subset of factors that influence patient experience can be observed by a third party.	• Integration of experiential quality questions with technical quality questions indicates a move toward a more patient-centered approach to care and standardizes the importance of patient experience.

Data collection tools should be adapted not just to the local language and cultural context but also local health needs (such as for a large elderly population). In some cases, it may be advantageous to employ multiple methods to obtain a more comprehensive view of experiential quality. Each method comes with tradeoffs that should be evaluated within the context and measurement goals. Many of these tradeoffs are related to the population of patients that can be assessed and the validity of the resulting data. (See **Box 4** for an example.)

BOX 4.

Tradeoffs in Methods for Measuring Patient Satisfaction

The best data collection method to use depends on what is being measured and in what context. For example, consider a district health manager who wants to assess the experiential quality of a facility. He has noticed that patient utilization rates have been steadily declining over the past six months. He decides to collect data on patient satisfaction to help identify the root causes of this trend.

His priorities include:

» Obtaining rapid feedback on the clinic climate

» Minimizing recall bias

» Obtaining input from the entire community, not just patients who have visited the clinic recently

The facility manager considers the options. He rules out household surveys due to their complexity and cost. He considers post-care interviews or a post-care questionnaire because they are less labor intensive than household surveys, but neither method provides rapid feedback or captures community members who did not seek care. He ultimately chooses patient exit interviews and focus groups; by combining these methods, he can obtain rapid feedback directly from patients after their medical visit and also learn about the views of patients in the wider community.

Table 8 lists tools developed by JLN countries to measure experiential quality, along with their intended measurement focus.

	TABLE 8. Tools Used by JLN Countries to Measure Experiential Quality		
Country	**Tool or Resource**	**Measurement Focus**	**Description**
Argentina	User Satisfaction with General Maternal and Child Health Care Services	• Provider practice • Patient experience • Patient satisfaction	A questionnaire that examines service utilization by mothers of children under age 6 (the eligible population for Plan Nacer) and level of satisfaction with services. Selected sections have been translated into English; the full questionnaire is available in the original Spanish.
Argentina	User Satisfaction with Neonatal Care Services	• Provider practice • Patient satisfaction • Patient experience	A questionnaire that examines service utilization by mothers with newborn children and includes in-depth questions on neonatal care. The questionnaire was implemented in conjunction with the User Satisfaction with Congenital Heart Disease Care questionnaire (see the next row) to examine cases with malformations other than congenital heart disease. Selected sections have been translated into English; the full questionnaire is available in the original Spanish.
Argentina	User Satisfaction with Congenital Heart Disease Care	• Provider practice • Patient satisfaction • Patient experience • Continuity of care	A questionnaire designed for caregivers of infants with congenital heart disease to examine the experience of patients and caregivers at different stages and the level of satisfaction with services. Selected sections have been translated to English; the full questionnaire is available in the original Spanish.
Kenya	Hospital Services Monitoring Tool Complemented by Guidelines on Hospital Services Monitoring and the Hospital Services Data Tool	• Facility organization and management • Availability of drugs and equipment • Patient experience • Provider practice • Hygiene and safety	A tool that integrates technical quality measurement with patient experience assessment. Direct observation and chart abstraction are used to understand the impact of provider practice, facility environment, and organization and management on patient satisfaction.
Kenya	Primary Care Facilities Data Tool	• Available workforce • Continuity of care • Comprehensive coverage • Time trends	A data collection tool that focuses on the facility level and draws on historical data related to workforce, continuity of care, and effective service coverage for maternal and child health related services and reproductive care.
Kenya	Integrated Primary Healthcare Services Monitoring Tool Complemented by Guidelines on Monitoring and Evaluation of Primary Facilities in Kenya	• Facility organization and management • Population outreach • Patient experience • Provider practice • Hygiene and safety	A tool that integrates technical quality measurement with patient experience assessment. It asks questions about the contextual factors affecting patient experience—such as facility hygiene and safety—as well as provider practices. Data are collected through a combination of direction observation and chart abstraction.
Kenya	MOH Client Satisfaction Survey	• Perceived access • Patient expectations • Patient satisfaction • Patient experience • Patient-provider interaction	A post-care survey that asks a comprehensive series of questions to assess patient expectations, satisfaction, and experience in current and past visits and use of facility services more broadly.

Table 9 lists resources developed by the global community to support assessment of experiential quality.

TABLE 9. Additional Resources on Assessing Experiential Quality			
Tool or Resource	**Source**	**Measurement Focus**	**Description**
Quality and Costs of Primary Care in Europe (QUALICOPC) study	**European Commission**	• Perceived access • Patient-provider interaction • Patient perception • Patient satisfaction • Patient experience	A survey that evaluates PHC system performance on quality, equity, and costs using patient feedback, practitioner input, and system-level contextual indicators. The survey has been implemented in 31 European countries as well as in Israel, Canada, Australia, and New Zealand.
	cordis.europa.eu/result/rcn/157428_en.html		
Primary Care Assessment Tools (PCAT)	**Johns Hopkins University**	• Perceived access • Patient-provider interaction • Patient perception • Patient satisfaction • Patient experience	A set of four surveys for assessing care structure and processes that contribute to strong health outcomes. They are organized into Consumer-Client, Facility, Provider, and Health System.
	www.jhsph.edu/research/centers-and-institutes/johns-hopkins-primary-care-policy-center/pca_tools.html		
Picker Patient Experience Questionnaire	**University of Stirling**	• Patient experience	A set of questions used to measure patient experience of inpatient care, including whether specific processes and events occurred during the patient's care episode.
	www.picker.org/tools-resources/toolkits/		
CAHPS Experience of Care & Health Outcomes (ECHO) Survey	**Agency for Healthcare Research and Quality**	• Patient perception • Patient experience • Patient satisfaction	A survey with standardized questions and optional supplemental questions to assess the patient perspective on hospital care. It includes questions about communication with health providers, responsiveness of hospital staff, cleanliness of the hospital environment, communication, and an overall rating of the hospital.
	www.ahrq.gov/cahps/surveys-guidance/echo/index.html		
Patient-Reported Outcomes Measurement Information System (PROMIS)	**HealthMeasures**	• Patient perception • Patient experience • Patient satisfaction	A set of measures that build on the generic PROMs to include both general and disease-specific questions.
	www.healthmeasures.net/explore-measurement-systems/promis		
Measuring Patient Experiences (PREMs)	**Organisation for Economic Co-operation and Development (OECD)**	• Patient perception • Patient experience • Patient satisfaction	A report that outlines progress related to the monitoring and assessment of PREMs across OECD member states and outlines plans for building on this important work.
	www.oecd-ilibrary.org/social-issues-migration-health/measuring-patient-experiences-prems_893a07d2-en		

Creative Solutions for Common Challenges

- Social norms can affect experiential quality, so all experiential quality assessments should be adapted to the cultural context and language. Malaysia convened medical specialists to help adapt data collection tools to the health needs of the population.

- Having third-party or non-health-facility staff conduct patient exit interviews can reduce courtesy bias. In Ghana, courtesy bias is mitigated through the use of anonymous exit interviews that are not conducted by providers, and responses are not linked to individual patients.

- Patients' memories of their treatment have been shown to become less positive as time passes. Technology, such as tablets, SMS messages, and online surveys, can be used to obtain nearly real-time feedback from patients, reducing both courtesy bias and recall bias. However, in some contexts patient literacy will need to be taken into account.

- If facilities are not taking action on addressing findings, their resistance may be due to an overly complex data collection process. Chile streamlined the PROMs data collection process by shortening the survey to seven questions whose results would be easiest to act on.

- To address high satisfaction ratings for poor care quality due to low expectations, education efforts can be used to raise community expectations.

Data collection method: patient exit interview

Malaysia ensures quality of health services through the use of guidelines, protocols, standardized service delivery, mandated certification and licensing of health professionals, and accreditation by independent bodies. All tools for measurement were developed specifically for Malaysia and are therefore not suited to international benchmarking.

To assess quality of care as perceived by patients in PHC settings and to evaluate these findings in global terms, Malaysia selected QUALICOPC, a tool developed to measure structures, processes, and outcomes of PHC delivery in Europe. The tool includes four questionnaires: one to survey general practitioners (GPs), one to survey patients about their experiences with their GP, one to survey patients about what they consider important in quality of care, and a practice-level questionnaire that evaluates system components. The questions were adapted to the Malaysian context, including language, culture, and the practice of primary care.

Collecting the Data

The study was conducted in five states, which were selected based on the results of the National Medical Care Surveys conducted in 2012 and 2014 and the National Health and Morbidity Survey conducted in 2011, in which patient demographics and disease patterns were found to be similar. Data were collected from 220 public and private health care providers chosen by a stratified random sampling and from patients accessing primary care services. Data were gathered through structured interviews.

Using the Data

The study's results were incorporated into *Malaysian Health System Research Volume 1: Contextual Analysis of the Malaysian Health System March 2016* and also resulted in a scientific publication. In response to these results, the government decided to pilot enhanced PHC services from July 2017 to July 2018.

Kenya:
Assessing Satisfaction of Patients and Providers

Data collection methods: provider questionnaire, patient exit interview

The health system in Kenya has been decentralized since early 2013, but the country needs to report on national health-sector progress as a whole, including for its international commitments (such as the SDGs). This led to a key question of how to conduct M&E in a decentralized system to address variation across the 47 counties.

In 2016, patients and providers were surveyed using structured questionnaires adapted from tools recommended by WHO and previously used in Kenya to conduct assessments for the Ministry of Health. The surveys focused on perceptions of care as well as objective experiences to capture both patient satisfaction and patient experience. The provider survey focused on experiences with providing health services and included a section that emphasized issues in the working environment that affect service delivery and outputs. Collection tools were standardized across counties and facilities, and patients were interviewed using an onsite exit survey.

Collecting the Data
Technical assistance was provided by WHO, the U.S. Centers for Disease Control and Prevention, and a local university supporting the Ministry of Health. Facilities included in the sample (hospitals and PHC clinics) were nationally representative and covered a representative mix of patients and provider staff. Evaluators recorded patient responses and used tablets to enter the data into the District Health Information System 2 (DHIS2), a web-based system that allows countries to aggregate and analyze their data; provider staff filled in the provider questionnaires.

Using the Data
A gap analysis and satisfaction index were used to interpret the data and create a report in the context of broader priorities for improvement. Client satisfaction levels were assessed on a five-point scale for quality aspects such as respect and dignity, prompt attention, history taking, autonomy, cost of treatment, availability of medicines, and comfort of amenities available at the facilities. The individual indices were then used to compute an overall client satisfaction index. Results were disaggregated by facility managing authority, gender, socioeconomic status, education level, and religion. In many areas of needed improvement, patient and provider priorities were aligned. Counties will disseminate the findings to ensure that the feedback is addressed at the facility level.

Data collection method: patient exit interview

Health facility managers in Ghana have been taking steps to improve measurement of experiential quality at the facility level. A number of district hospitals and health centers are implementing quarterly patient surveys to obtain data on patient satisfaction and patient experience.

Collecting the Data
A standard survey with questions adapted from existing quality assurance tools in Ghana is used for patient exit interviews at facilities of different levels. It covers many critical components of experiential quality, ranging from perception of the health facility and services to clinician practices, waiting times, and care received. A non-health worker who is unknown in the district interviews a random sampling of patients after they have received a service.

Using the Data
Results of the survey are compiled and reviewed by facility managers, who can then address the issues identified—such as long wait times or problems with staff attitude. Actions that have been implemented as a result of these assessments have included improvements to patient flow, posting of a permanent medical officer in hospitals, trainings for staff on patient rights, enhanced privacy during clinical visits, and better adherence to screening procedures for older populations.

CHILE:
ADAPTING OECD QUALITY MEASURES

DATA COLLECTION METHOD: SURVEY

In Chile, PHC is provided by teams that typically consist of a GP or family doctor, dentist, nurse, midwife, nutritionist, psychologist, social worker, and physiotherapist. In 2016, the country reviewed its PHC indicators and found that nearly all of the 700-plus PHC indicators were about processes. To focus more on improving health, rather than alignment with a checklist of activities, Chile adapted and implemented the OECD's Patient-Reported Experience Measures (PREMs) and Patient-Reported Outcome Measures (PROMs).

COLLECTING THE DATA
Chile conducts an annual user satisfaction survey, containing mostly subjective questions, in all health facilities. To obtain more objective data on patient experience for comparison across different groups (such as urban versus rural), the country adapted the OECD PREMs survey and began piloting the resulting tool in exit interviews. The original tool contains only five questions, but Chile increased this number to 24 to emphasize quality of service delivery, including access barriers, time spent with the clinician, receipt of easy-to-understand directions from the provider, and the opportunity to ask questions or raise concerns during the appointment. When the final results of the pilot are obtained, Chile will undergo a second process to narrow down the questions to those found to be most useful.

PROMs was first implemented in Chile in the More Smiles for Chile dental program by adapting the Oral Health Impact Profile (a self-reported oral health status tool that evaluates the impact of the program on its beneficiaries, provider performance, and resource allocation) to the Chilean context. This tool was validated for Chile and translated into Chilean Spanish. In the municipalities, this tool is used to survey a representative sample of 2.5% to 5% of program beneficiaries. Other PROMs are being piloted in other areas of health, such as respiratory rehabilitation and alcohol and drug consumption.

USING THE DATA
Use of PREMs and PROMs data has been found to benefit both patients and clinicians. Understanding patient views on treatment has helped ensure that care is more acceptable to patients and is delivered as effectively as possible. Variations in PROMs results across municipalities have provided critical information for resource allocation, with lower-performing municipalities receiving fewer resources.

MEASURING COMMUNITY ENGAGEMENT
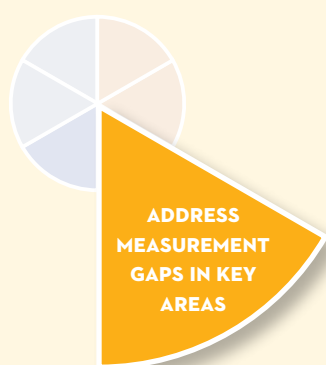
OBJECTIVE		To identify appropriate data collection methods for assessing community engagement
WHO IS INVOLVED?		Planning teams, M&E officers, systems and facility managers, frontline providers, patients, communities
TOOLS		» Data collection methods » Data collection tools

ADDRESS MEASUREMENT GAPS IN KEY AREAS

DEFINITIONS OF *COMMUNITY ENGAGEMENT* VARY AMONG COUNTRIES AND INSTITUTIONS, but they often employ themes of empowerment, social accountability, and rights. WHO's regional office for Europe defines community engagement as a "process by which people are enabled to become actively and genuinely involved in defining the issues of concern to them, in making decisions about factors that affect their lives, in formulating and implementing policies, in planning, developing and delivering services and in taking action to achieve change."

In this toolkit, community engagement refers to a range of practices that increase the ability of a health system to respond to the needs and expectations of the population and engage community members in the design, planning, and governance of PHC services. Evaluation of this nuanced concept is challenging because community engagement itself is frequently used as an evaluation tool—for example, to assess how the community feels about clinic services or whether a health education campaign was successful. This chapter focuses on evaluating community engagement *processes*, such as promoting participation in activities, the community's sense of empowerment and autonomy, and community involvement in decision-making—rather than the use of community engagement techniques to evaluate programs.

Why Measure Community Engagement?

Community engagement can help patients and health system managers create a shared vision of success for population health. Diverse and active feedback from communities allows for targeted responses to local priorities, supports the responsible use of health services, and improves equity, trust, and system resilience. Assessment of community engagement activities helps ensure that these programs are implemented effectively and can be sustained.

Observation of community meetings can yield a significant amount of qualitative data and contribute to a deeper understanding of how and why community members engage. Information gained can include the tone of the meeting, the number of times individuals speak, the quality of contributions, and the extent to which all participants are included in the discussion. Tools such as checklists can help observers record their observations for analysis.

Communities are dynamic and ever-changing. Just as the evolving characteristics of the community will affect engagement programs, the engagement process itself may modify some community attributes. In fact, some community engagement activities are undertaken with the explicit goal of influencing the community—such as changing social norms that are hazardous to community health. In selecting assessment methods, it is important to consider not only the type of program being assessed but also the role of various social factors, including:

- Social norms
- Community cohesion
- Resources available to the community
- Involvement of community leaders
- Feedback mechanisms in the community or at local health facilities

How to Measure Community Engagement

The first step in evaluating community engagement is to consider the intended goals of the engagement activities. Different goals require different measurement questions and data collection methods. **Figure 4** maps typical goals of engagement activities to increasing levels of community decision-making power, which may be thought of as increasing levels of participation in the design, planning, and governance of PHC services.

Service providers should have a role in evaluating community engagement. Clinicians and health care providers may feel overlooked if their views and opinions are not represented in assessments of community engagement activities.

When adapting assessment methods to social norms, it is important to get feedback from a range of experts who understand the local context.

FIGURE 4.

Public Participation Spectrum

Inform	Consult	Involve	Collaborate	Empower
Community members are informed of their rights and informed about system-wide changes.	Community members provide feedback on specific aspects of the design, planning, and governance of PHC services.	Community members are engaged throughout the design and planning of PHC service improvement.	Community members work closely with planning and management teams on an ongoing basis to determine priorities, identify challenges, and develop solutions.	Community members play a meaningful role in the design, planning, and governance of PHC services.

Increasing Levels of Community Decision-Making Power →

Adapted from the Public Participation Spectrum developed by the International Association for Public Participation

The following methods are commonly used to evaluate community engagement:

- **Vignette.** Community members are presented with standardized hypothetical scenarios and are asked to walk through how they would act and respond.

- **Key informant interview.** In-depth structured or semi-structured questionnaires are conducted with community members who have primary knowledge of the community engagement activities.

- **Focus group.** Groups of individuals are gathered to discuss their views and experiences of community engagement, under the direction of a facilitator. These groups may be diverse or made up of participants with shared attributes, such as gender, ethnicity, or religion.

- **Direct observation.** Evaluators attend engagement events—such as community forums—either as silent observers or as participant observers.

- **Community survey.** Data are collected from a representative sample of the community through written questionnaires or in-person surveys.

> *Community engagement can be an effective strategy for empowering and amplifying community voices. But when community members feel that their views are met with resistance or inaction, the effect can be a sense of general disempowerment and discouragement.*

Table 10 provides an overview of data collection methods that can be useful for measuring community engagement in terms of relevance, affordability, complexity, reliability, validity, and utility.

TABLE 10.
Methods for Measuring Community Engagement

	Relevance	Affordability	Complexity	Reliability	Validity	Utility
Vignette	• Measures these goals: » Consult » Involve » Collaborate » Empower	• Developing a standardized scenario for individual discussion with all participants can be moderately labor intensive.	• Vignettes must be validated before use. • Allows for testing of concepts that may be difficult to observe. • Vignettes should be based on the local health context.	• The use of an "anchoring vignette"—a brief example using standardized terms—can be valuable for overcoming differences in interpretations of questions and ensure that respondents and evaluators have the same understanding of concepts.	• The research team that develops the vignettes can control for confounding variables in a way that is not possible in real-life situations.	• Vignettes allow evaluators to understand the reasoning used by community members when making decisions and can inform efforts to increase capacity at all levels.
Key Informant Interview	• Measures these goals: » Inform » Consult » Involve » Collaborate » Empower	• Preparing for, conducting, and codifying interviews can be time and resource intensive, especially if many interviews are conducted.	• Unstructured interviews, which may be a more effective way to truly understand an individual's reasoning, often require a level of trust that must be developed over a series of interviews. • Semi-structured interviews may be easier to implement, but the complexity of identifying and recruiting participants is still a factor. • Interviewers must be highly trained.	• The interviewer may influence the validity of responses received.	• Useful for understanding an individual's perspective, but results from a single interviewee cannot be generalized to an entire group or population.	• Strategic interviews with key members of the community can be an effective way to understand community perceptions and identify solutions.

	RELEVANCE	AFFORDABILITY	COMPLEXITY	RELIABILITY	VALIDITY	UTILITY
TABLE 10. **Methods for Measuring Community Engagement** CONT'D						
FOCUS GROUP	• Measures these goals: » Inform » Consult » Involve » Collaborate » Empower	• Can require less time and fewer resources than individual interviews while still yielding rich qualitative data. • Existing community groups may be used as sources of participants. • Small stipends may be given to participants.	• Group size should be between six and 12 participants who are ideally unknown to one another before the discussion. • Moderator must be trained to guide the discussion toward meaningful responses. • In some cases, gathering groups by shared identity (such as patients or women) can elicit more candid responses because respondents may feel safer.	• Given the open-ended nature of focus group discussions, reliability will depend on the skills of the moderator and the quality of the questions presented. • Audio recording can be used to record discussions and increase the reliability of the analysis.	• The group environment can help participants clarify their views and allow them to voice agreement and disagreement. • Moderators must prevent the dominant group opinion from drowning out opposing voices. • Conversation and debate that emerge through guided discussion increase the likelihood of cross-verification of views.	• Conversation will often reveal priorities and topics of importance to the community.
DIRECT OBSERVATION	• Measures these goals: » Consult » Involve » Collaborate	• Training and use of observational techniques are highly labor and time intensive.	• Requires standardized training of observers. • Each level of observation—complete observer, participant observer, and complete participant—is labor intensive, but more so as the level of participation increases. • Participant observers and complete participants should be paired with a separate note taker.	• A standardized grading rubric can guide direct observations and help ensure reliability of results. • Assessments made by second reviewers can be used to ensure the dependability of the initial results.	• Subject to observation bias. • Validity of findings may depend on the researcher and the relationship developed with the community while observing. • Deeper levels of engagement by may cause the observer to lose objectivity.	• Depending on the level of participation, may invite collaboration between community leaders and health system workers. • Community members are not prompted for responses by evaluators, allowing for important insights into community priorities.
COMMUNITY SURVEY	• Measures these goals: » Inform » Consult » Involve » Collaborate	• Conducting interviews at patient homes can be costly, especially if multiple visits are required to connect with patients. • Phone surveys are an option, but this introduces risk that findings will not be representative due to cell coverage limitations, shared phones, wrong numbers, etc.	• Location of clinic and households, regional languages, staff availability, and any external technical support can influence complexity. • Introduces challenge of patient confidentiality if multiple individuals are home when interview is conducted. • Existing outreach mechanisms, such as CHWs, may be used to increase outreach and improve feasibility.	• Interviewer can affect how candid the respondent will be. • For self-administered surveys, clear questions, layout, and instructions are essential for eliciting useful responses.	• Increased likelihood of reaching individuals who both have and have not had direct experience with community engagement, which can help researchers understand how effective the activities are and why programs are not reaching some populations.	• Provides an important indication of the reach of community engagement activities. • Depending on the sampling method chosen, may capture the breadth of community experiences, including members who have not had direct experience with engagement activities.

In some cases, it may be advantageous to employ multiple methods to obtain a more comprehensive view of community engagement. Each method comes with tradeoffs that should be evaluated within the context and measurement goals. (See Box 5 for an example.)

BOX 5.

Tradeoffs in Methods for Assessing a Community Forum

The best data collection method to use depends on what is being measured and in what context. For example, consider a district health manager who wants to understand how effective a community forum is at capturing representative feedback from the community. She knows that if many community members do not attend the event, or if the atmosphere does not encourage honest feedback, the forum will not be successful.

Her priorities include:

» Understanding how well attended the forum is by different segments of the population

» Identifying whether the feedback received is representative of the entire community

» Identifying ways to improve subsequent forums

The facility manager considers the options. To assess the effectiveness of a single forum, she decides that hypothetical vignettes are not likely to yield relevant data. Systematic data collection using community surveys, key informant interviews or focus groups may require too much time or too many resources. She chooses to use direct observation and develops a checklist to track attendance and guide evaluators through the process of capturing how often different members of the community provide feedback.

Table 11 describes tools developed by JLN countries to collect data on community engagement, along with their measurement focus.

TABLE 11. Tools Used by JLN Countries to Measure Community Engagement			
Country	**Tool**	**Measurement Focus**	**Description**
Bangladesh	Selection of best community clinic	• Availability and adequacy of facility infrastructure • Facility organization and management • Knowledge management • Adherence to guidelines • Sanitation and patient safety • Proactive population outreach	A brief survey that collects data through health facility visits where key structural items, including cleanliness, organization, and management, are assessed alongside provider practice and local engagement.
Indonesia	Rechecking instruments for the implementation of Desa Siaga	• Facility organization and management • Engagement meetings held • Content of engagement meetings • Organizational structure of community engagement	A checklist that provides a strong foundation for evaluating engagement activities, from the implementation of community forums to the content of those forums and how decisions made during forums are acted on.
Kenya	Integrated Primary Healthcare Services Monitoring Tool Complemented by Guidelines on Monitoring and Evaluation of Primary Facilities in Kenya	• Facility organization and management • Availability of drugs and equipment • Availability of services • Provider training • Provider practice • Patient experience • Hygiene and safety • Organizational structure of community engagement • Proactive population outreach	A guide based on the Guidelines on Monitoring and Evaluation of Primary Facilities in Kenya that leads evaluators through an assessment of key results areas related to management and governance of facility services, population outreach, and community involvement using a combination of staff interviews, chart audits, and a review of administrative documentation.

Creative Solutions for Common Challenges

- Low survey response rates may be due to practical considerations related to question complexity. Short, directed questions that require simple responses are often the most efficient way to gather information and ensure useful responses. Bangladesh addressed low response rates by allowing responses to be submitted even if all questions had not been answered.

- Interpretations of nuanced interactions can be heavily influenced by preexisting beliefs. When recruiting evaluators, it is important to be explicit with them about acknowledging their individual biases and continuously reflecting on how these biases may affect interpretation.

- In focus groups, elite members of the population are in a stronger position to make their opinions heard and may drown out the voices of others. Engaging directly with marginalized populations—including women or poorer people—can be important to ensure that a representative sample of voices is heard.

Table 12 lists resources developed by the global community to support assessment of community engagement.

TABLE 12.
Additional Resources on Measuring Community Engagement

Tool or Resource	Source	Measurement Focus	Description
Standard Coding Scheme Meeting Evaluation	Transparency for Development	• Citizen empowerment • Citizen participation • Consultation • Involvement • Collaboration	A protocol for collecting qualitative and quantitative data on citizen participation in key components of an adapted community scorecard intervention. It includes several questions and modules that can be adapted to specific community engagement programs.
Citizen Empowerment Survey	Transparency for Development	• Citizen empowerment • Knowledge	A survey built around a series of vignettes that are designed to reveal the underlying sense of empowerment of individual citizens before the start of the intervention and after completion.
Assessment of Community Empowerment and Social Capital	Transparency for Development	• Citizen empowerment	A method of assessing broader community empowerment through analysis of data from baseline and end-line community surveys. It does not focus specifically on PHC, but it may provide a helpful foundation for assessing empowerment and social capital in any context. The research team based this protocol on a World Bank working paper titled "Measuring Social Capital: An Integrated Questionnaire."
Social Accountability E-Guide	World Bank	• Citizen empowerment • Citizen participation • Consultation • Involvement • Collaboration	A comprehensive online guide that includes methods, modules, and background information on implementing and assessing a range of social accountability activities. It steps through the implementation process, from scoping entry points through evaluation, and provides additional methods of community engagement and expands on concepts introduced in this chapter.
	saeguide.worldbank.org/		

GHANA:
INSTITUTIONALIZING COMMUNITY ENGAGEMENT THROUGH POLICY ALIGNMENT

DATA COLLECTION METHOD: FOCUS GROUP

To address health inequities on the path toward UHC, Ghana adopted the Community-based Health Planning and Services (CHPS) model in 1999. CHPS has shifted the emphasis from facility-based service delivery to a program of mobile, community-based care provided by community health nurses (CHNs) and community health officers (CHOs). With a catchment area of about 3,000 individuals, each CHO offers health education, immunizations, family planning services, and prenatal, delivery, and postnatal care directly to community members.

Shared ownership is an important component of CHPS. Local facilities known as "community health compounds" are built using land, materials, and labor sourced from the local community. The facilities are managed by community health committees—made up of community representatives—who also oversee CHOs and CHNs who have been posted to communities and provided with a motorcycle for transportation.

COLLECTING THE DATA
Focus groups have been used at all levels of the CHPS model to understand local priorities and gain insight into implementation challenges. Qualitative assessments are performed by the National Monitoring and Evaluation program to understand the views of community members, workers, supervisors, and district leaders and identify where problems exist, how they affect progress, and how they can be overcome.

USING THE DATA
Data are circulated electronically to all districts to provide an overview of CHPS successes and challenges. At the national level, assessments are made to understand where problems are occurring and where to deploy additional support to develop plans to address them. Findings are often presented at regional and national gatherings.

Data collection method: direct observation

In Indonesia, community engagement activities have been implemented to promote a sense of shared responsibility for health outcomes. They have helped accelerate improvements in areas ranging from safe childbirth to communicable disease management. The Ministry of Health's Desa Siaga program supports community health through outreach programs complemented by community-based schemes that finance nutrition and supplementary food programs, programs that support expectant mothers, and hygiene and sanitation programs.

Desa Siaga relies on community participation. Civil society organizations play a vital role in implementation, especially in areas where political will is weak. They facilitate outreach and recruitment of community health volunteers, conduct trainings, initiate advocacy work, and work with academics to conduct research and gather data.

Collecting the Data
A standardized checklist is used to collect data on and evaluate Desa Siaga programs. Each level of the system (national, provincial, district/municipal, and subdistrict) is encouraged to form a task force to support Desa Siaga monitoring and functioning. Community participation is the primary engine of Desa Siaga programs. Local task forces help determine priorities, implement program activities, and work with government, academics, and other stakeholders to conduct research and gather evidence of success and improvements.

Using the Data
The results of the assessment are reported at coordination meetings (known as Desa Siaga forums) that take place at every level of the health system and include participants from government, academia, and civil society. The meetings are held biannually at the national and provincial levels and quarterly at the subdistrict and village levels. Communities can participate in setting priorities based on their own needs and interests as well as work with health system representatives to review progress and discuss ways to make improvements. Research results are also disseminated through policy notes, briefs, and presentations during regional action planning meetings, where regulators from various sectors are invited to attend, listen, and make presentations.

DATA COLLECTION METHODS: COMMUNITY SURVEY, DIRECT OBSERVATION

In response to a shortage of clinicians and public demand for more accessible clinics, Bangladesh launched a program in 1998 (which was revitalized in 2009) that uses public-private partnerships to increase access, reduce costs, and strengthen continuity of care. The Community Based Health Care (CBHC) program involves community groups and community representatives in clinic management and community education efforts, including spreading awareness of the services offered. Community health care providers offer a wide range of essential health services in the clinics, manage referrals, and implement educational programs to strengthen appropriate care-seeking behaviors within the community. Routine M&E efforts use performance indicators for specific areas of care, including prenatal care and noncommunicable diseases.

COLLECTING THE DATA
Monitoring indicators are selected based on their ability to provide insight into population coverage, continuity of care, and referral pathways; they are often coupled with independent clinic evaluations. At the clinic level, direct observation and a review of administrative recordkeeping are used to evaluate the frequency of community group meetings. A survey tool is used to assess the functioning of community groups as well as group efficacy.

USING THE DATA
Clinic outreach priorities are reevaluated at community group meetings according to population needs identified in surveys. Survey data are communicated to the central office of the CBHC program, which reviews them in the context of DHIS2-reported data and analyzes them to identify areas for improvement and identify an annual "Best Community Clinic."

Data collection methods: mixed methods

In Cameroon, accountability mechanisms are used at all levels of the health system and consist of a combination of self-evaluation, observation, and a desk review of administrative recordkeeping. The unit of engagement—the district health committee (DHC)—is considered to be functioning if at least 50% of the activities identified in the health district development plan have been carried out during the evaluation period.

Collecting the Data
Each district carries out a self-assessment that includes a review of administrative recordkeeping and data collection using indicators outlined in the 2016–2020 National Monitoring and Evaluation Plan. These indicators examine the regularity of DHC meetings as well as the outputs achieved and actions taken after the meetings. Suggestion boxes placed in hospitals facilitate regular feedback from patients and care providers on the functioning of institutions and help prevent corruption in health facilities.

Using the Data
At coordination meetings, health system leaders, civil society organizers, and community leaders discuss progress and activities and agree on actions to be carried out and discussed at the next meeting. These meetings conclude with a specific action plan that participants agree to carry out and report on at the next convening; the plan provides an important way to hold all key parties accountable for improvements that align with the National Monitoring and Evaluation Plan.

PART 03

MANAGING DATA AND LINKING DATA SOURCES

CHAPTER 06	IMPROVING DATA QUALITY
CHAPTER 07	LINKING AND MANAGING DISPARATE DATA SYSTEMS

Data collection is only one aspect of assembling data that can be translated into information that decision-makers can use to make improvements. It is also critical to ensure that data are of high quality, accurately reflect reality, are obtained from the most appropriate data sources, and are readily available and accessible to key stakeholders when needed. Chapter 6 provides guidance and tools to support data quality improvement, and Chapter 7 describes how to link and centralize data across disparate sources through the development of a data warehouse.

IMPROVING DATA QUALITY
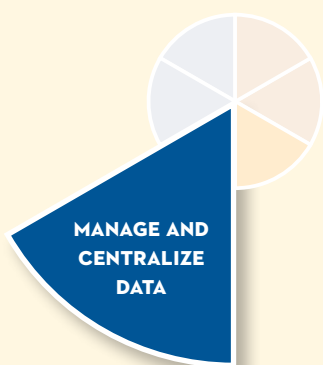
MANAGE AND CENTRALIZE DATA	**OBJECTIVE**	To understand the key factors that affect data quality and identify strategies for improving data quality
	WHO IS INVOLVED?	Data producers and consumers, including information system managers, financial managers, planning teams, M&E officers, providers, and policymakers
	TOOLS	» Data Production Lifecycle Tool » Data Quality Review Checklist

DECISION-MAKERS NEED DATA THAT ARE ACCURATE, COMPLETE, AND TIMELY in order to make decisions that lead to improvement. If they do not trust the quality of the data, they will not use it; and if they use low-quality data, they may make the wrong decisions.

High-quality data are both reliable and valid. Reliable data are replicable: if the same assessment is conducted multiple times, the results should be the same. Valid data reflect reality. Validity can be further broken down into internal and external validity. Internal validity means the data are a true representation of the sample; external validity means the findings can be generalized—for example, to the entire population.

The Data Production Lifecycle

Data production means the process of managing how data are handled, from the point of data collection to the submission of data for use by decision-makers. The data production lifecycle consists of five stages, as shown in **Figure 5** : data collection, data entry, report generation, data review, and report submission. When data are first collected, they are called *source data* or *raw data*. Once they have been verified and errors have been corrected, they are called *clean data* or *validated data*.

> *The most important step in improving data quality is ensuring the quality of the input at the source. The phrase "garbage in, garbage out" describes the reality that if data quality is poor at the beginning, it will still be poor once the data are cleaned and validated.*

Understanding the factors that affect data quality and diagnosing at which stage of the data management lifecycle an error has occurred allows practitioners to identify opportunities to improve data management processes and produce better-quality data. The Data Production Lifecycle Tool (Table 13) describes each step of the data management lifecycle, including the key factors that affect data quality, common challenges that can reduce data quality, and strategies for improving data quality.

Combine clinical and administrative training to support data collection by staff at lower levels.

FIGURE 5.
Data Production Lifecycle
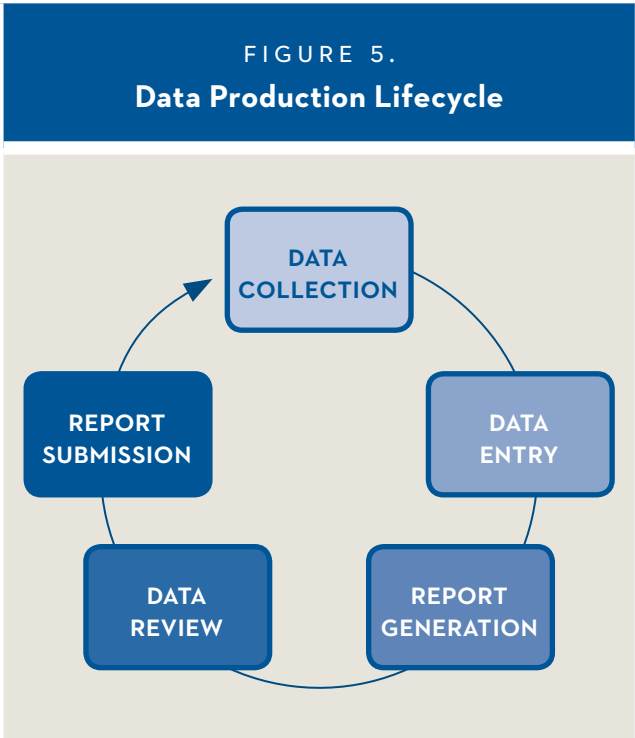
GHANA:
IMPROVING DATA QUALITY

Data quality improvement activities in Ghana are designed to address every point at which data quality might be compromised. Tools used to minimize errors and ensure uniformity in reporting include:

» Standardized registers with definitions

» Standardized reporting forms with definitions

» Tally books

» District Health Information Management System (DHIMS2) platform for data storage and data retrieval

» Data entry checks in DHIMS2 (e.g., the male side of the form is blocked for the reporting on malaria during pregnancy)

TABLE 13.
Data Production Lifecycle Tool

Lifecycle Stage	Description	Factors Affecting Data Quality	Data Quality Challenges	Strategies to Improve Data Quality
Data collection	Point at which data are observed or collected; often performed by administrative or clinical staff at the site of care, but can also be performed by other evaluators (e.g., when a survey is conducted).	• The biases and other qualities of the individual collecting the data or the patient providing responses • Data collection method or tool being used • Competency and training of the staff collecting the data • Conditions or environment in which the data are collected	• Patients do not give accurate information. • Data collection instrument does not record accurate information. • Staff or evaluators are inadequately trained in data collection. • Data collection process was rushed or not a priority for staff or evaluators.	• Educate patients on the importance of providing accurate information. • Use prompts or additional questions to ensure more accurate results. • Use accurate and feasible data collection instruments. • Implement a process for data quality assurance (e.g., clinical audits). • Ensure adequate evaluator and staff training in data collection. • Provide supportive supervision for data collection.
Data entry	Point at which data are recorded into a paper-based or electronic system. Performed by administrative staff, clinicians, or other evaluators.	• Quality of source data • Legibility of source data (e.g., written notes from patient files) • Competency of the person entering the data • User-friendliness of the data entry process	• Transcription errors occur in translating data from source documents. • Errors occur during data entry.	• Institute dual entry and cross-checks by two or more staff. • Complete data entry during the data collection stage to avoid errors resulting from delays. • Use scanning or automated digital methods to upload the data. • Redesign and streamline the system to improve usability.
Report generation	Point of aggregation and analysis of data and development of reports. Performed by information officers or data clerks.	• Aggregation and analysis process • Level of standardization of report requirements • Timely availability of data required for report • Relevance of report content in the context of current data needs	• Manual aggregation methods may be subject to human error. • Inadequate data user input into report content leads to misalignment with needs. • Reports are too complex and time-consuming to produce. • Data entered are incomplete, late, or otherwise of poor quality.	• Automate aggregation and analysis of data (e.g., using dashboards). • Standardize the reporting cycle and source databases. • Engage report producers and consumers to improve report format and submission timelines.
Data review	Verification of data included in the report. Performed by the team of data producers and manager responsible for report submission.	• Whether data used to compile the report are accessible for verification • Whether methodology for compiling the report is defined	• Reviewers are unable to verify data quality. • Date of data file used is not indicated. • Data in report are not based on actual data collected.	• Identify the data source. • Indicate the date of source data. • Evaluate metadata when data from different electronic systems are combined, to guard against data transfer errors. • Produce and share standard operating procedures for data collection and reporting among data producers and data users.
Report submission	Point of circulation of validated report. Performed by the manager responsible for producing the report.	• Staff competency to perform signoff	• Report signoff done for compliance without stringent review.	• Note that requiring multiple signoffs for high-level reports can improve report quality but lead to later submission. • Limit authorization for report signoff to improve accountability for the quality of the report. • Debrief with the team after report submission to refine the process.

Reviewing Data Quality

Data users who review reports that have been through the data production lifecycle must determine their level of trust in the quality of the data. Ideally, the standardized data management process can ensure the technical soundness of the report and ensure that the original data and analysis results have been validated. However, even within a strong data management structure, it is important for data users to routinely review the validity and reliability of the data they receive.

The Data Quality Review Checklist (Table 14) lists considerations that can help data users ascertain the quality of data within a report. Engagement between data users and data producers is important for data quality because it helps ensure consistency of terms and analysis throughout the data quality hierarchy.

It is helpful when reviewing a report to consider several elements of data quality, as shown in Figure 6 . The highest level of quality can be assured when the data are substantiated by other sources through a process of triangulation, or external cross-validation; however, this is not always practical or necessary. The most fundamental indicator of data quality is the completeness of the data in the report. A report with a large portion of the data pending or omitted does not meet minimum reporting standards.

FIGURE 6.

Data Quality Hierarchy

TRIANGULATION/
CROSS-VALIDATION

VERIFICATION
BY DATA PRODUCERS

INTERNAL VALIDATION

TIMELINESS

COMPLETENESS
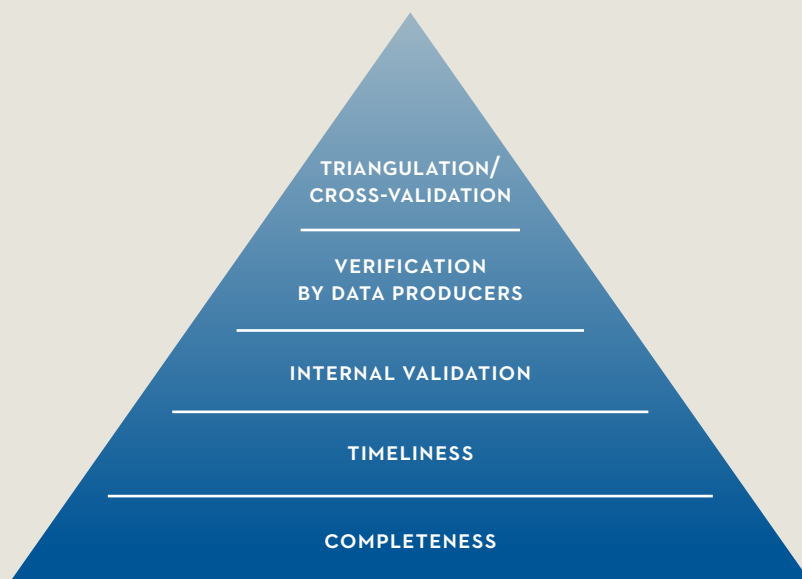
TABLE 14.
Data Quality Review Checklist

Data Quality Check	Description	What to Investigate	Recommended Actions
Data completeness	• Is the report missing a lot of data? • Does the report contain many duplicate entries?	• Determine with the data producer whether the cause of missing data or duplicates is related to random errors or systematic errors. • Determine whether the problematic data element adds value to support decision-making. • Are the "missing" and "zero" values distinguishable? • Understand what indicators and denominators were used in the report.	• Standardize reporting requirements. • Streamline the data collection process. • Improve data collection capacity (e.g., through staff training). • Diagnose the relevance of the indicator and/or determine whether a proxy indicator is available.
Frequency of data submission	• How often are data received (daily, weekly, monthly)?	• Do a quick check to see if the data are similar to the last few reports; identify variations to be discussed with the data producer.	• Standardize the reporting submission process. • Teach data producers to identify variations before submitting the report. • Assess the utility of the current frequency of data submission.
Data integrity checks for internal validity	• What is the method of data entry (paper-based or electronic)?	• Is the information submitted a product of technically sound methodology, and is a quality assurance process in place?	• Support data producers in incorporating a quality assurance process. • Advocate for improved information systems and infrastructure to support more robust aggregation methods.
Data verification	• Who owns and has signed off on the report?	• Is there an audit trail of source data being signed off on?	• Ensure that a mandatory data verification and signoff process is in place.

Monthly Validation of Reports

In Ghana, monthly validation of reports conducted using the DHIMS2 platform include completeness and timeliness of data. Facilities that have not reported data are contacted by phone and email. Data quality rules and integrity checks are also built in: for example, there should normally be more prenatal care registrants than prenatal care attendances, and it is not possible for small health facilities to have no attendance for a particular month and yet report new registrants. These discrepancies are reported to health facilities for correction. A data verification manual shows health workers how to verify the quality of data and what actions to take.

CAMEROON:
ENLISTING PARTNER ORGANIZATIONS TO CONDUCT REGULAR ASSESSMENTS

Cameroon enlists partner organizations to conduct standardized quality assessments every six months. These are performed by trained health personnel, which helps ensure reliable and valid data. Facility staff are also motivated to ensure data quality because problems that are documented using high-quality data are addressed more quickly by the department of health.

Creative Solutions for Common Challenges

- Random spot-checks can help improve the validity of data collected by health workers. In Bangladesh, random spot-checks of health cards (patient-held records) during supervisory visits helped improve the validity of data collected by community health care providers.

- Mentorship programs can help staff improve data quality. Tamil Nadu instituted mentorship programs to support field supervisors. Ghana identified skilled personnel at lower levels of the health system and designated them as champions to ensure high data quality.

- A standardized national quality assurance process can help ensure data quality. In Rwanda, data quality is assessed at every level of the health system. Monthly online reports alert central data managers of missing values. The system also uses quarterly audits and employs internal hospital and health center validation teams.

- To address poor oversight of data collection among district directors, data management can be added as a criterion for evaluating their performance. Ghana has had challenges in ensuring data quality because of lack of interest in data among some district directors of health services. Some regional directors have assigned district directors an active role in data management and use it as one of the criteria for assessing district directors' performance.

Table 15 lists resources developed by the global community to support assessment and strengthening of data quality.

TABLE 15.		
Additional Resources on Improving Data Quality		
TOOL OR RESOURCE	SOURCE	DESCRIPTION
IMPROVING DATA QUALITY: A GUIDE FOR DEVELOPING COUNTRIES	WHO	A comprehensive toolkit that guides policymakers, administrators, and health system managers through the process of evaluating and improving data quality. It also includes guidance on mitigating the impact of poor data quality.
	www.wpro.who.int/publications/pub_9290610506/en/	
IMPROVING DATA QUALITY IN MOBILE COMMUNITY-BASED HEALTH INFORMATION SYSTEMS: GUIDELINES FOR DESIGN AND IMPLEMENTATION	MEASURE Evaluation	A mobile health guide that examines data quality improvement strategies, with a focus on decentralized modes of data collection. It complements the guidance and tools outlined in Chapter 7.
	www.measureevaluation.org/resources/publications/tr-17-182	
DATA QUALITY REVIEW TOOLKIT	WHO	A toolkit that presents a framework for strengthening routine assessments of facility-reported data and simplifying processes.
	www.who.int/healthinfo/tools_data_analysis/en/	

CHAPTER 07

Linking and Managing Disparate Data Systems
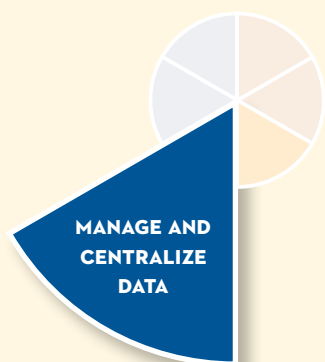
OBJECTIVE		To understand the key steps and considerations in setting up a data warehouse
WHO IS INVOLVED?		Policymakers, information managers, infrastructure and technology managers, legal departments, cybersecurity specialists, financial managers, planning teams, M&E managers
TOOLS		» JLN Open Health Data Dictionary » Technical Integration Use Case Checklist » Data Mapping Template » Data Warehouse Checklist

MANAGE AND CENTRALIZE DATA

In many countries, health information systems and data sources are fragmented—owned by different organizations or stakeholders—which makes it difficult for data users to access the information they need when they need it. Often these systems develop in isolation, rely on different technologies, and store data in different ways, requiring sophisticated technical solutions to link and centralize the data.

A *data warehouse* is an electronic platform or system that brings disparate data sources together in one place and provides access to the right data at the right time. In many ways, a data warehouse is structured like a library or a bank: content is organized in a logical way so it is easy to retrieve when needed. When supported by a strong data governance process, the result is a system that supports data analysis, visualization, and communication for decision-making.

Setting Up a Data Warehouse

Practitioners can develop an approach for setting up a data warehouse in five key steps:

1. Establish a governance structure

2. Publish norms and standards

3. Set up reference registries

4. Determine priorities for technical integration

5. Define the scope of the data warehouse

1. Establish a Governance Structure

A strong governance structure is critical for establishing a data warehouse. The governance body should include experts who understand the needs of the data warehouse users, as well as experts who understand the technical underpinnings of the data and information system. Key considerations for establishing the governance structure include:

- Which government agencies need to be represented in the governing body?

- Who should chair or co-chair the governing body?

- What should the mandate of the governance structure be?

The governing body will evaluate the national eHealth strategy and determine a roadmap for achieving an integrated information system. Key questions that an eHealth strategy should address include:

- Why is a national eHealth plan needed?

- What will the national eHealth plan need to achieve?

- How will the national eHealth plan be implemented?

What Is eHealth?

WHO defines eHealth as the use of information and communications technology (ICT) for health. This includes hardware, software, electronic communication and information systems, governance structures, and policies that are part of the health system.

Ghana:
Transitioning to a Data Warehouse to Promote Transparency

In Ghana, integrating routine service and program data, clinical data, and insurance data has been a challenge due to a lack of coordination in data collection among institutions and programs. To promote transparency and accountability, an initiative is underway to link and organize data using DHIMS2, a platform that uses census data as the denominator and aggregates information ranging from logistics and health finances to disease, immunizations, and human resources. This initiative is supported by a strong eHealth strategy.

Bangladesh:
Transitioning to a Data Warehouse to Reduce Duplication

In 2009, Bangladesh rolled out a policy initiative called Digital Bangladesh 2021 to advance digitization of health information and create a data warehouse to solve a major health system issue: the duplication of data and reports. DHIS2 was chosen as the technology platform for the warehouse because it was free and open-source. In 2011, GIZ (Deutsche Gesellschaft für Internationale Zusammenarbeit) supported the customization of a DHIS2 dashboard to support monitoring and decision-making.

2. Publish Norms and Standards

Every data system stores data in a particular format and follows norms and standards in recording, storing, and transferring data. These norms and standards ensure consistency across different data systems and ensure that future technology developments will align with existing systems. They also ensure that the data being transferred are secure. Protocols related to encryption and access rights are also of particular importance when working with patient-level data.

A *health data dictionary* can be used to govern the development and use of norms and standards for recording and storing data. It lists and defines the data elements and data formats, including the attributes of data elements that are used or captured in a database. It also provides guidance on interpreting and representing the data.

The Open Health Data Dictionary (openHDD) is an application (available at www.openhdd.org) developed by the JLN Information Technology Initiative for creating and storing data dictionaries. (See **Figure 7** for an illustrative screenshot.) It is a collaborative, web-based, free, open-source application that promotes interoperability among the various information systems used in health care. openHDD allows practitioners to write definitions for indicators and data elements and share this information on the web as XML or PDF files.

FIGURE 7.

Open Health Data Dictionary
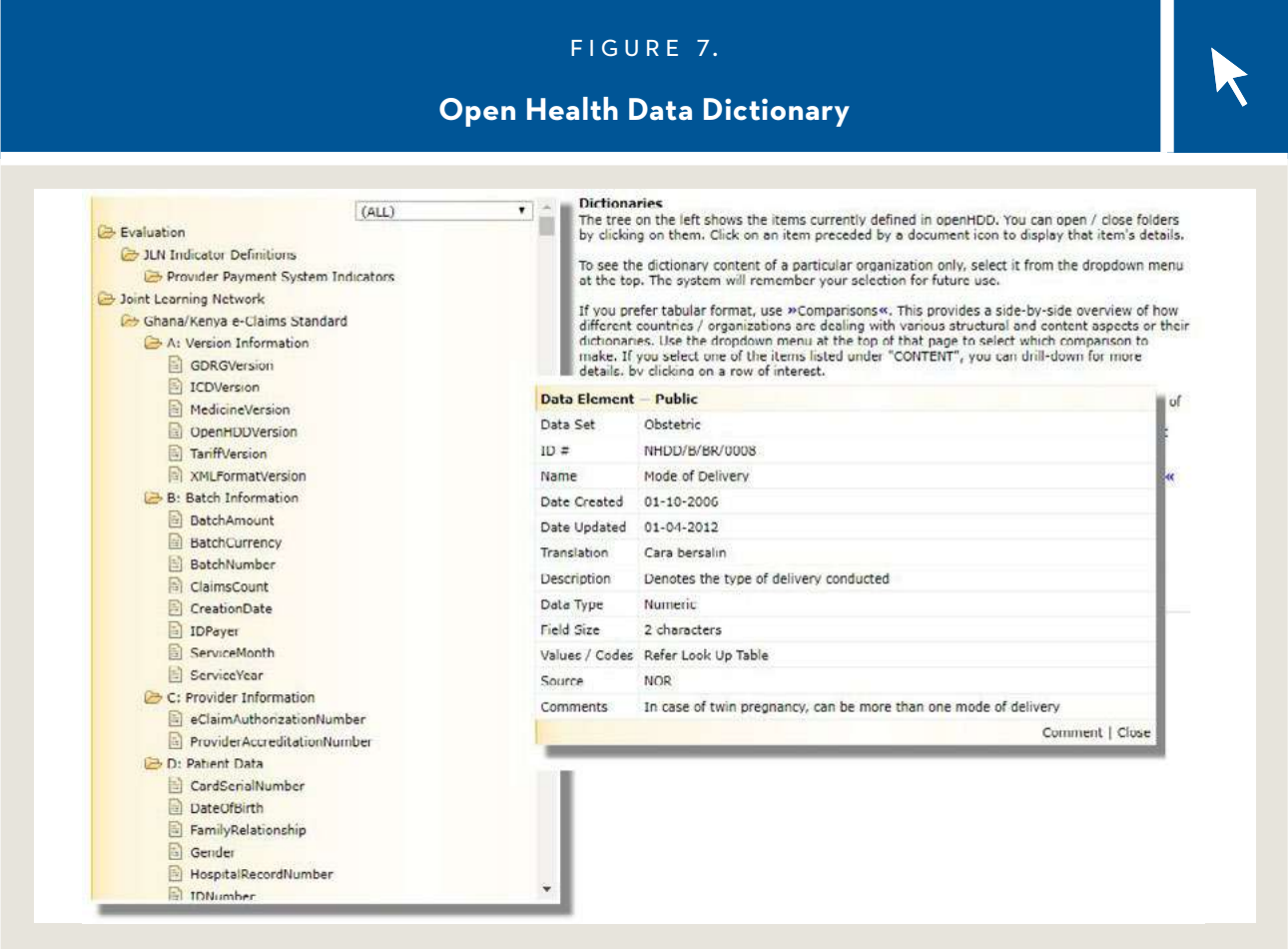
Norms and standards also govern the format in which data are imported to and exported from other systems. In some cases, data can be exchanged directly between systems if they already share the same structure, but often an intermediate layer is needed to convert data to the structure of the receiving platform. This layer is known as a *health information exchange*. A health information exchange is an information technology system that securely manages the linking of data systems. It ensures that the data transferred from one data system to another are readable to the receiving system and are recorded in a standardized way so they can be aggregated correctly.

EXAMPLES OF STANDARDS FRAMEWORKS

Tamil Nadu, India, has embarked on a data warehousing program to link health information in state databases and in isolated systems at the national level. The central government built a single health management information system based on international standards, but the transition of all data to this repository is ongoing.

Ghana aims to support information sharing across government services so data are available anytime to anyone who is authorized to access them. A government interoperability framework supports these principles.

3. Set Up Reference Registries

Registries, or master lists, are trusted sources of shared data that multiple users and systems can use. These registries use standardized terminology and definitions so data elements and indicators from different sources can be matched and linked.

The following registries are important examples to consider:

- **Patient/client registry.** Maintains demographic information related to patients in the system. This is synonymous with a patient master index (PMI) and master patient index (MPI).

- **Provider / health worker registry.** Maintains provider data such as name, contact information, and role within the health system.

- **Facility registry.** Maintains information on all health facilities, including name, physical location, services, and contact information. This can be maintained in a national data dictionary that curates and manages any changes in facility details.

Chile:
Integrating Disparate Systems for a National Registry

In the mid-2000s, Chile found that 30 different software platforms were being used across municipalities to collect health data. Although each municipality can choose its own software provider, Chile has defined an interoperability strategy to make information available to all levels of the health system. Information is centralized in the Nucleus of Sectoral Health Information Assets, with the aim of making information available to support continuity of care and decision-making in direct care.

Chile developed pillars of interoperability that allow for continued advancement in this area. They include a patient identity manager, a terminology server, standards, advanced electronic signature, and a minimum basic set of data for the electronic clinical record.

Benefits from this strategy are already apparent and include integration with information systems from the National Registry and Identification Service, allowing for a national-level patient database. The strategy has also allowed Chile to implement additional integrations that generate value, such as electronic clinical record integrations with patient imaging and laboratory data. Information is made available to patients and facilities through a web portal.

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4. Determine Priorities for Technical Integration

There are many points within the health system where data must be shared or aggregated, and one of the most difficult steps in establishing a data warehouse is determining the order in which data systems should be integrated.

In determining the priorities for technical integration, two areas are important to consider: the effort required to integrate the data and the supporting information required of the data users. (See step 5.)

> *When possible, adhere to existing business processes that staff and managers are accustomed to using. In Ghana, stakeholders worked together to map out business processes in the well-known paper-based systems before discussing how those processes could be supported by technology.*

The practical considerations for determining the level of effort needed to integrate data sources include:

- The technical readiness of the system for integration, particularly whether the system meets minimum standards for interoperability

- How easy it will be to access the data, based on data ownership

If a data warehouse doesn't include the information decision-makers need, it will not serve its ultimate purpose and will likely be met with resistance. An effective approach to understanding user requirements is to develop a series of *technical integration use cases* based on the data that are required. Use case scenarios map out the sequence of information requirements in a real-world setting.

The Technical Integration Use Case Checklist (shown in Table 16 with information from Ghana) can be useful for identifying the technical feasibility of integration, as well as required activities.

If the data are owned across multiple institutions, access to the information might depend on establishing institutional arrangements, which can be a lengthy process. It is crucial to start identifying data ownership early in the process.

GHANA:
TECHNICAL INTEGRATION USE CASE

Ghana started by integrating inpatient and outpatient data because the database and indicators were very stable and the variables collected were easily understood. The data are owned by the Ministry of Health, which means there are no restrictions on data access. The beneficiaries of the integration were national, regional, and district managers, who could better assess the number of patients accessing clinics and the flow of patients within the PHC system. The next area to be integrated is immunization data.

USE CASE:
Integration of aggregated inpatient and outpatient headcount data

What is the status/quality
of the input data elements?

GOOD. Database and indicators were very stable, with minimal changes occurring annually. The variables collected were also easily understood, which meant that data quality was generally better.

How easy is it to **ACCESS** the databases for integration?

How feasible is the **TECHNICAL INTEGRATION**?

Who would **BENEFIT** from the use case?

Database owned by Ministry of Health

National, provincial, and district managers

What **DECISIONS** can the integration support?

All the data are collected on the same DHIMS2 platform

Able to assess facility utilization rates and resourcing

TABLE 16.	
Technical Integration Use Case Checklist (Ghana Example)	
USE CASE CONSIDERATIONS	**COMMENT**
SOFTWARE DEVELOPMENT Low level of effort required—the input data are all from the DHIMS2 platform.	Software already exists and only requires customization.
BENEFICIARIES National, district, and facility managers. They are familiar with the software, and integration will improve the aggregation of data, enable monthly comparisons, and improve data quality.	Integration will be beneficial to multiple stakeholders.
INFRASTRUCTURE REQUIRED Can use existing computers in health facilities and district offices. Internet connectivity will improve transfer of data. Digitization can improve timeliness and accuracy of information.	Feasible to implement with existing infrastructure.
DATA OWNERSHIP Data owned by MOH, source files are accessible.	Feasible to access the data sources.
COST IMPLICATIONS The procurement and maintenance of necessary technology as well as the staff capacity building and trainings to support its use.	Procurement, capacity building, and trainings are feasible with existing resources.

Use cases can also help minimize the redundant capture of data. If multiple systems require the same data, the data can be shared. It is important to map the data requirements of each stakeholder and identify what data the systems are collecting in order to identify areas where data is recorded more than once.

CAMEROON:
TRANSITIONING FROM A PAPER-BASED SYSTEM

Until 2010, all government departments in Cameroon used paper data collection and recordkeeping methods. Key challenges—including the logistics of storing vast amounts of paper documents as well as slow processing issues—spurred the transition to an electronic system. The country began by computerizing its civil registration system at the facility level through death registration. In the health domain, Cameroon is in the process of transitioning to DHIS2 and has identified key indicators for DHIS2 that have been validated at all levels.

The Data Mapping Template (Table 17) can help with this mapping, including identifying areas where duplication of data elements may be occurring and understanding the information requirements of key stakeholders. The table includes sample responses for an indicator measuring prenatal care coverage (4+ visits).

TABLE 17.

Data Mapping Template

INDICATOR: PRENATAL CARE COVERAGE (4+ VISITS)

TOPIC	QUESTIONS	RESPONSE
Data format	• In what format do you receive the data?	Excel spreadsheets and DHIS2 data files.
Frequency	• What is the frequency of data submission? • Is there a set data submission schedule?	Monthly (data received by the 15th of the month).
Data storage	• In what database or file do you enter or store the data after you receive them? • What computer program do you use? • How frequently do you enter/store the data? • Any challenges in entering/storing the data? • Any privacy issues when storing the data?	The data (Excel and DHIS2 files) from each health facility are imported monthly into the provincial DHIS2 software. Matching and identifying facilities is a challenge, however. Standardizing naming conventions or using a unique identifier for each facility would improve accuracy and speed up the process.
Data aggregation	• Do you perform any data aggregations? Which ones? • Using which calculations? • How often? • Are there any challenges in aggregating the data?	The data are aggregated to provide a provincial view of the indicators, with automatic drill-down to the district, subdistrict, and facility levels when the data are imported.
Data quality	• What quality checks do you perform on the data? • Are there any known issues with data quality?	Trend data are reviewed quarterly to identify deviations in the submitted data. A query is generated if appropriate. Standardized reporting tools are used and data completeness reports are run to identify missing data.
Data usage	• Do you use the data for reporting? If so, in which reports and for which purpose, and who is the audience? • Are the data used for decision-making? If so, how?	A report is generated for provincial planning. Data are aggregated to a national-level report each month to track the progress of the national indicator data set.
Data sharing	• With whom do you share the data? • In what format do you share the data (type of form, file, database, aggregation levels)? • How often do you share the data? • How do you share the data (e.g., internet, email, USB flash drive, disk, hard copy)? • Are there any delays or challenges in preparing the data and/or sending them?	Data reports are published annually to show the health system performance. Health department officials have online access to the DHIS2 file as a resource to manage their services.
Additional comments about this data element and/or indicator		

Adapted from: JLN Provider Payment Mechanisms Information Technology Collaborative

5. Define the Scope of the Data Warehouse

The requirements for a data warehouse include the hardware for capturing and storing the information, the infrastructure to support the transfer of data, tools for data analysis and system maintenance, and management staff. This section addresses key questions related to these requirements.

How much hardware infrastructure is needed?

The hardware capacity (memory and processing capabilities) needed by a data warehouse is directly proportional to the amount of data to be stored and accessed. Future additional data sources and data fields will result in an exponential increase in volume requirements. The following factors affect the performance of the data warehouse and will require increased hardware infrastructure:

- **Large data volumes.** Large files require greater data warehouse capacity and network bandwidth.

- **High frequency of updates, uploads, and downloads.** Regular system updates are important to maintain a secure network, but they may temporarily slow down processing for users. Also, high volumes of uploading and downloading require high bandwidth.

- **Applications that require high processing speeds.** Processes that convert x-rays into JPEG or PDF format when uploaded require higher bandwidth.

- **High number of concurrent users.** Many concurrent users will place strain on data warehouse processing speeds. In a single health facility, the staff and a district manager will be accessing the information at the same time. In the case of a national patient registry, every computer in every health facility in the country will be accessing the database each time a patient is registered for a health visit.

What human resources are needed to manage the data warehouse?

The data warehouse staff, who are responsible for performance and monitoring, may include:

- Project manager
- Technical solutions architect
- Developers
- Database administrator
- Data network controller

You can think of data warehouse staff as a combination of librarians (who ensure that the catalogues are correct), traffic officers (who keep the data flowing), and physicians (who constantly check the vital signs of the servers to maintain peak performance).

Key activities related to managing the data warehouse include security, authorization, and access; conducting data quality checks; auditing and reporting data warehouse usage and status, backup and recovery; and managing data warehouse storage. System updates from multiple sources will also have to be monitored and managed. To ensure efficient workflow, system updates and maintenance should be scheduled for times when they will result in the least impact on data warehouse functionality.

How will new systems identified for integration into the data warehouse be handled?

For new systems to be included in the data warehouse, they must comply with the established norms and standards. The accreditation process for new databases or systems requires additional staff to evaluate the level of compliance. Some countries establish an external body that independently evaluates new systems against agreed-upon standards; others require certification from an international standards body. There is no prescribed solution, except that capacity to conduct these tests and configurations is essential.

How will access to information within the data warehouse be governed?

The data warehouse must prevent access to data by unauthorized persons or systems while maintaining access for authorized persons and systems. This is accomplished through an authentication process that confirms the identity of any user (or machine) that attempts to access the data. Many authentication mechanisms are available, with varying strengths, but all serve this same purpose.

What kind of data disaster recovery plan is needed?

A data disaster recovery plan is a documented, structured approach for responding to incidents in which data systems go offline or a critical error results in data loss. The plan outlines precautions to minimize the impact of these incidents, such as protocols for saving and retrieving backup files and the order in which data warehouse functionality will be restored.

National databases should have local backups on the main data warehouse infrastructure as well as an offsite backup of the information in case the main storage site is compromised.

A plan should also be in place that identifies which systems are most critical if a problem with the connectivity infrastructure occurs. For example, the national patient registry responsible for supporting the authentication of patients may be considered a higher priority than location-based (geographical information system) analytics.

The Data Warehouse Checklist (Table 18) helps to guide practitioners through the process of scoping a data warehouse and ensuring that critical functions can be carried out. The steps are organized by key domains and questions.

	TABLE 18.		
	Data Warehouse Checklist		
DOMAIN	**QUESTIONS**	**DESCRIPTION**	**WHEN TO CONDUCT THE CHECK**
GOVERNANCE AND STANDARDS	Has a governance body (such as a health information advisory or technical group) been established?	A regulatory or expert review panel that provides oversight of the data integration process	Step 1
	Has a policy and legislative framework (including the necessary institutional arrangements) been established?	A governance structure for a digital strategy for the health sector that establishes the legitimacy of regulatory functions	Step 1
	Has a digital or eHealth strategy been published?	A roadmap of digital and eHealth priorities	Step 1 (recommended for review at least every 3 to 5 years)
	Have technical norms and standards been published?	Technical requirements for disparate systems to be interoperable	Step 2 (recommended for review at least every 3 to 5 years)
LANDSCAPE ANALYSIS	Have the current information systems been mapped and assessed for compliance with technical norms and standards?	Assessment of compliance with technical norms and standards of systems currently in use in the country	Step 3
INFORMATION SYSTEM REQUIREMENTS	Has the priority integration use case been identified?	Alignment of key information needs	Step 4
TECHNICAL INFRASTRUCTURE REQUIREMENTS	Have the hosting and technical platform requirements been determined?	Specification for data warehouse platform requirements	Step 5
	Is a data disaster recovery plan in place?	Backup of data warehouse information	Step 5
	Have skilled operations staff been identified?	Staff who are responsible for ongoing operations and adjustments to the data warehouse	Step 5

Table 19 describes JLN country experiences with creating a data warehouse.

TABLE 19.
JLN Country Experiences with Creating a Data Warehouse

Country	Motivation for Creating Data Warehouse	Intended Users	Data Sources Integrated	Technology Platform	Biggest Challenge(s)	Creative Solutions
Bangladesh	To streamline the production of high-quality reports for subdistrict, district, and national levels.	Program managers, policymakers, and development partners	Routine data from PHC centers, selected district hospitals, and certain private clinics	DHIS2	Ensuring data completeness and timely submission of data. Resistance from managers to complying with new data management process. Synchronization of all data sources at the national level.	Meetings with policymakers and district managers to demonstrate the utility of the dashboard for evidence-based decision-making. Showing the dashboard to journalists and encouraging them to report stories based on dashboard data.
Cameroon	To move away from paper data collection and recordkeeping, which created logistical challenges and delays in data availability	Decision-makers at all levels; technical and financial partners	Civil registration at service delivery points; key program indicators at health centers and district and regional hospitals; reference laboratories	DHIS2	Validating information before making it public. Ensuring complete and timely information.	Putting in place technical staff to validate and provide information about quality indicators.
Chile	To link 30 software platforms in use across municipalities to collect health data (including from clinical records, appointments, disease and planning strategies from different agencies, and programs and platforms associated with MOH)	Municipal, regional, and national health managers; health economists	Insurance, health records and census data; PHC and hospital performance data; historical data for trend analysis	Tableau and other business intelligence software	Integration of multiple systems.	National strategy supported by a strong governance structure that includes all stakeholders. Instead of quickly introducing new technology, Chile started by using a known tool (Excel) and ensured that staff were assigned to collect data relevant to their role.
Ghana	To promote transparency and accountability (to address suspicions originating from self-reported performance data), support managers in decision-making, and provide data security and control	Health managers, frontline health workers, academics, and researchers. Direct access to the data warehouse is restricted to Ghana health-sector officials.	Individual and aggregated routine service and program data, clinical data, and health insurance data	DHIMS2 (Ghana's adaptation of DHIS2). Migrating from a Microsoft Access–based district health information system.	Obtaining MOH financing and logistics support. Identifying skilled personnel at lower levels with the technical and clinical knowledge needed to ensure high data quality.	Standardized dashboards targeted at health managers. Dedicated cadre of staff responsible for managing health information at all levels. Working with health facility regulatory authority to embed the reporting process in the legislative framework.

				TABLE 19.		CONT'D
		JLN Country Experiences with Creating a Data Warehouse				
Country	**Motivation for Creating Data Warehouse**	**Intended Users**	**Data Sources Integrated**	**Technology Platform**	**Biggest Challenge(s)**	**Creative Solutions**
India (Kerala state)	To link health information from state databases and isolated systems at the national level	National managers and program staff, federal and state managers	HMIS data from all states in India. These data feed the national data warehouse.	National HMIS open government platform and DHIS2	Duplication of reporting and resistance to change (particularly from clinicians, resulting in difficulty enlisting medical doctors for the project management unit).	Planned system that links health information to a unique national ID.
India (Kerala state)	To link data from 20 health directorates to support decision-making	State managers in the health and family welfare directorates	Routine information systems, supply chain information, human resources information, surveillance data, state insurance data, and food safety data	Custom HMIS and web application platform	Complexity of moving to real-time data upload.	Implementation of five zones of access based on user roles. Dashboards customized for each directorate.
Rwanda	To consolidate and simplify the data management process and link multiple information systems to improve use at the national level and improve data traceability, recording, and use at the local level	MOH, Rwandan Biomedical Center, managers, M&E experts	Routine information systems, individual patient data, and survey data	DHIS2	Maintaining system interoperability between vertical information systems. Lack of broadband internet connectivity and areas of low cell coverage. Health workforce hesitancy toward transitioning to computerized reporting system.	Integration with mobile platforms for health promotion and integrated disease surveillance. Full integration of the civil registration and vital signs system.

Creative Solutions for Common Challenges

- To improve interoperability between isolated systems, separate the information required for management decisions and for clinical decisions to streamline the integration process. Integrate the data related to management decisions first.

- If health program managers are unfamiliar with or resistant to information technology, be open to their questions and concerns about the transition to a new information storage system. Ensure that staff at all levels who are responsible for collecting the data understand the benefits they will gain through a reduced administrative burden.

- Relying on external consultants is expensive and limits the ability to respond quickly to issues. Invest in internal capacity to maintain and develop the data warehouse systems. India used a global bidding process to select software developers, who were all new to the system; staff from each sector had to translate their data requirements for the developers.

Table 20 lists resources developed by JLN countries to support the process of linking and managing data systems.

TABLE 20. Data Warehousing Tools Used by JLN Countries		
Country	**Tool or Resource**	**Description**
India	Interoperability Framework for e-Governance	India's interoperability framework.
	egovstandards.gov.in/sites/default/files/Interoperability%20Framework%20For%20e-Governance%20%28IFEG%29%20Ver.1.0.pdf	
India	National eHealth Authority Executive Summary	India's national eHealth strategy.
	https://www.mygov.in/sites/default/files/master_image/NeHA%20Concept%20Note%20Eng.pdf	
Ghana	E-Government Interoperability Framework	Ghana's interoperability framework.
	https://www.ghanahealthservice.org/downloads/Ghana_eGIF_Main.pdf	
Ghana	National eHealth Strategy	Ghana's national eHealth strategy.
	www.moh.gov.gh/wp-content/uploads/2016/02/Ghana-E-Health-120504121543.pdf	
Bangladesh	Digital Bangladesh 2021	Bangladesh's national eHealth strategy.
	www.plancomm.gov.bd/wp-content/uploads/2015/02/18_Achieving-Digital-Bangladesh-by-2021-and-Beyond.pdf	

Table 21 lists resources developed by the global community to support the process of linking and managing disparate data systems.

TABLE 21. Additional Resources on Data Warehousing		
Tool or Resource	**Source**	**Description**
National eHealth Strategy Toolkit	WHO	A comprehensive toolkit that includes a framework for establishing a national eHealth vision, including guidance for an implementation plan and monitoring framework. This tool is intended for use by countries at all levels of eHealth maturity and emphasizes the continuous improvement and ongoing engagement required in any strong eHealth strategy.
	apps.who.int/iris/handle/10665/75211	
A Framework for Selecting Digital Health Technology	Institute for Healthcare Improvement	A tool that guides users through the process of selecting a digital health technology to support reductions in health care costs while improving population health and the patient care experience.
	www.ihi.org/resources/Pages/Publications/AFrameworkforSelectingDigitalHealthTechnology.aspx	

PART 04

USING DATA FOR DECISION-MAKING

| CHAPTER 08 | COMMUNICATING DATA TO KEY AUDIENCES |
| CHAPTER 09 | USING DATA FOR DECISION-MAKING |

The final part of the toolkit provides guidance on transforming data into useful information and sharing the information with key stakeholders to support effective decision-making. Chapter 8 reviews methods for visualizing and presenting data to decision-makers in simple and compelling ways, including data visualizations, and explains how to adapt communication methods to fit the needs of different stakeholders. Chapter 9 introduces a framework for identifying the systems and capacities needed for effective data collection and offers guidance on building a culture of data use.

CHAPTER

08

COMMUNICATING DATA TO KEY AUDIENCES
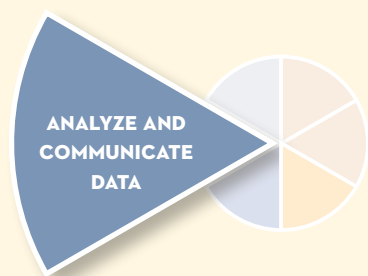
OBJECTIVE		To understand how to create simple, effective, and audience-specific data visualizations and communication plans
WHO IS INVOLVED?		Policymakers, data producers, information managers, facility managers, researchers
TOOLS		» Audience Identification Template » User Persona Template » Communication Approaches Tool » Visualization Considerations Tool

ANALYZE AND COMMUNICATE DATA

TO TRANSLATE DATA INTO USEFUL INFORMATION, they must be effectively analyzed, organized, visualized, and communicated to key audiences. This chapter focuses on the role of data communication in influencing data users—the people who may be motivated to act on the data.

Creating a Data Communication Plan

The chapter covers five key steps in creating a data communication plan:

1. Define the issue to highlight.

2. Clarify the desired action.

3. Identify the target audience.

4. Research the target audience.

5. Select the appropriate communication method.

The chapter also describes how to identify the most appropriate types of visualizations for specific audiences.

STEP 1. DEFINE THE ISSUE TO HIGHLIGHT

Defining the issue to highlight is the first step in identifying an effective data analysis and communication approach. Clearly articulating the problem helps to define what types of data are needed to understand underlying causes and potential solutions, as well as identify what data should be shared with whom.

The most important thing about data communication is not the visualization method—it's identifying the target audience. Any data communication plan should concisely articulate who is in the target audience, the desired action, and the impact of the action.

For example, a facility manager might notice that the number of facility-based deliveries has gone down. Is the cleanliness of the facility the problem, or is a lack of necessary supplies discouraging women from using the facility to give birth? To answer these questions, it may be necessary to gather additional input from facility staff or the community to better understand the problem and identify root causes. Understanding the issue helps to identify what data are needed, whether those data are available or need to be collected, and who should be targeted for data communication.

Step 2. Clarify the Desired Action

Data may be shared for a multitude of reasons, from holding others accountable to supporting continuous quality improvement. It's important to clearly articulate the goals of a data communication plan to ensure that data are shared in a way that will effectively influence action.

Step 3. Identify the Target Audience

The next step is to identify the target audience—decision-makers who can take direct action and other stakeholders who can influence those actions.

Consider the example in step 1—the facility where the number of deliveries has decreased. The target audience will depend on the underlying causes of the issue, the level of the system where the root causes can be addressed, and what actions need to be taken. Table 22 shows the Audience Identification Template filled out with information from this facility.

TABLE 22. Audience Identification Template					
Issue	Underlying Cause	System Level	Action(s)	Decision-Makers	Influencers
Decrease in facility-based deliveries	Problems with facility cleanliness	Facility	Increase hours for current maintenance staff, hire additional staff, implement regular checks for cleanliness	Facility manager (who can adjust schedules, hire staff, and implement additional reviews of maintenance staff performance)	Community members (who can voice dissatisfaction through community forums)
	Low availability of supplies	District	Improve supply chain management, highlight need for additional supplies	District health manager (who can work with regional representatives to address bottlenecks, logistical challenges, and other problems related to supply chain management)	Facility managers (who can communicate needs to the district level)
	Shortage of skilled providers	National	Alleviate staffing shortages	MOH permanent secretary (who can adjust staff distribution, increase training and recruitment)	Media (who can bring attention to the issue)

Step 4. Research the Target Audience

The target audience will determine which data visualization and communication approaches will be most effective in influencing and motivating action. Gathering quantitative data (such as demographic information) and qualitative information (gathered through review of relevant policy literature and interviews) can be useful for placing the target audience along a continuum of influence in the context of other stakeholders and the wider policy environment.

One useful technique for understanding key stakeholders and the communication approaches that will appeal to them is to create user personas:

1. **Sketch.** Find demographic information on each decision-maker or stakeholder in the target audience, along with that person's values, interests, motivations, and level of technical expertise. The User Persona Template (Table 23 , filled in for the facility-based delivery example) provides a starting point for identifying who that person is and why he or she should care about the issue.

2. **Classify.** Create categories of stakeholders based on common characteristics. This exercise can streamline data communication later on by identifying who will be motivated by data visualizations or by other types of communication approaches, such as stories.

3. **Expand.** Refine and expand the user personas until they accurately characterize key audience members. It may be necessary to add or fundamentally change some user personas during this process.

The resulting set of user personas should:

- Describe with reasonable completeness all of the important members of the target audience

- Reflect a current, not idealistic, representation of each targeted individual or group

- Highlight challenges to getting buy-in and action, as well as identify audience goals that conflict or align with those of other groups

- Enable data producers to better understand and empathize with target audiences

Audience research is not static. Over time, the target audience will change, along with attitudes and beliefs. The process of developing user personas is ongoing and requires continuous research.

Keep in mind that the action you are requesting may have benefits beyond the intended outcome. Be sure to highlight all of the potential positive effects of the desired action.

Be creative with the user persona format and include everything you think will be important to the data communication strategy. Consider each individual's professional connections, peers, friends, and former colleagues.

TABLE 23.
User Persona Template

Stakeholder:	**Opportunities to Influence:**
Facility manager	Community forums, patient surveys

Topic: Facility cleanliness	**Data Communication Method:**
Desired Outcome: More maintenance staff hired, more frequent checks of facility cleanliness **Desired Action:** Increase hours for current maintenance staff, hire additional staff, implement regular checks for cleanliness	• Community members come together to raise the topic during monthly coordination meeting to explain how poor facility cleanliness has affected them and influenced their health decisions.

Characteristics:	**Motivated by:**	**Concerns:**
• College educated • Large family • Highly engaged with community	• Compelling stories from the community • Praise • Good news • Passion for work	• Job security • Reputation in community

Stakeholder:	**Opportunities to Influence:**
Permanent Secretary, Ministry of Health	Before elections and when problems are identified, through high-level forums

Topic: Staff shortages in clinics	**Data Communication Method:**
Desired Outcome: More clinicians in each facility **Desired Action:** Adapt staffing distributions, improve retention rate of nurses	• A policy brief presented by representatives of labor unions, a district representative, or another high-ranking official • Bringing media attention to the problem

Characteristics:	**Motivated by:**	**Concerns:**
• Highly educated • Comfortable with technology • Experienced decision-maker • Good relationship with politicians and labor unions	• Positive press coverage • Praise and power • Achieving goals • Broadening political base	• Media • Not meeting targets • Job security • Other coalitions

STEP 5. SELECT THE APPROPRIATE COMMUNICATION METHOD

Data can be communicated in numerous ways, from stories and reports to scorecards and dashboards. The way data are presented is critical to how they are understood and used. Audience research helps inform the choice of communication methods. When selecting among different communication approaches, simplicity is the key: a concise set of compelling communications are often more effective than numerous or disparate messages. The Communication Approaches Tool (Table 24) aids in the selection of an appropriate communication approach by describing several common approaches and when they are valuable.

The most effective data communication method may not involve technical data visualizations. For example, some people may be more effectively influenced through verbal communication or storytelling, including personal stories or anecdotes.

When developing a dashboard, ask your audience what comparisons are relevant. Dashboards can include comparisons to peer countries or international standards, subnational comparisons, or trends.

	TABLE 24.	
	Communication Approaches Tool	
COMMUNICATION FORMAT	**DESCRIPTION**	**WHEN IT IS VALUABLE**
VERBAL	Informal interaction with an individual, such as at briefings, on phone calls, or at networking events.	Verbal communication works best when refining an idea, sensitizing audiences to information, seeking consultation from an individual, or communicating important themes. This method should be complemented by written follow-up communication.
STORYTELLING	Communication containing characters who develop during the course of a scenario.	Storytelling can provide context and add a humanizing element to the data, allowing audiences to identify with characters and empathize with their experiences.
VISUAL AIDS	Examples include posters, flip charts, and sample products.	Visual modes of communication can efficiently communicate data and concepts, but consider the environment where they will be used (e.g., advertisements in public spaces, charts shown during a presentation) and what level of complexity is appropriate for the audience.
INFOGRAPHICS	Simple, compelling visual aids that combine visualization and text to distill complex topics into understandable pieces of information.	An effective way to disseminate complex information to large audiences.
MULTIMEDIA PRESENTATIONS	A combination of content forms such as text, audio, images, animations, video, and interactive content.	A valuable communication method when presenting to multiple stakeholders at events such as conferences, seminars, or meetings. Establishes a cohesive flow of information that provides both context and depth.
SCORECARDS OR COUNTRY PROFILES	A scorecard is a type of report that measures and compares performance against projections and goals. Profiles often use a standard set of key performance indicators to evaluate performance across a range of countries, regions, districts, or organizations.	Can be effective for showing trends over time.
DASHBOARDS	Electronic representations of data from multiple reports. Dashboards can be customizable and present different views of data.	Dashboards can allow for easy comparisons of different reports or provide access to diverse data sets in one place. Scorecards can be included and viewed on a dashboard with other types of reports.
POLICY BRIEFS	A concise summary of the policy options available to deal with an issue, along with recommendations.	With a focus on impact, these brief written documents are often aimed at government policymakers and others who are interested in formulating or influencing policy.
PUBLIC SERVICE ADS	Incorporates health messaging into channels of communication already used by the population.	Public service ads using radio and other media are most effective for relatively simple messages that must be communicated quickly and broadly.
SMS / SOCIAL MEDIA	Social media campaigns may focus on spreading key messages or ask users to provide updates and information in real time.	These campaigns can communicate simple messages that require engagement with a wide audience.
EDITORIAL CARTOONS	Easily understandable visualizations that distill high-profile, complex messages and make readers feel included in the topic.	This method is especially valuable for communicating a clear point of view and when the language and visualization align with the technical level of the target audience.

Kenya has implemented a number of tools that allow local governments to better identify and implement health-promoting interventions and allow communities to hold their local and national government accountable. One such tool is the African Leaders Malaria Alliance (ALMA) RMNCH scorecard. ALMA is a coalition of African heads of state who share the goal of addressing the major health challenges facing the continent, including malaria, health financing, and reproductive, maternal, newborn, and child health (RMNCH). Subnational scorecards, which provide disaggregated data for each indicator assessed, are understandable to policy advocates and technical staff as well as to community members.

The Ministry of Health articulated clear objectives for how this tool would help Kenya accelerate progress toward global goals for maternal and child health, including:
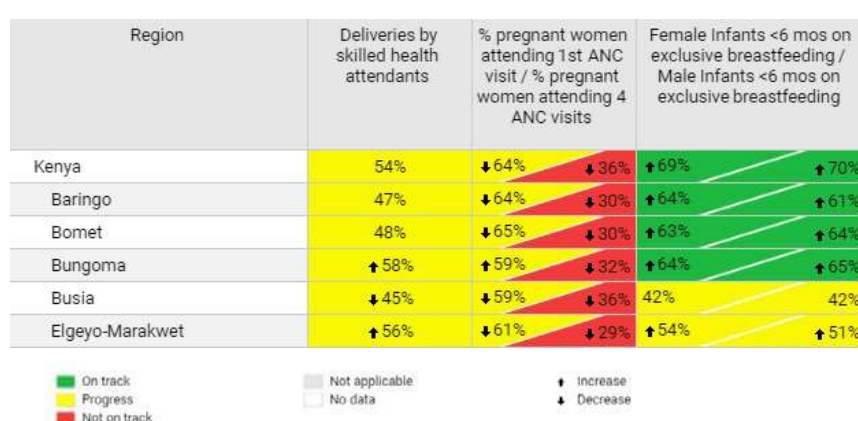
- Promote accountability and accelerate action to improve RMNCH performance outcomes

- Track performance at national and subnational levels for key indicators

- Identify areas of strong performance and incentivize improvement

Indicator selection for this scorecard was based on information that would be most useful—rather than information that already existed in the monitoring framework—and plans were drafted to make progress in areas where indicators were not immediately available. After testing of each selected indicator for utility and validity, the final list included 26 indicators.

Use of this scorecard has allowed for deep assessments of counties with the highest maternal mortality ratio and has supported the integration of the scorecard's core indicators with existing information management systems.

After instituting a subnational RMNCH scorecard, Kenya conducted an internal audit to examine how the tool was being used throughout the country, identify best practices, and develop resources to highlight strong examples of data capture, reporting, and scorecard use.

The following visualization is an example of national and subnational comparisons. The first row indicates progress throughout the country, and subsequent rows break down progress by region, allowing policymakers, health system actors, and global partners to identify areas that need improvement.

Region	Deliveries by skilled health attendants	% pregnant women attending 1st ANC visit / % pregnant women attending 4 ANC visits		Female Infants <6 mos on exclusive breastfeeding / Male Infants <6 mos on exclusive breastfeeding	
Kenya	54%	↓64%	↓36%	↑69%	↑70%
Baringo	47%	↓64%	↓30%	↑64%	↑61%
Bomet	48%	↓65%	↓30%	↑63%	↑64%
Bungoma	↑58%	↑59%	↓32%	↑64%	↑65%
Busia	↓45%	↓59%	↓36%	42%	42%
Elgeyo-Marakwet	↑56%	↓61%	↓29%	↑54%	↑51%

- 🟩 On track
- 🟨 Progress
- 🟥 Not on track

- ⬜ Not applicable
- ⬜ No data

- ↑ Increase
- ↓ Decrease

Ghana's health system uses different data visualizations for different target audiences. Targeted DHIMS2 dashboards provide up-to-date, actionable information to busy senior health system managers, who rarely have the time to complete their own analyses. The dashboards include both technical and contextual information that managers need in order to make evidence-based decisions.

Compare the visualization below from Ghana's DHIMS2 to the ALMA scorecard visualization from Kenya shown earlier. The target audience of the DHIMS2 visualization is clearly more technical. While the ALMA scorecard is color-coded in a clearly understandable way, the DHIMS2 visualization requires the user to interpret trend lines and understand the noncommunicable disease burden in context of other health priorities in Ghana. A data user looking at this visualization might decide to increase refresher trainings for clinicians, with an emphasis on diagnosis and management of noncommunicable diseases, or may ask for analyses of these data to determine which population group carries the greatest disease burden and develop targeted interventions based on the findings.

Four-Year NCD Trend
Ghana

Legend: Sickle Cell Disease, Asthma, Cardiac Diseases, Diabetes Mellitus, Hypertension
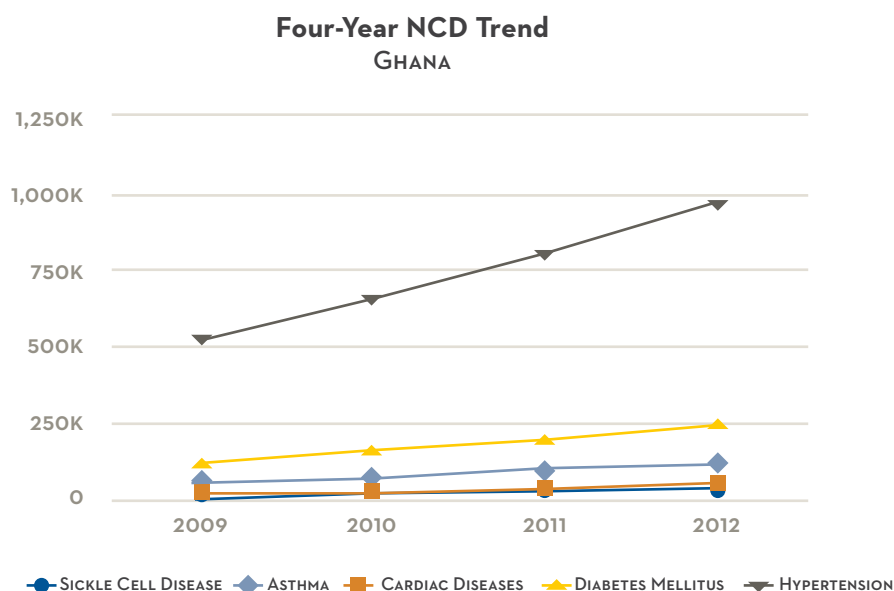
Visualizing Data

The most appropriate type of visualization will depend on the selected communication approach and the technical level of the audience. Here are tips that apply to both basic and advanced visualizations:

- Identify the key message.

- Select visualizations that focus on meaningful data comparisons and relationships.

- Use the simplest visualization that adequately conveys the desired message.

- Eliminate distractions within graphics, particularly too many colors or lines.

- Annotate charts to highlight interesting findings.

Don't be afraid to ask for audience feedback. Asking data users whether the visualizations show them what they need to know can yield insight into how to improve the effectiveness of the visualizations.

When creating charts, consider the following questions:

- How many variables will be included?

- How many data points will be included?

- Will the chart depict change over time?

Table 25 describes popular visualization types and what they are best used for.
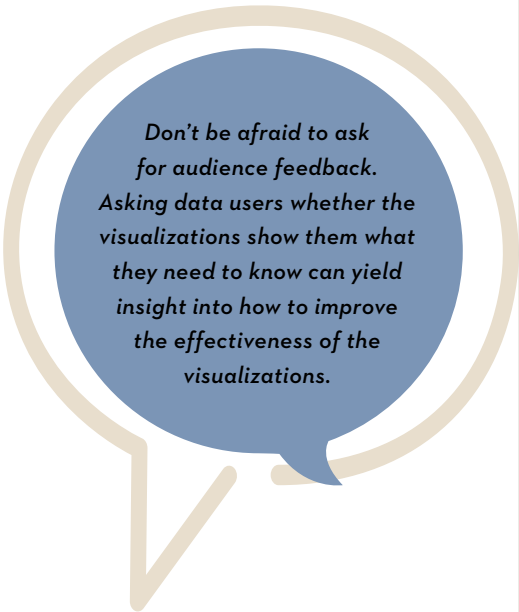
TABLE 25. Visualization Considerations Tool		
Visualization Type	**What It Demonstrates**	**What It Is Best For**
Column Chart	**Comparison**	Comparing values across categories
	Can also use: line chart, bar chart, or circular area chart	
Scatter Chart	**Relationship**	Showing correlations between two variables
	Can also use: bubble chart	
Stacked Column Chart	**Composition**	Indicating parts of a whole
	Can also use: waterfall chart, stacked area chart, pie chart	
Column Histogram	**Distribution**	Showing variation in a single category over time
	Can also use: line histogram, scatter chart, 3D area chart	

Combining Visualization Types

Visualization types can be combined to show different types of comparisons. For example, the accompanying visualization from Ghana's DHIMS2 shows the geographical distribution of maternal death throughout the country as well as the magnitude of the problem, using shading to indicate severity.

Map of maternal mortality ratio
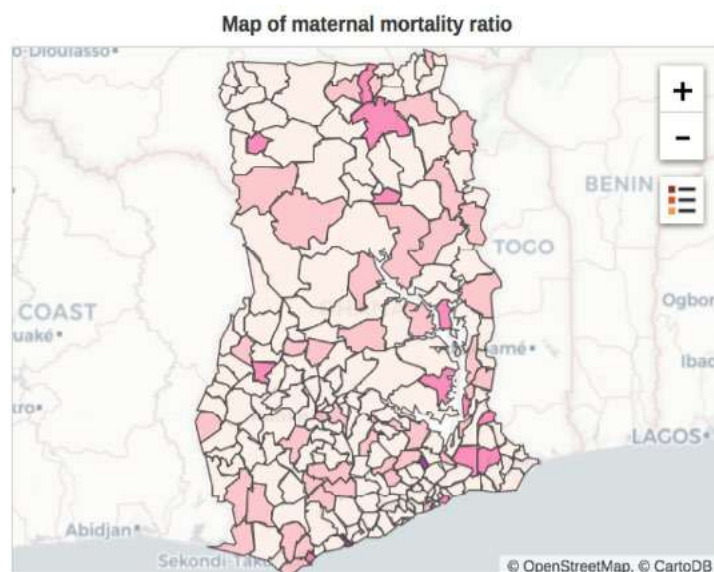
Using Data Visualization Software

Data visualization software can facilitate the creation of graphs or routine data updates (e.g., for a performance management dashboard). When selecting such software, important factors include specific country requirements, overall cost of use and ownership, scalability, ease of use, adaptability, and sustainability. Numerous comparisons of analytic and visualization platforms have been performed, and some are publicly available. (See Table 26 .) Evaluating and selecting visualization software should be a careful, collaborative process. Criteria to consider include:

- Visualization, sharing, and export capabilities

- Features and product details

- Intended users (number and types)

- Data integration features

- System maturity, support, and ability to upgrade

- Administrative controls

- Compatibility with other systems in use (e.g., Microsoft Office)

- Hosting platform required (e.g., Microsoft Windows, Linux)

- Web-based visualization software vs. desktop-based software

To improve the use of data for decision-making, Nigeria is strengthening data visualization and communication strategies. Previously, it reported routine immunization data using the District Vaccine and Devices Monitoring Tool, a paper-based strategy with limited options for data visualization. To address the urgent need to improve routine immunization and routine immunization data quality, the country adopted DHIS2 to establish the country's first electronic, online, real-time reporting platform. This allowed for the creation of data visualizations at all levels and has made it possible for those with data oversight responsibility to remotely track the performance of data reporting units and provide feedback.

The example below shows a visualization from the Nigerian DHIS2.

1a. Reporting Rates (Public and Private facilities)
(Target: 95%)
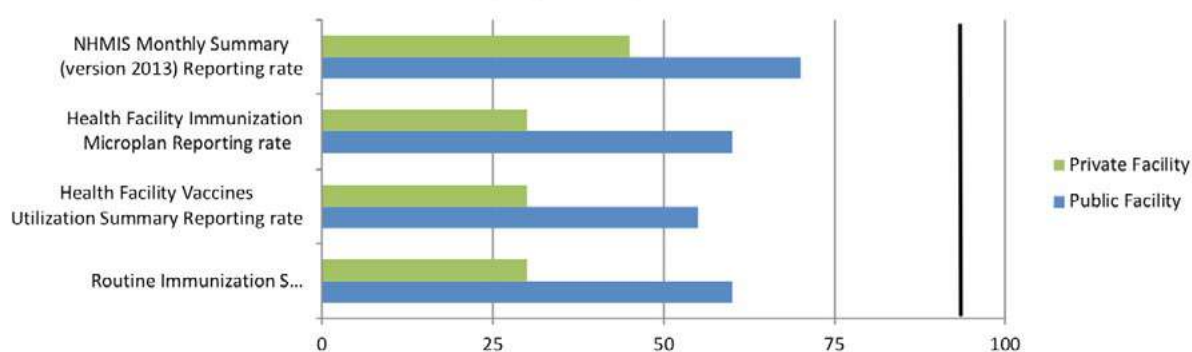
To address the need for easily interpreted information for PHC performance monitoring and analysis, Chile developed an interactive dashboard to generate performance profiles for each commune. These dashboards, powered by Tableau software, integrate and visualize PHC data from across municipal and nonprofit organizations to improve decision-making from the municipal health level up to the Ministry of Health.

Using integrated data, the dashboard reveals gaps, identifies trends in certain key indicators, and highlights investment opportunities for communes. Each indicator on the dashboard is defined and mapped to specific domains and objectives.

For example, the indicator description for community density of PHC professionals includes:

- A clear description of the indicator

- Links to the relevant objectives

- Description of the numerator and denominator, so it's easy to understand how the indicator is calculated

- The data source and update frequency

- Guidance on how to interpret the indicator

In the visualization of the indicator, the communes' performance is represented by a horizontal bar graph. Each commune is easily identifiable on the x-axis. The norm is based on Pan American Health Organization standards for the density of professionals in the entire health system (at least 25 professionals per 10,000 inhabitants nationwide), which corresponds to the total number of doctors, nurses, and midwives. In this visualization, the target is 23.76 professionals per 10,000 inhabitants, as indicated by the red dotted line. Communes that have reached the target have a blue graph bar; the others have orange bars. A high-level snapshot of the number of communes achieving the target is also indicated alongside the number of communes who have yet to reach this target (four vs. 28, respectively).

Densidad comunal de profesionales en APS cada 10.000 habitantes

Estándar Ideal
23.76

Comunas bajo Estándar Ideal	Comunas sobre Estándar Ideal
28	4

Promedio
15.56

Communes result represented by a blue bar as it meets the target

Communes result represented by an orange bar as it is below the target

Target of 23.74 indicated on the x axis
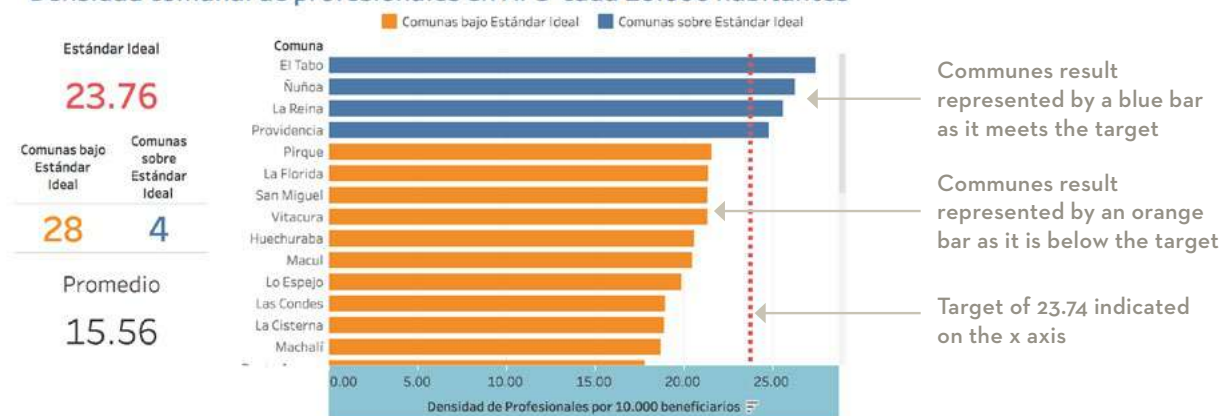
Creative Solutions for Common Challenges

- When presenting data to multiple audiences in a single report, avoid trying to address the unique interests of each audience. Instead, select a set of key points to communicate and demonstrate how these points are relevant to all of the audiences. It is also helpful to present the data in a logical sequence, from the most aggregated data (which is often most relevant to policymakers) to the most granular data (often more useful to on-the-ground implementers).

- When presenting data, orient the audience to the big picture with an opening context-setting statement or visual. For example, if the goal is to demonstrate that the maternal mortality rate is high in a selected area, visualize this within the context of all maternal mortality in the country.

- Be prepared for technology glitches, from faulty hardware to poor internet connectivity. Have a backup plan, such as sending soft and/or hard copies ahead of a presentation. Limit the use of visualizations that require high-resolution projections or those that make sense only when presented in color.

- Avoid having the data communication format be dictated by the technology you are using. Instead, focus on the best medium for communicating data to your target audience. In Ghana, different modes of visualization—ranging from DHIMS2 dashboards to charts and global scorecards—are used for different target audiences.

Table 26 lists resources developed by the global community to support and strengthen data communication strategies.

TABLE 26. Additional Resources on Communicating Data		
TOOL OR RESOURCE	**SOURCE**	**DESCRIPTION**
VISUAL ANALYSIS BEST PRACTICES	Tableau Software	A comprehensive guide to creating compelling data visualizations.
	www.tableau.com/sites/default/files/media/whitepaper_visual-analysis-guidebook_0.pdf?ref=lp&signin=c3750e05f7af0074dd7d71738ba39fac	
DATA VISUALIZATION THAT WORKS: FACILITATING HIV PROGRAM TARGETING: CASE EXAMPLES AND CONSIDERATIONS	MEASURE Evaluation	A report that explores how data visualization can be used to promote improvements and strengthen decision-making in HIV programming.
	www.measureevaluation.org/resources/publications/wp-16-162	
GUIDE TO DEVELOPING USER PERSONAS	Usability	A concise guide to developing a user persona.
	www.usability.gov/how-to-and-tools/methods/personas.html	
UNIVERSAL HEALTH COVERAGE DATA PORTAL	WHO	A tool that provides interactive maps and underlying data to visualize key indicators related to UHC.
	apps.who.int/gho/cabinet/uhc-service-coverage.jsp	
GLOBAL BURDEN OF DISEASE (GBD) RESULTS TOOL	Institute for Health Metrics and Evaluation	A tool that shows what can be accomplished using effective data visualization.
	www.healthdata.org/results/data-visualizations	

OBJECTIVE		To identify the systems and capacities needed to effectively use data for decision-making and to identify strategies for building a culture of data use
WHO IS INVOLVED?		National and subnational leaders, planning teams at all levels, clinical and subnational program managers, HMIS director, M&E officers, local public health institutions, frontline providers, development partners
TOOLS		» Systems and Capacities Checklist » Data for Decisions Worksheet

USE DATA FOR DECISION-MAKING

THE PREVIOUS CHAPTERS OF THIS TOOLKIT focused on methods and strategies for identifying and collecting the right data, ensuring data quality and accessibility, translating the data into useful information, and communicating that information to support evidence-based decision-making.

In practice, however, decision-makers often face growing amounts of data that are neither analyzed nor presented in understandable ways, so much of the data are often left unused. Decision-making, planning, and improvement efforts are also affected by many other factors, from politics and the media to limits on resources and capacity. In this context, practitioners must find ways to ensure that measurement is a driving factor behind decision-making.

This chapter focuses on improving the use of data that are collected by establishing a culture of evidence-based decision-making. Culture change is a difficult process, requiring both time and resources to implement effectively. The strategies and examples outlined in this chapter can serve as a guide for achieving this change.

The Data to Improvement Pathway

The Data to Improvement Pathway (**Figure 8**) shows the steps for identifying and collecting the right data and translating those data into information, communicating the information to increase knowledge, and using it to make decisions and take action. The pathway begins with a clear articulation of the measurement question, and while it is presented as series of steps, it is not linear: adjustments and feedback are necessary every step of the way.

FIGURE 8.

The Data to Improvement Pathway

DATA
- What data do we have?
- What data do we still need?
- How are data collected, compiled, and stored?

INFORMATION
- From our data, what indicators can we assess?
- How can data be analyzed, organized, and usefully presented?

KNOWLEDGE
- What is the meaning of this information within our context?

DECISION
- Based on our knowledge, what decisions are needed to spur improvements?

ACTION
- How should decisions be implemented?

IMPROVEMENT
- Do our data show that action resulted in improvement?

Systems and Capacities to Support Data Use

Every step of the Data to Improvement Pathway requires the right systems and capacities:

- **Systems** must be in place to enable data collection, such as for indicator selection, data collection, data storage, data quality assurance, and information technology for sharing and receiving data. Systems beyond data management are also required, including for communication, accountability, quality improvement, and resource allocation.

- **Individual and team capacities** are required to produce data (reliably collect, analyze, visualize, and communicate data) and consume data (understand and respond to data).

The use of data analytics will be different at different levels of the health system. Increasing the capacity of managers at all levels of the system—facility, district, state, and national—to understand data analytics and improve data management can support the stronger use of data.

The Systems and Capacities Checklist (Table 27) outlines the critical systems and capacities needed to effectively implement each step of the Data to Improvement Pathway .

TABLE 27.
Systems and Capacities Checklist

Step	Relevant Toolkit Chapter(s)	Systems	Capacities
Data	Chapters 1–7	• Effective HMIS, civil registration, and vital statistics • Routine health and demographic surveys • Manual or electronic data collection tools and management and storage systems • Systems to receive and store data from lower levels and report data to higher levels • Data quality assurance and validation systems	• Personnel trained in data collection, data quality assurance, data management, and reporting • Leadership to identify priority indicators and data elements
Information	Chapters 6–8	• Technology, such as software, to convert data elements into needed indicators • Ability to identify trends, outliers (positive and negative), variation, and emergent situations, and to compare data across system levels and locations	• Training of data and system managers in data analysis, interpretation, and visualization
Knowledge	Chapter 8	• Systems, platforms, and data visualizations to facilitate the review, interpretation, and communication of performance results • Key stakeholders and decision-makers to interpret information and determine if action is needed, including setting targets	• Technical knowledge and skills, as well as contextual knowledge and management across different data sources • Effective communication skills
Decision	Chapter 9	• Articulation of required decisions across system levels, as well as the decision-makers • Systems for communicating data to decision-makers at appropriate levels • Appropriate policies, a favorable political environment, and transparency • Supervision down to the facility level to understand the context and standard guidelines and protocols	• Training in management, data literacy, quality improvement, systems thinking, and empowerment for decision-makers • Capacity to convene a diverse set of stakeholders, including the community • Decision-makers with the authority to make decisions
Action and Improvement	Chapter 9	• Systems and resources to translate decisions into action plans and implementation • Systems for M&E action plans, including feedback mechanisms between higher and lower system levels	• Leadership commitment, time, resources, and change-management and technical skills to develop and execute action plans • Institutionalized quality improvement processes • Adaptive management (described later in this chapter) • Ongoing M&E to assess change • Training and mentoring

Tamil Nadu, India:
Building Systems and Capacities for an HMIS Rollout

In Tamil Nadu, HMIS rollout began in 2008 with support from the World Bank. A critical first step in strengthening information flow through technology was ensuring that the right infrastructure and supplies were available at all primary care centers and subdistrict and district hospitals. This included computers for data entry as well as adequate training for field staff and nurses. Increases in technical resources were matched by training opportunities for staff, including a required training course and IT coordinators at the district and state levels to conduct analyses and prepare reports. A data feedback system was developed in which data move from the PHC center to the district and then to the state. At the state level, M&E staff oversee data quality in each district, and data are fed back to the district and facility levels on a weekly basis during supportive supervision visits.

Engaging Decision-Makers

Effective decision-making requires that the right decision-makers are convened, that they can identify and access the data they need, and that a process is in place for making decisions and for subsequent planning and implementation. But first they must understand their purpose in using the data. At the facility and subnational level, data are often used in a more operational capacity; at the national level, data are largely used for purposes related to review, strategy, and planning.

The Data for Decisions Worksheet (Table 28) provides a set of key questions to consider when articulating the decisions to be made and identifying the stakeholders, data, and processes needed to support them. The table includes sample responses.

> *Thinking ahead about the purpose of data can inform which data from the routine system should be regularly reviewed and reported, what changes should be made to the routine HMIS to address measurement gaps, and what novel data should be collected to answer new or emerging questions.*

TABLE 28.
Data for Decisions Worksheet

Key Questions	Sample Responses
What decision needs to be made or influenced?	A regional manager notices that the region is not on track to meet annual performance improvement goals for maternal mortality. After identifying and reviewing the data for the facilities with the worst maternal mortality rates, the manager realizes that a targeted skill-building intervention at these clinics is needed to reduce maternal mortality.
At what level of the system (community, facility, subnational, national) will the decision be made?	A decision at the provincial level is required to allocate additional funds for refresher trainings for the region's health workers to help identify skills gaps related to maternal and child health services at targeted facilities and to reinforce or retrain providers in these core competencies.
Who needs to be involved in the decision-making process and how will they be convened?	Provincial head of department, maternal and child health program managers, M&E officers, policy and information directorate
What data are needed to support the decision (source, indicators, frequency, disaggregation, analysis, and variance)? • Can the decision be informed by routinely collected data, or will new data be collected? • Which indicators should be used for data collection and review? • How frequently should the data be collected? • How should the data be disaggregated? • How should the data be analyzed (e.g., trend data) and visualized?	• Maternal mortality rate (civil registration system, facility records) • Provider absenteeism (facility survey, facility) • Number of births attended by skilled birth attendant (administrative records, facility) • Provider technical quality, including adherence to guidelines (administrative records, facility)
What data are available, and what new data are still needed?	Available data: • Maternal mortality rate • Provider absenteeism • Number of births attended by skilled birth attendant Data needed: • Adherence to safe delivery guidelines
Who will make or approve the decision?	Provincial head of department
Who will be responsible for planning and implementing actions?	Regional health system managers

Malaysia:
Using Data for Decision-Making

In Malaysia, health informatics have evolved from manual recording and documentation by field workers to a central health informatics center with three major functions—data management, publication, and dissemination—supported by health informatics standards. An HMIS Blueprint, aligned with the Ministry of Health ICT Strategic Plan (2011-2015), established a national health data warehouse that is in its second phase and includes data for clinical support services, outpatient visits, and inpatient procedures for traditional and complementary medical facilities.

Malaysia has worked to incorporate indicators and involve parties from all levels of the health system to foster a sense of shared responsibility for system performance. In Malaysia's HMIS, routine data are collected at the health clinic level, where maternal and child patient registries allow clinic nurses to track patient care and conduct home visits. At the district level, quarterly performance monitoring meetings compare health clinic performance, assess root causes of identified issues, and allocate resources to implement solutions. At the ministry level, policies are created based on evidence—such as cost-effectiveness—and are sent down to the states for implementation.

Policies for health information management are made centrally and formulated with input from various divisions within the Ministry of Health that own existing information systems, as well as implementers from hospitals, districts, and states. They also align with the government's central policies and laws and international standards. The governance system at the national level also includes representatives from the private sector.

Engaging Stakeholders Through Routine Data Reviews

Routine data reviews should include managers, providers, data officers, and ideally representatives from the community. Data analysis and communication should be tailored to the audience, with sufficient time provided for open discussion. The reviews can allow for identification of common problems (e.g., every health center is out of malaria medication) and special cases (e.g., only two of the 18 facilities are out of malaria medication), and provide opportunity for discussion of root causes and possible improvement interventions. This mode of engagement helps demonstrate the value of the data and ways to use data to address gaps, as well as to identify and learn from successes.

Root cause analysis (RCA) is a problem-solving approach based on the understanding that outcomes result from multiple factors and influences. This retrospective assessment is an important group brainstorming tool because it shifts the conversation from a primarily reactive mode—focusing on the symptoms of the problem—to one that accounts for the underlying and systemic factors leading to poor performance.

RCA starts with the outcome, works backward to identify the factors that led to that particular outcome, and successively breaks these down into their component parts until the group can agree on a set of key root causes. The diagram below—referred to as a "fishbone diagram"—visually represents this type of activity. The outcome in this case is high maternal mortality. Table 29 at the end of the chapter lists resources that provide more information about conducting root cause analyses.

STAFF

LACK OF AVAILABLE TRAINED STAFF

- High caseload per provider, leading to shortened visits
- Difficulty recruiting newly trained staff to rural areas
- No refresher trainings offered for emergency obstetric care

POLICIES AND PROCEDURES

INCOMPLETE INFORMATION ON ADHERENCE

National prenatal care guidelines in place, but no data on how well clinicians are adhering to them

- Facilities lack functional equipment needed for safe deliveries
- Provider payments are often delayed due to fund disbursement challenges at the national and regional levels

FINANCIAL RESOURCES ARE NOT ALLOCATED APPROPRIATELY FROM THE FEDERAL LEVEL

RESOURCE ALLOCATION

HIGH MATERNAL MORTALITY RATE (162 PER 100,000)

Building a Culture of Data Use

Using data for decision-making can be challenging as well as politically difficult. Examining data sometimes means facing "bad news," such as unexpected underperformance. Although there are many reasons why people at all levels of the health system might be hesitant to illuminate areas of weakness, a culture of data use requires that even poor performance is reviewed and contributes to learning.

Global literature and country experiences show that a culture of data use has many important components, from inspiring leadership to the right enabling environment, accountability, transparency, and respect. The culture must include the use of "safe spaces" where gaps and challenges can be discussed honestly and objectively, without fear of blame. A culture of safety must be communicated at all levels of the system and can be reinforced through verbal commitments and the modeling of desired behaviors by leaders and managers.

A culture of data use demands consistent and transparent data to inform decisions and promote mutual accountability at all levels of the system, leading to continuous improvement, learning, and innovation. Accountability systems can be either internal or external and are an important way to ensure that data are not just communicated up through the system, but are used to inform decisions and are communicated back to district and facility levels.

Guiding questions for establishing a culture of data use include:

- Why are data collected? Do data producers and data users know why the data are collected?

- Where does the demand for data come from? How are data used?

- Who sees the data? Are the data only fed up the chain of command, or are they fed back to lower levels of the health system?

- Whose voice matters in interpreting and understanding the data?

- How are data shared?

- Is feedback constructive or punitive?

KENYA:
CONVENING SENSITIZATION MEETINGS ON SCORECARD USE

Kenya convened health-sector actors from across the country for "sensitization meetings" to discuss how county-level performance scorecard objectives and indicators could be used to promote improvements. In these meetings, county managers were asked to populate their scorecards and experienced how easy it was to use these new tools for data entry and monitoring. These gatherings were also an opportunity to share feedback and resulted in a list of recommendations from county health directors, county reproductive health coordinators, and county health information officers, including on scorecard technical enhancements and how scorecard use could be supported at subnational levels.

What Influences a Culture of Data Use?

Components of a strong culture of data use will depend on the local or national context, but key cultural and organizational aspects include:

- **Leaders** who clearly articulate the importance of data for decision-making and model the use of the desired methods of using data

- **An enabling environment**, including a coherent organizational structure and adequate resources for data collection and analysis

- **Robust data feedback loops** that allow data to move up through the system to be translated into information and for this information to move back down through the system

- **Clear roles and responsibilities** that support a unified vision and coherent strategy for data use and improvement

- **A no-blame environment** that establishes safe spaces for discussion and promotes transparency

- **Mutual accountability** in which lower levels of the health system are held accountable for collecting high-quality data and upper levels of the system are held accountable for using that data to inform action

- **Shared ownership** of outputs and successes, including an acknowledgment of the entire team that makes successes possible

- **Encouragement and incentives** to motivate behavior change and celebrate the contributions of staff in meeting system objectives

- **Competencies** throughout the system that support data use and interpretation, which may require professional development and skills training

- **Respect** for the work, time, and effort of all team members

- **Evidence-based actions** that demonstrate the value of high-quality data for decision-making

1 2 3 4 5 6 7 8 9

Bangladesh:
Building Support at All System Levels

To ensure that field workers and managers are comfortable entering and using health data in the DHIS2 platform, Bangladesh has garnered strong institutional and political support for its Digital Bangladesh 2021 initiative at all levels of the system, led by the director of the Department of Management Information Systems and extending to departments throughout the government. Field staff are fully trained in data entry, and managers are coached in data analysis and the use of data for decision-making. Today, nearly all government programs use DHIS2.

Strategies for Building a Culture of Data Use

Building a culture of data use requires a thorough and honest review of the existing system, including cultural as well as the technical and systematic elements. Understanding technical capabilities of a system—such as infrastructure and interoperability—is important for gaining insight into the realistic scope of potential standards, legislative policies, and strategies. This, in turn, helps inform the governance structure, leadership, and core workforce capabilities required to support strong data use.

When identifying elements of data culture, it can be helpful to begin by asking two simple questions:

- How does this element support the use of data for decision-making?
- How does this element constrain the use of data for decision-making?

Strategies for building accountability and promoting a culture of data use include:

- **Political commitment.** The behavior and political will at the upper levels of a health system can be mirrored at all system levels, including accountability and respect for evidence-based actions.

- **Policy frameworks.** Policy frameworks should be developed—or existing frameworks should be adapted—to guide and enforce the use of data for decision-making at all levels of the system.

- **Clear communication from leaders.** Effective leaders motivate workers and help foster a sense of shared ownership of successes, respect for the effort of team members, and a no-blame culture where findings can be discussed openly.

- **Friendly peer competition.** Promoting healthy, performance-based competition among districts or facilities—for example, through the use of ratings—can be a fun and transparent way to encourage adaptability. In promoting peer competition, it's important to recognize achievements, even if improvement is relative.

- **Team-building exercises.** Team-building efforts can help create a shared sense of ownership and motivate enthusiasm for institution-wide improvements and communicate that innovative ideas can come from anyone.

- **Examples of accountability at all levels.** A critical aspect of a data culture is ensuring that individuals at all levels of the system feel appreciated for their contributions. Consistent feedback can ensure that data are communicated not only upward through the system but also downward to the facility level in the form of evidence-based actions.

- **Consistent feedback.** Channels for consistent feedback of data results and actions are essential to fostering a culture of improvement. Ensuring that feedback is encouraged and readily accepted can be an important way to resolve challenges before they become impediments and can allow for early identification of successful programs that should be scaled up.

- **Support for low performers.** Responses to underperformance should not be solely punitive. To encourage transparency and provide motivation to improve, officials should help low performers determine the root causes of underperformance and identify solutions, whether through coaching or additional resources. In some cases, underperformers may be doing well relative to their context, and this should be recognized.

Identifying "champions" within institutions—including at subnational levels—can be an effective way to inspire support and help overcome resistance to change. Champions have long been used in policy spheres to advocate for legislation and can be similarly used to advocate for investments, policies, and strategies to build a stronger data culture.

Political support for improved measurement is crucial. In Malaysia, political will to improve information technology throughout the government established a precedent that was an important foundation for understanding the role of data in the health sector.
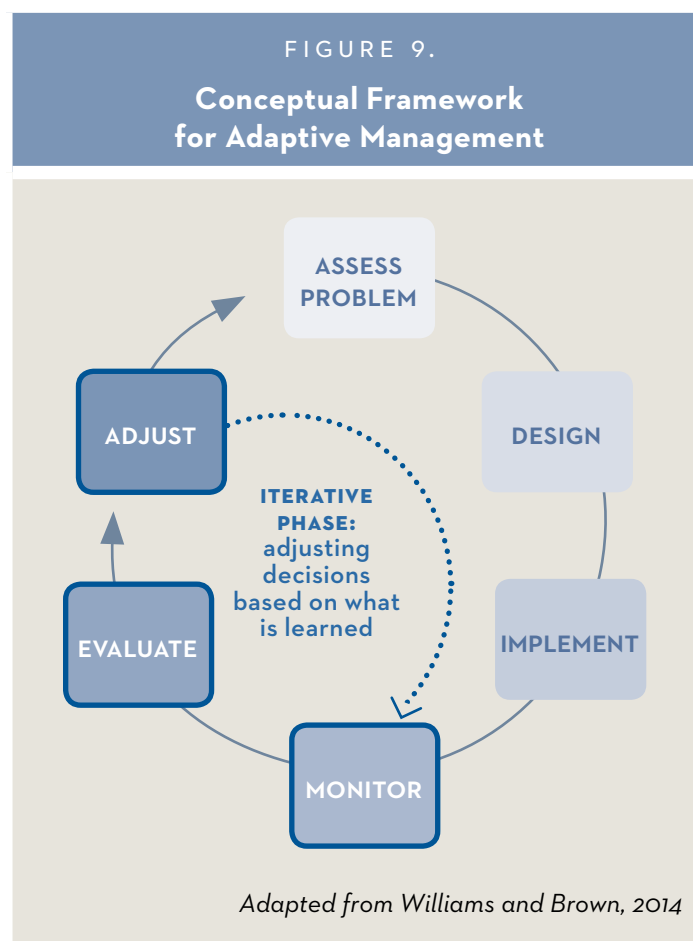
Ghana:
Building a Culture of Data Use

One of the primary impediments to a culture of data use in Ghana was a lack of skilled personnel to collect, manage, and present health data in a meaningful way. Health managers at the operational levels also had limited capacity to use information for decision-making. This was compounded by inadequate supplies and logistics for health data management and the need for a stronger national information and reporting system. To address these issues, all key health professionals are now required to take a course on biostatistics and health information management during their training. A specialized three-year Health Information Course designed by the Ministry of Health provides training to middle-level health professionals and managers to support the use of data for planning and local decision-making. Other strategic efforts have been carried out in parallel to improve systemic issues, including logistics and supply problems related to health information.

Currently, specialized health professionals lead health data management for all levels, from district to national, with an emphasis on presenting data in a meaningful way to support local use. In some districts, root cause analysis conducted for neonatal deaths led to the establishment of a biannual birth asphyxia training program for hospital midwives; in other districts, initiatives have been implemented to reduce delays in seeking and accessing care based on patient data. To support the use of data both within facilities and in the community, root cause "fishbone" diagrams have been used to encourage conversation among community leaders about causes of poor health outcomes and potential solutions. One example of success is a real-time analysis of available bed space in all hospital wards to improve the referral process for women in need of emergency care during labor and delivery.

Promoting Improvement Through Adaptive Management

Adaptive management is a management approach that emphasizes continuous reflection and evaluation and incorporating information as it emerges to ensure that improvement efforts are targeted, well-informed, and successful. This is not a linear process; as shown in Figure 9, it is an iterative process that involves adjustment and readjustment based on available and emerging knowledge.

FIGURE 9.

Conceptual Framework for Adaptive Management

Adapted from Williams and Brown, 2014

CHILE:
IMPROVING HEALTH THROUGH BETTER MEASUREMENT

Chile's Digital Health Strategy (DHS)—or eHealth Plan—supports population health improvement through timely, efficient, and reliable management of standardized information. In 2004 and 2005, Chile undertook a health reform process to assess current care models and identify areas to implement new strategies and processes. During this exercise, the need for information systems to provide accurate and timely information was identified as a critical need to support population health, disease prevention, and effective management in an increasingly complex health care environment.

Initiatives to improve health information systems are guided by the core objectives of the DHS:

- Ensure the continuity of patient care with a standard clinical history at the national level, regardless of geographic location or where care is provided.

- Establish a national information system that pulls data from the source to inform local and central dashboards, waiting lists, and statistics.

- Computerize health care processes to improve efficiency in management and equity in the allocation of financial resources.

- Integrate technological platforms and design information systems that contribute to empowering patients and improving their quality of life.

A foundational component of the DHS is an initiative known as SIDRA, which aims to integrate information at all levels of care, including both clinical and administrative data, while ensuring that all inputs are high quality, timely, and collected at the origin. SIDRA draws support from both central and regional leaders under the Management Commitments 2015–2018, an agreement between the Ministry of Health and 29 regional health managers.

Strong, central political commitment was demonstrated in 2015, when the president of Chile announced the implementation of the Digital Agenda 2020, a program that seeks to improve information technology and communication across all sectors. The creation of a National Repository of Integrated Health Data, a centralized tool promoted by the Ministry of Health, supports decision-making at all management levels by supporting the creation of dashboards with management indicators that are updated in real time.

Creative Solutions for Common Challenges

- If teams and organizations are reluctant to learn new technologies for data collection or analysis, gaps in demand and ability to interpret the results are likely to emerge. Fostering excitement about system changes through skills training programs can be an effective way to build support.

- Automating access to reports and information can be a way to ensure that data are available to those who need it, when they need it. In Chile, establishing a National Repository of Integrated Health Data supports decision-making at all management levels by supporting the construction of dashboards with management indicators updated in real time.

- Data producers and data users don't always "speak the same language," so aligning their understanding during the data production process is critical to producing useful data and fostering a culture of data use. In Nigeria, inclusive processes to build a data dictionary helped ensure that relevant stakeholders had a role in identifying and defining measurement priorities, which improved long-term buy-in.

- Frontline improvement happens at lower levels of the system, but lower-level managers are not always engaged in the decision-making process. In Kenya, sensitization meetings were held to promote engagement at the subnational level by empowering actors at all levels of the system to make decisions to promote change and improvement.

- Successful engagement requires that decisions be made in a timely manner and be informed by evidence and data. In Bangladesh, incorporating decision-makers and policymakers early in the process improved understanding and helped ensure that important decisions were timely and based on evidence. Strategic alignment of data improvement initiatives within the health system and across the government more broadly reduced inefficiencies by cutting down on the duplication of data and reports.

- Incompatible information systems within ministries can lead to duplication and redundancies. In Malaysia, policies for health information management drew input from various divisions within the Ministry of Health and aligned with the government's central policies, allowing for the creation of a national reference data model and a data dictionary.

Table 29 lists resources developed by the global community to support a culture of data use.

TABLE 29. **Additional Resources on Creating a Culture of Data Use**		
TOOL OR RESOURCE	**SOURCE**	**DESCRIPTION**
QUALITY & PERFORMANCE INSTITUTE	University Research Co.	A strategy for evaluating the health system to identify areas for improvement at all levels, from clinics and hospitals to programming and policy. Key components include health communication and behavior change efforts that emphasize the continuum of care and a people-centered approach.
	www.urc-chs.com/quality-improvement	
QUALITY IMPROVEMENT ESSENTIALS TOOLKIT	Institute for Healthcare Improvement	A toolkit that complements existing processes within institutions to accelerate quality improvement.
	www.ihi.org/resources/Pages/Tools/Quality-Improvement-Essentials-Toolkit.aspx	
LEARNING HEALTH SYSTEM CYCLE	Learning Healthcare Project	A framework that uses a cyclical improvement approach similar to that used in this toolkit. The resources developed by this project emphasize the importance of ongoing improvement.
	www.learninghealthcareproject.org/section/background/learning-healthcare-system	
DEFINING AND BUILDING A DATA USE CULTURE	PATH	A document that explores two frameworks developed by PATH to highlight key components of a data use culture at the country, organization, facility, community, and individual levels. It also presents recommendations on how the digital health field can take local, regional, and global action to accelerate the rate at which countries and communities design and build their own data use cultures.
	www.path.org/publications/detail.php?i=2805	
DATA DEMAND AND USE TOOLS	MEASURE Evaluation	Tools for stimulating data demand, building capacity, and enhancing evidence-based decision-making.
	www.measureevaluation.org/resources/tools/data-demand-use	
USE OF COMMUNITY HEALTH DATA FOR SHARED ACCOUNTABILITY: GUIDANCE	MEASURE Evaluation	Guidance on using health data to be more responsible and accountable to communities.
	www.measureevaluation.org/resources/publications/tr-18-238	

Conclusion

PRIMARY HEALTH CARE IS FOUNDATIONAL TO CREATING HEALTH SYSTEMS in which all citizens—regardless of their economic standing—have access to high-quality, affordable health care services. Across the globe, country practitioners recognize the importance of collecting and using data to improve PHC performance. Countries can draw on the collective experience presented in this toolkit to create an effective PHC monitoring system that generates information routinely or at strategic points to increase knowledge about PHC system performance and support effective decision-making.

Monitoring and improvement is cyclical. Successful implementation of the **Measurement for Improvement Cycle** is a continuous process that involves routine measurement and iterative improvement and requires countries to build the systems for data collection, the individual capacities to provide and receive data, and a culture that builds demand for and values data use. As systems and measurement priorities change, countries can return to and adapt the guidance and tools in this toolkit to meet their evolving needs.

APPENDIXES

A

DEFINING PRIMARY HEALTH CARE

COUNTRIES IMPLEMENT PHC DIFFERENTLY, often using a mix of public and private providers and providing care within communities, clinics, or higher-level facilities. However, high-performing PHC systems around the world share a set of common characteristics (as shown in **Figure A-1**): they represent the first point of contact with the health system, provide a set of comprehensive and high-quality services to address most health needs, deliver continuous care throughout the life span, coordinate the care patients receive across the health system, and are people-centered and accessible.

FIGURE A-1.

Characteristics of High-Performing PHC Systems

PEOPLE'S FIRST CONTACT
Serves as the entry point into the health care system and is the first source of care for most health needs

PEOPLE-CENTERED
Organized around the health needs and expectations of people rather than diseases

COMPREHENSIVE
Delivers a broad spectrum of preventive, promotive, curative, and palliative care

CONTINUOUS
Connects people with trusted providers that can address their health needs throughout their lives

COORDINATED
Manages care across levels of the health system, referring patients to specialists as needed and effectively following up to ensure improvement

ACCESSIBLE
Offers care within people's communities, at a price they can afford

Adapted from: PHCPI

APPENDIX
B

DEVELOPMENT OF THE PHC CONCEPTUAL FRAMEWORK

THE PRIMARY HEALTH CARE PERFORMANCE INITIATIVE (PHCPI) developed the PHC Conceptual Framework as a tool to highlight the critical components of a strong PHC system, basing it on a literature review as well as a review of more than 40 existing frameworks for monitoring primary care and health system functioning. The PHC Conceptual Framework helps fill gaps related to the conceptualization of PHC, including a mixture of "hardware" inputs (such as funds, supplies, and information systems) and "software" inputs (including financing, regulations, and provider payment incentives). Grounded in an input-process-output-outcome logic model structure, the framework shows the directionality of system components to indicate how each domain links to the surrounding domains and highlight the broader health system and the socioeconomic, political, and cultural context in which the system originates. For more information about the framework and its development, see the PHCPI website at www.phcperformanceinitiative.org.

In contrast to frameworks that focus primarily on health system inputs and outcomes, the PHC Conceptual Framework recognizes the PHC system as the foundation for strong outcomes across all health areas and programs, from maternal and child health to noncommunicable diseases. The framework is centered around the service delivery domain to emphasize the importance of people-centered care, supply and demand functions, and integrated service delivery through effective organization and management of health services.

Although country information systems often collect vast amounts of data, many policymakers and managers lack information on these important service delivery processes. For example, health system managers often do not have good data on how frequently health workers accurately diagnose and treat patients. Even fewer managers have data on the experience of patients who receive care or how engaged communities are in the planning, delivery, and governance of health services. With better data on *how* PHC services are delivered, countries can better understand where change will have the biggest impact and how to monitor improvement over time.

Table B-1 lists the key performance questions that underlie the measurement domains of the PHC Conceptual Framework .

TABLE B-1.
Key Performance Questions

Subdomain	Key Question
System	
A1. Governance & Leadership	Do national policies reflect the importance of PHC, promote high standards, and involve stakeholders from all sectors?
A2. Health Financing	Is PHC adequately funded to ensure access, provide protection against catastrophic expenditures, and ensure equitable use of resources?
A3. Adjustment to Population Health Needs	Is the delivery of PHC flexible enough to adjust to and best serve the needs of the population?
Inputs	
B1. Drugs & Supplies	Are essential drugs, vaccines, consumables, and equipment available when needed?
B2. Facility Infrastructure	Are there enough health facilities to serve the population and are they appropriately distributed?
B3. Information Systems	Are health facilities appropriately linked to information systems, including system hardware and records?
B4. Workforce	Is there sufficient staff and an appropriate combination of skills in PHC services?
B5. Funds	Are sufficient funds available at the facility level to cover recurrent and fixed costs?
Service Delivery	
C1. Population Health Management	Are local populations engaged in the design and delivery of health services to ensure that their needs and priorities are met?
C2. Facility Organization & Management	Are PHC facilities organized and managed to promote team-based care provision and use of information systems, support staff, and performance measurement and management to drive continuous improvement?
C3. Access	Do patients have financial, geographic, and timely access to PHC facilities?
C4. Availability of Effective PHC Services	Are the staff of PHC facilities present and competent and motivated to provide safe and respectful care?
C5. High-Quality PHC	Are PHC services high quality, meeting peoples' needs, and connected to other parts of the health system?
Outputs	
D1. Effective Service Coverage	Does the PHC system offer high-quality services across the lifespan?
Outcomes	
E1. Health Status	Does PHC reduce the number of deaths and improve health?
E2. Responsiveness to People	Does the PHC system respond quickly to the needs of the population?
E3. Equity	Are health outcomes equitably distributed across society, by geography, education, and occupation?
E4. Efficiency	Are resources used optimally to improve health outcomes?
E5. Resilience of Health Systems	Is the PHC system able to continuously deliver health care, regardless of political or environmental instability?

Source: Primary Health Care Performance Initiative

TABLE C-1. Indicator Scoring Template					
THEORETICAL CRITERIA			**SCORE**		
CRITERION	**DEFINITION**	**QUESTIONS TO CONSIDER**	**WEAK** *(1 to 5 points)*	**MODERATE** *(6 to 10 points)*	**STRONG** *(11 to 15 points)*
Sensitivity	System responses to changes will lead to noticeable changes in the indicator that can be accurately interpreted.	• How does this indicator reveal whether the objectives of the system are being met? • How would you interpret a change (increase or decrease) in the indicator measure? • How much will the value of the indicator change in a short period of time?			
Frequency	Changes in the system will be quickly reflected by changes in the indicator.	• Are changes in the system quickly reflected by changes in the indicator, or is there a significant time lag?			
Specificity	Indicator will accurately reflect changes in the system that it is intended to measure.	• Will any factors affect the indicator that do not reflect relevant changes in the system?			
Feasibility	The data for the indicator are feasible to collect over time.	• How difficult/expensive is it to collect the data needed for the indicator? • Are the required data routinely collected? • How reliable are the data?			
Purity	The data for the indicator cannot be manipulated, corrupted, gamed, or adjusted.	• How easy or difficult is it to manipulate or adjust the existing data?			

TABLE C-1. Indicator Scoring Template					CONT'D

PRACTICAL CRITERIA			SCORE		
CRITERION	**DEFINITION**	**QUESTIONS TO CONSIDER**	**WEAK** *(1 to 5 points)*	**MODERATE** *(6 to 10 points)*	**STRONG** *(11 to 15 points)*
Usability	The results of the indicator can (and will) be used to inform policy decisions.	• How closely does the indicator answer the policy question? • How easy or difficult is it to translate the results of the indicator into a decision?			
Acceptability	Indicator is acceptable to key stakeholders and does not create political risks or concerns.	• Do all stakeholders agree on this indicator? • Will policymakers understand what the indicator conveys? • Are there any political risks associated with reporting this indicator?			

How the Indicators Work Together as a Group		No	Yes	
These questions should be asked about the indicators as a group.	• Does the set of indicators cover each objective? • Do any indicators need to be considered together in order to reach the correct interpretation? • Do the indicators as a group provide a good picture of how the system is performing?			

Adapted from: JLN Provider Payment Mechanisms and Information Technology Collaborative

TABLE C-2. Technical Integration Use Case Checklist	
Use Case Considerations	**Comment**
Software Development	
Beneficiaries	
Infrastructure Required	
Data Ownership	
Cost Implications	

TABLE C-3.
Data Mapping Template

Indicator:

Topic	Questions	Response
Data format	• In what format do you receive the data?	
Frequency	• What is the frequency of data submission? • Is there a set data submission schedule?	
Data storage	• In what database or file do you enter or store the data after you receive them? • What computer program do you use? • How frequently do you enter/store the data? • Any challenges in entering/storing the data? • Any privacy issues when storing the data?	
Data aggregation	• Do you perform any data aggregations? Which ones? • Using which calculations? • How often? • Are there any challenges in aggregating the data?	
Data quality	• What quality checks do you perform on the data? • Are there any known issues with data quality?	
Data usage	• Do you use the data for reporting? If so, in which reports and for which purpose, and who is the audience? • Are the data used for decision-making? If so, how?	
Data sharing	• With whom do you share the data? • In what format do you share the data (type of form, file, database, aggregation levels)? • How often do you share the data? • How do you share the data (e.g., internet, email, USB flash drive, disk, hard copy)? • Are there any delays or challenges in preparing the data and/or sending them?	
Additional comments about this data element and/or indicator		

Adapted from: JLN Provider Payment Mechanisms Information Technology Collaborative

TABLE C-4.
Audience Identification Template

Issue	Underlying Cause	System Level	Action(s)	Decision-Makers	Influencers

TABLE C-5.
User Persona Template

Stakeholder:

Opportunities to Influence:

Topic:

Desired Outcome:

Desired Action:

Data Communication Method:

Characteristics:

Motivated by:

Concerns:

TABLE C-6.
Data for Decisions Worksheet

Key Questions	Responses
What decision needs to be made or influenced?	
At what level of the system (community, facility, subnational, national) will the decision be made?	
Who needs to be involved in the decision-making process and how will they be convened?	
What data are needed to support the decision (source, indicators, frequency, disaggregation, analysis, and variance)? • Can the decision be informed by routinely collected data, or will new data be collected? • Which indicators should be used for data collection and review? • How frequently should the data be collected? • How should the data be disaggregated? • How should the data be analyzed (e.g., trend data) and visualized?	
What data are available, and what new data are still needed?	
Who will make or approve the decision?	
Who will be responsible for planning and implementing actions?	

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