

# HRIS

## STRENGTHENING IMPLEMENTATION TOOLKIT

April 2009







# HRIS

HUMAN RESOURCES INFORMATION SYSTEMS

## STRENGTHENING IMPLEMENTATION TOOLKIT

April 2009





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# HRIS

## STRENGTHENING IMPLEMENTATION TOOLKIT

### Introduction

**Goal:**

Understand the HRIS strengthening process.

**Tools:**

About This Toolkit

Overview Brief: Strengthening Human Resources  
Information Systems

HRIS Strengthening Implementation Guidebook



# About This Toolkit

## Introduction

The Capacity Project's HRIS Strengthening team developed and compiled this HRIS Strengthening Implementation Toolkit. For more information, please visit the HRIS Strengthening website at [www.capacityproject.org/hris/](http://www.capacityproject.org/hris/) or contact us at [hris@capacityproject.org](mailto:hris@capacityproject.org).

*The Capacity Project, funded by the United States Agency for International Development (USAID) and implemented by IntraHealth International and partners (IMA, JHPIEGO, LATH, MSH, PATH, TRG), helps developing countries strengthen human resources for health to better respond to the challenges of implementing and sustaining quality health programs.*

*This document is made possible by the support of the American people through USAID. The contents are the responsibility of IntraHealth International and do not necessarily reflect the views of USAID or the United States Government.*

### How are you using the toolkit?

The Capacity Project would like to hear your feedback on this Toolkit. Please let us know how you are using this Toolkit in your HRIS strengthening efforts, and share any comments or suggestions you may have for improving it. Contact us directly by email at [hris@capacityproject.org](mailto:hris@capacityproject.org). Thank you!

### HRIS Strengthening Implementation Toolkit Contributors

Dykki Settle, Director, Health Informatics, The Capacity Project/IntraHealth International  
Shannon Turlington, Senior Systems Development Manager, The Capacity Project/IntraHealth International  
Carol A. Bales, HRIS Specialist, The Capacity Project/IntraHealth International  
Julie C. Spero, HRIS Specialist, The Capacity Project/IntraHealth International  
Angela Self, HRIS Advisor, The Capacity Project/IntraHealth International  
Samwel Wakibi, HRIS Advisor, The Capacity Project/IntraHealth International  
Laticha Walters, HRIS Advisor Namibia, The Capacity Project/IntraHealth International  
Luke Duncan, Senior Systems Developer, The Capacity Project/IntraHealth International  
Mark Hershberger, Open Source Developer, The Capacity Project/IntraHealth International  
Carl Leitner, Open Source Developer, The Capacity Project/IntraHealth International  
Pamela McQuide, Workforce Planning and Policy Advisor, The Capacity Project/IntraHealth International  
Danny de Vries, Monitoring, Evaluation and Research Manager, The Capacity Project/IntraHealth International

### Acronyms Used in This Toolkit

CDC	Centers for Disease Control
DDDM	Data-Driven Decision-Making
DSDR	Data Sharing for Demographic Research
ELIS	Electronic Library Information System
FBO	Faith-Based Organization
FOSS	Free and Open Source Software
FTE	Full-Time Equivalent
GIS	Geographic Information System
GPL	General Public License
HIS	Health Information System
HMIS	Health Management Information System

HMN	Health Metrics Network
HR	Human Resources
HRH	Human Resources for Health
HRIS	Human Resources Information System
ICPSR	Interuniversity Consortium for Political and Social Research
ICT	Information and Communications Technology
iHRIS	Integrated Human Resources Information System (refers to the suite of three HRIS software products developed by the Capacity Project)
ISCO	International Standard Classification of Occupations
JIT	Just-in-Time
KM	Knowledge Management
LIMS	Laboratory Information Management System
MOH	Ministry of Health
MOHSS	Ministry of Health and Social Services
MOHSW	Ministry of Health and Social Welfare
MOPSI	Ministry of Public Service and Information
MSH	Management Sciences for Health
MSS	Main Success Scenario
NGO	Nongovernmental Organization
OS	Operating System
PDA	Personal Digital Assistant
PDF	Portable Document Format
PMP	Performance Monitoring Plan
SCMS	Supply Chain Management System
SLG	Stakeholder Leadership Group
SQL	Structured Query Language
TIMS	Training Information Management System
UNMC	Uganda Nurses and Midwives Council
WHO	World Health Organization



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# **Overview Brief: Strengthening Human Resources Information Systems**

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Introduction

**Please look in the front folder pocket for this brief.**



## Strengthening Human Resources Information Systems

### To Learn More:

Dykki Settle, Director of Health Informatics, [dsettle@capacityproject.org](mailto:dsettle@capacityproject.org)

Pamela McQuide, RN, PhD, Workforce Planning Advisor, [pmcquide@capacityproject.org](mailto:pmcquide@capacityproject.org)

### Why Strengthen Human Resources Information Systems?

Many low-resource countries are facing daunting obstacles to meeting the health care needs of their people. To ensure that the right health care provider is in the right place with the right skills, these countries need current, accurate data on human resources for health (HRH). A strong human resources information system (HRIS) helps health care leaders quickly answer the key policy questions affecting health care service delivery:

- **Workforce Planning:** Are enough health care workers being trained to meet the projected need? How might policy changes affect the health workforce?
- **Training:** Are students discontinuing pre-service education before entering the workforce, and if so, why? Are health workers receiving in-service training? Do they have the training necessary for their jobs?
- **Qualifications:** Are health workers meeting continuing education requirements for licensure? Have workers been assessed competent in the qualifications required for their jobs?
- **Service Delivery:** Are health workers employed in posts that match their education and training? Are health workers optimally deployed in locations to meet national health priorities? How many workers need to be recruited to fulfill anticipated vacancies?
- **Retention:** How many health workers are leaving the workforce? What are the causes of attrition for health care workers? What initiatives are effective in keeping them in priority posts, and how are they affecting attrition rates?

### What Is an HRIS?

An HRIS provides health sector leaders and managers with the information needed to assess HR problems, plan effective interventions and evaluate those interventions. An HRIS can be as simple as a filing cabinet of paper personnel files or as complex as a multi-database system with the capacity to analyze workforce problems and possible solutions. The strength of an HRIS does not depend on technology but on its ability to generate information that is accurate and timely and to be adapted to address new HRH issues.

In the Project's approach, many stakeholders are involved. Ministries, licensing and certification bodies, private-sector organizations and other stakeholders work together to develop a mature and complete HRIS that tracks health professionals from the time they enter training until they leave the health workforce. In each country, a Stakeholder Leadership Group has ownership of the HRIS, and the Project's efforts focus on developing their capacity to use, support and improve the system after the Capacity Project's assistance has ended.



Ministry of Health staff updating personnel files the old-fashioned way in Zanzibar.

## What Has the Capacity Project Accomplished?

- Developed the Project's five-step HRIS strengthening approach
- Developed and released the iHRIS suite of three software systems (which can be quickly customized for local needs):
  - iHRIS Qualify tracks health worker training, certification and licensure
  - iHRIS Manage maintains personnel deployment, performance and attrition information
  - iHRIS Plan models long-term health workforce needs
- Developed and released a Windows desktop version of the iHRIS Suite for use in decentralized locations such as facilities and district offices
- Installed iHRIS Qualify at four professional councils in Uganda
- Installed iHRIS Manage at the Ministries of Health in Rwanda, Uganda and Zanzibar
- Installed iHRIS Manage in HR offices in three states in Southern Sudan
- Piloted iHRIS Plan in Namibia
- Developed HRIS step solutions in Swaziland and Lesotho
- Initiated HRIS strengthening activities in Botswana, Kenya and Tanzania
- Conducted training on using HR data to make evidence-based decisions in Uganda, Swaziland, Rwanda and Southern Sudan.

## What Have We Learned?

- In order for the HRIS to be successful and sustainable, national ownership and capacity building must be priorities from the early planning stages.
- Key issues for stakeholders to address are data ownership, policies for data sharing and policy questions that the HRIS will answer.
- Data frequently exist in small datasets or paper files that are not necessarily known by all stakeholders. Bringing together HRIS stakeholders, often for the first time in the same room, ensures that information is shared and helps the group quickly reach consensus for making good use of the data that do exist.
- HRIS solutions should be designed around country needs as identified by system stakeholders. The HRIS must be flexible and adaptable in meeting emerging needs after it is developed. Use cases have proven to be an effective method of prioritizing stakeholder requirements and communicating those requirements to system developers.
- Capacity building is often needed in the areas of developing strong data collection systems, using data for planning and managing human resources and providing technical support for the system and its infrastructure.
- In order for a system to be effective it must be used. A key step in strengthening HRIS is creating a culture of routinely using data as a basis for decision making.

For more information and to view software demonstrations, visit the HRIS Strengthening website: [www.capacityproject.org/hris/](http://www.capacityproject.org/hris/)



The Capacity Project  
IntraHealth International, Inc.  
6340 Quadrangle Drive  
Suite 200  
Chapel Hill, NC 27517  
Tel. (919) 313-9100  
Fax (919) 313-9108  
[info@capacityproject.org](mailto:info@capacityproject.org)  
[www.capacityproject.org](http://www.capacityproject.org)

This publication is made possible by the support of the American people through the United States Agency for International Development (USAID). The contents are the responsibility of IntraHealth International and do not necessarily reflect the views of USAID or the United States Government.

## The Capacity Project Partnership

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a nonprofit organization strengthening health programs worldwide

# HRIS Strengthening Implementation Guidebook

## Introduction

Health care leaders need current, accurate data on human resources for health (HRH) in order to quickly answer key questions affecting health care service delivery. Understanding the current health workforce enables decision-makers to create informed, effective strategic plans designed to ensure a steady supply of trained health professionals and retain health worker skills and experience in the country.

The Capacity Project's human resources information system (HRIS) strengthening process is designed to foster better understanding of the current health workforce picture. This understanding prepares decision-makers to effectively plan for recruitment, training, deployment and retention of health professionals to meet health care needs.

The goal of this Toolkit is to provide a package of HRIS strengthening procedures and tools to HRH stakeholders, HR managers and software developers in order to facilitate applying the HRIS strengthening processes and implementing the HRIS software developed by the Capacity Project. The Toolkit collects briefs and tools to assist with the five steps of the HRIS strengthening process:

1. Build HRIS leadership using a participatory, inclusive approach that incorporates a thorough assessment of any related systems already in use
2. Assess and improve existing systems, such as data collection processes and information technology infrastructure, to support an HRIS
3. Develop HRIS software solutions customized to answer key health workforce policy and management questions
4. Support managers and decision-makers to effectively use and analyze data for informed and confident decision-making
5. Ensure sustainability and continuous improvement of the HRIS through training and technical support.

## The Problem in Context

Many developing countries encounter serious constraints to maintaining accurate health workforce data and information, including a lack of well-functioning national HRH databases. Few, if any, electronic versions of health workforce records are readily available. While a paper-based system can represent a functioning HRIS, there are often serious limitations to the use of these data.

In most paper-based systems, data are collected on multiple forms, which often contain duplicate information. When so many forms for so many people must be completed, filed and tracked, the system becomes unworkable. Problems with data quality, such as incomplete forms and inconsistencies across forms, are harder to identify and correct. It becomes increasingly difficult to track an individual health worker moving through the system. Aggregating the data for meaningful analysis turns into a labor-intensive, time-consuming process, preventing policy and management decisions from being made in a timely manner. All of these issues create gaps when deploying health workers to the places where they are most needed.

The most efficient, up-to-date way to track changes to a health workforce is to use data from a routine information system, or a human resources information system. These systems are typically used by administrative organizations such as licensing boards, ministries of health and professional associations to qualify, manage and plan the health workforce. Strengthening the HRIS and related processes improves the accuracy and quality of HRH information that is available to HR managers and workforce planners, improving their ability to make well-informed decisions and meet health care needs.

## What Is an HRIS?

A human resources information system collects and manages information used in HR decision-making. A complete HRIS links all human resources data from the time professionals enter pre-service training until they

leave the workforce. Typically, the system is computerized and consists of a database for storing the information, software for entering and updating data, and reporting and analysis tools.

A simple HRIS may rely on paper forms or on electronic files such as spreadsheets housed in different departments that do not link together, but such a system often does not adequately meet the country's needs. Putting in place a computerized, integrated HRIS achieves the following objectives:

- Improve the accuracy and availability of HRH data
- Track people as they move through the health workforce system
- Decrease the labor required to maintain the HRIS
- Quickly aggregate and use data
- Report on and analyze data regularly
- Project workforce needs into the future.

The goal of HRIS strengthening is to progress from any systems that are currently in place—retaining the processes that are working while improving weaker parts and filling in gaps—to a complete and mature HRIS. A mature HRIS is defined by the following characteristics:

- The software is located on a central computer, or server, that multiple users can access concurrently and that can be kept secure and backed up
- The data are stored in a centrally located database, which enables easier updates, searching and analysis of collected HRH information
- A Web browser is the principal tool for interacting with the HRIS, so that the system is immediately available to anyone with an Internet or network connection and authorized access, reducing deployment time and training requirements.
- The system can easily be customized to fulfill the specific needs of the context in which it will be used
- The system can be scaled to adapt to a growing workforce or for use by more organizations
- Additional modules can be programmed for the system to meet changing and expanding needs.

If well designed, managed and maintained, an HRIS can provide a cost-effective yet extremely useful source of information with which to monitor and evaluate the impacts of changes in HRH policy at the national and sub-national levels.

### **Implementing the HRIS Strengthening Process**

The HRIS development and strengthening process comprises five key stages using a participatory approach (see Figure 1). The participatory approach involves stakeholders in HRH information from various ministries and sectors from the outset and increases local ownership of the system.

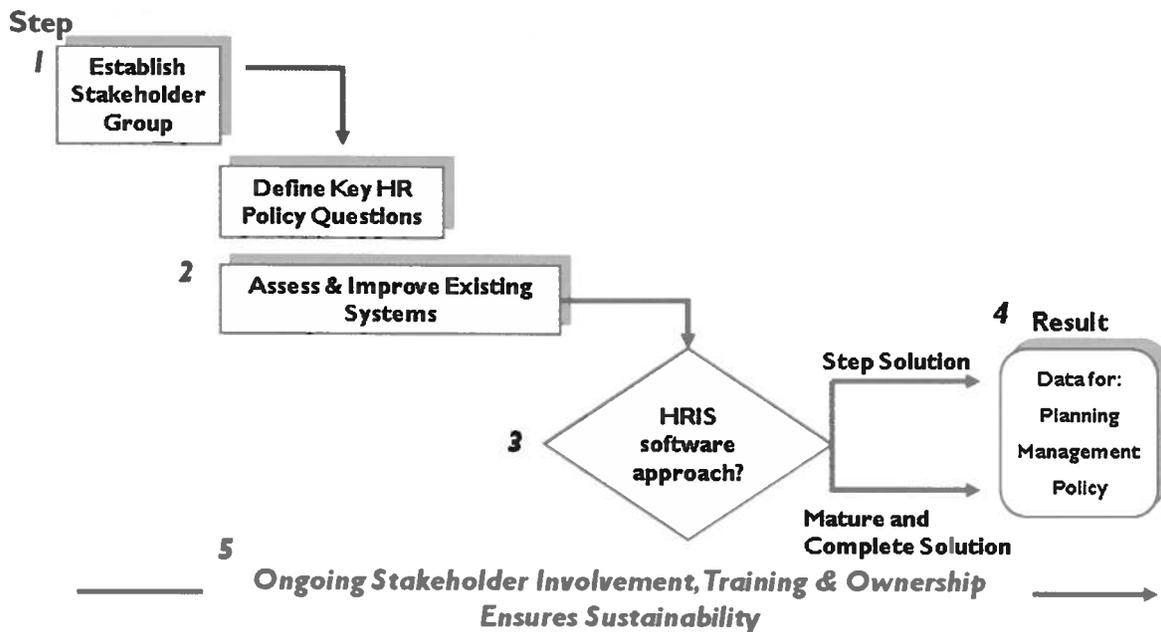


Figure 1: Flowchart of the HRIS Strengthening Process

The five steps of the HRIS strengthening process are:

1. **Build HRIS leadership.** Establish a Stakeholder Leadership Group (SLG) and identify key HRH policy and management questions.
2. **Assess and improve existing systems.** Conduct an assessment of existing HRIS and other health management information systems, current information and communication technology infrastructure (e.g., existing networks, Internet connectivity and software) and data already being collected by different ministries, councils and other organizations. Identify gaps that should be addressed by an improved HRIS while making rapid improvements as feasible.
3. **Develop software solutions.** After the SLG agrees on key health workforce questions and necessary system improvements, customize HRIS software solutions to meet identified needs. The agreed-upon solution could either be a step solution or a mature system, but it should incorporate existing systems, tools and processes as much as possible to lower costs and speed up implementation.
4. **Use data to make decisions.** Once the improved HRIS begins producing reports of HRH information, pay attention to how data are actually used for decision-making. Provide training and support to managers and decision-makers in their efforts to effectively use and analyze the data that the HRIS provides.
5. **Ensure sustainability.** Throughout the process, emphasize sustainability and continuous improvement of the HRIS through training and building capacity to support, use and improve the system into the future.

### Building HRIS Leadership

The Capacity Project advocates a country-level participatory approach to strengthening HRIS in order to generate ownership of the system among all stakeholders and build capacity within the country to support, use and improve their HRIS. The foundation for the participatory approach is the Stakeholder Leadership Group, in which all producers and consumers of HRH data are represented. Working collaboratively enables stakeholders to exchange data with one another—often for the first time—as well as reduces redundant data collection and provides a comprehensive picture of human resources from both the public and private sectors.

The SLG model brings all stakeholders together in one room to assess their common needs for an HRIS. Together, they develop the specifications for the system and initiate, lead and monitor all HRIS strengthening activities. The result is an HRIS that is appropriate for their context and tailored to their needs—a system they designed for themselves.

Section I includes the following tools for organizing and managing a SLG:

- Establishing the Stakeholder Leadership Group
- Stakeholder Leadership Group Principles of Operation and Terms of Reference
- Developing Human Resources Policy and Management Questions.

### **Assessing and Improving Existing Systems**

Once formed, the first task of the SLG is to assess the systems that are already in place for supporting a strengthened HRIS. This comprehensive assessment should consider not only any existing electronic HR information systems, but also paper-based systems, data collection forms and processes for gathering data about the health workforce. In addition, the information and communications technology (ICT) infrastructure needed to support a software-based HRIS should be considered.

The assessment provides a complete picture of how HR information is currently collected, managed and reported; the tools and processes that are in place for managing HR data; and the gaps that need to be addressed to meet the most pressing needs. Often the results are surprising. During the assessment phase, the SLG may discover underused sources of HR information managed by different departments or organizations that can be linked together to immediately improve HRH data access for all.

Following the assessment, the SLG typically can recommend rapid improvements to ICT infrastructure to appropriately bring networks, Internet connectivity, hardware, software and even electrical supply up to standards that can support an HRIS. These improvements can generally be implemented quickly and often result in increased efficiency and productivity. In addition to improving the ICT infrastructure, recommendations for improving data collection, training procedures and technical support should be made at this point in the process. Data quality is of primary importance and should be emphasized at every step of the process, from initial data collection to data analysis and interpretation.

Section II includes the following tools for assessing and improving existing systems that support the HRIS:

- Conducting the HRIS Assessment
- Health Information System and Strengthening Activity Survey
- HRIS Assessment Questionnaire
- Data Quality Considerations in Human Resources Information Systems (HRIS) Strengthening
- Designing Data Collection Tools and Procedures
- Sample Health Employee Data Collection Forms (printable format and Microsoft Excel format for electronic use).

### **Developing Software Solutions**

Once the infrastructure can support an HRIS, the next step is to develop HRIS solutions that are customized for the country context and answer the key HR policy and management questions for that country. These solutions may consist of interim, or “step,” solutions that build on tools and processes already in use or, if appropriate, one or more of the mature solutions in the Capacity Project’s iHRIS software suite.

A “step” solution is most appropriate for contexts that do not yet have the resources or infrastructure to support a complete and mature HRIS. The step solution uses and improves existing tools, systems and processes to quickly start collecting and using HR data while progressing in manageable steps toward a more complete HRIS.

The Capacity Project iHRIS (integrated human resources information system) suite comprises three core software solutions to address the most critical health workforce planning and management issues:

- **iHRIS Qualify:** a health professional certification and licensure system
- **iHRIS Manage:** a human resources management system
- **iHRIS Plan:** workforce planning and modeling software.

Working together in a country setting, these three systems provide a powerful feedback loop for analyzing, planning and managing workforce resources and needs. Each of the three systems may also be deployed independently or integrated with software products already in place to provide a customized, contextual solution, filling in any gaps that existing systems may have left. Distributed as Open Source code, all three products can be downloaded, used and modified with no licensing fee.

Section III provides the following tools for developing HRIS software solutions and deploying the iHRIS Suite:

- Use Case Development Tool
- Case Study: Developing an HRIS Step Solution
- Brief Guides to the iHRIS Software Suite, iHRIS Manage, iHRIS Qualify and iHRIS Plan
- iHRIS software suite and accompanying technical documentation (electronic version of Toolkit only).

### Using Data to Make Decisions

The primary aim of any HRIS should be to promote better use of data to drive effective decision-making for addressing daily challenges and positively impacting HR policies and practice. Even when policy-makers and other key stakeholders have access to extensive information about the health workforce, it may be difficult to see uses for these data beyond the usual reports previously generated with paper records. All stakeholders should be engaged in understanding how they use data, both individually and organizationally, and what factors are important in their context for using data effectively.

This step of the process focuses on providing opportunities for stakeholders to experience critical decision-making scenarios so they can develop their skills using real data in real-life situations. Stakeholders will understand different models for projecting health workforce needs into the future as the basis for strategic planning. At this point, it is often helpful to improve communication among users of data and leverage opportunities for improved data-sharing across different levels of the organization and with other stakeholders.

Section IV provides the following tools for improving the use of data to make decisions:

- Building the Bridge from Human Resources Data to Effective Decisions: Ten Pillars of Successful Data-Driven Decision-Making
- An Overview of Human Resources for Health (HRH) Projection Models
- Creating a Data-Sharing Agreement.

### Ensuring Sustainability

An information system requires ongoing support and improvement to ensure maximum utility and sustainability. Depending on the context and needs of the country, sustainability strategies include continuous collection of feedback from stakeholders about changing data needs and rolling out improvements that align with those needs. The early involvement of stakeholders with the design and eventual implementation of the HRIS encourages their sense of ownership.

Skills development is necessary for maintaining and improving computerized information systems. This step of the HRIS strengthening process should include ongoing training of data collectors, information system support staff and data managers to support and improve technology infrastructure, data quality and integrity. Linking disparate systems often results in improved data use and quality. A sustainability strategy could also include

developing regional user communities to facilitate problem solving and share system improvements, possibly in collaboration with local educational institutions.

Section V provides the following tools for ensuring sustainability and continuous improvement of the HRIS:

- HRIS Performance Monitoring Plan
- Case Study: Integrating HR Information Systems
- Resources for Implementing HRIS Strengthening.

### **Using This Toolkit**

If you are planning to develop a new human resources information system or improve an existing system, we highly recommend that you read through the entire Toolkit and develop a plan for implementing the HRIS strengthening procedures before you start system development.

Several steps in the HRIS strengthening process must be completed before actually starting to develop the HRIS, including forming a Stakeholder Leadership Group, conducting an HRIS assessment and improving existing systems, infrastructure and data collection procedures. It may seem like these steps will take a lot of time, but we have found them to be essential in ensuring that the HRIS strengthening activity is successful and can be sustained over the long term. The initial planning steps will make certain that the HRIS you develop actually meets your needs and saves costs and time when software development gets underway.

HRIS strengthening activities and this Toolkit are primarily aimed at national-level ministries of health and similar bodies with the aim of improving the HRIS for the country's health workforce. However, we have found that the methods and tools described in this Toolkit, and the accompanying iHRIS software, may readily be adopted by other large organizations seeking to improve HRIS. Other groups that will benefit from applying these methods include: private or nongovernmental organizations managing health workers in the country; districts adopting an HRIS to track local health staff; professional licensing or certification associations tracking a cadre of qualified health workers; or large hospitals seeking to better manage employees. These methods are general enough that with a little adaptation, they may also be applied to other sectors besides health.



# HRIS

## STRENGTHENING IMPLEMENTATION TOOLKIT

### **Section I: Building HRIS Leadership**

**Goal:**

Establish and manage a Stakeholder Leadership Group to guide HRIS strengthening activities.

**Tools:**

Establishing the Stakeholder Leadership Group

Stakeholder Leadership Group Principles  
of Operation and Terms of Reference

Developing Human Resources Policy  
and Management Questions



# Establishing the Stakeholder Leadership Group

## Building HRIS Leadership

The Stakeholder Leadership Group (SLG) is a formal group of representatives from all stakeholders that produce and use human resources for health (HRH) information. Establishing this group is an essential first step when implementing an HRIS. This group will initiate, lead and monitor all activities in HRIS strengthening.

The SLG empowers stakeholders to envision and develop an HRIS that meets their needs. The SLG ensures ownership of the system by those who will use it and builds the necessary capacity to support and improve the HRIS. Furthermore, bringing together the key stakeholders opens communication channels between groups that typically may not interact, facilitating collaboration and sharing of data.

### Who Are the Stakeholders?

A participatory and inclusive approach is the key to the SLG's success. An effort should be made to identify and invite representatives from all government and nongovernment groups that produce and use HRH data to join the SLG.

Think broadly when considering whom to invite as stakeholders. Ask:

- Who provides HRH information?
- Who uses HRH information?
- Who are the HRH decision-makers?

Ministry departments (especially personnel, information technology and payroll units), licensing and registration/certification bodies, private-sector organizations, hospitals and health facilities, scholarship boards and training institutions may all be stakeholders. Ideally, the SLG should include experts in health workforce planning and information systems. Depending on the scope of HRIS development, health staff may be invited to ensure that individual-level data remain accurate and that they have access to necessary information. Community leaders and volunteers may also be stakeholders in certain contexts.

Take care, however, not to create a group that is too large in size, as large groups tend to be less effective. It is best to invite one or, at most, two representatives from each stakeholder to join the SLG.

### The Role of the SLG

The SLG's role is to **lead, coordinate and provide oversight for all HRIS strengthening activities**. In this role, the SLG manages the following activities:

- Establish consensus on the mission and purpose of the SLG
- Agree on operating principles and terms of reference for organizing the SLG
- Develop policy and management questions to inform data needs and HRIS functions
- Define indicators to monitor the status of the health workforce via the HRIS
- Identify existing systems, including infrastructure, databases, forms and collection mechanisms at all levels
- Prioritize requirements for the HRIS
- Select an appropriate HRIS software package to meet immediate needs
- Determine timelines and meetings for HRIS strengthening activities
- Address issues pertaining to data confidentiality, privacy and ownership and policies for data-sharing
- Establish data-sharing agreements with partners, collaborators and one another
- Share findings and tools with other ministries, sectors, countries and regions.

## Getting Started

The initial meeting should include representatives from as many identified stakeholders as possible, explain the need for and benefits of a strengthened HRIS and provide a general overview of the HRIS strengthening process, as outlined in the introduction to this Toolkit.

The outcome of the first meeting should be a formally charted SLG, including terms of reference for the group and principles of operation for the meetings. Terms of reference address issues of group leadership, membership, accountability, mission, functions, decision-making processes and duties. Principles of operation might include such principles as equality of all members, the need to hear from all participants and the need to reach consensus for decisions to occur. (Sample terms of reference and operating principles are included in this Toolkit.) The initial meeting is also a good time to decide on a meeting schedule and location.

Now the group is ready to begin defining the key HRH policy and management questions that need to be answered by an HRIS. (A tool for developing these policy and management questions is included in this Toolkit.) It is critical that the stakeholders identify and own these questions to ensure the success and usability of their HRIS.

Once the SLG agrees on these questions, the group should continue to meet regularly to provide direction for HRIS strengthening activities: infrastructure strengthening, data collection and inputting, HRIS selection and customization, report development, use of data for decision-making, data-sharing and confidentiality policies and continued maintenance and development of the system. (Each section in this Toolkit provides resources and tools to assist the SLG with conducting these activities.)

The initial assessment stages of HRIS strengthening will help the SLG to identify gaps and begin forming an overall strategic plan for strengthening the HRIS. This strategic plan can then be refined into iterative active plans, such as three-month, six-month or year-long workplans, that proceed step-by-step toward closing the gaps. The SLG's primary responsibility throughout is to guide and manage the HRIS implementation process. As the process moves forward, the group should regularly evaluate the progress of HRIS strengthening against agreed-upon targets and adjust either the targets or the implementation steps as needed. At every juncture, the most important outcome is that ownership for the HRIS is being built and capacity is being developed among all stakeholders.

# Stakeholder Leadership Group Principles of Operation and Terms of Reference

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## Building HRIS Leadership

The **Stakeholder Leadership Group (SLG)** is comprised of representatives of human resources for health (HRH) decision-makers, both producers and consumers of HRH information. (For more information about the SLG, please see “Establishing the Stakeholder Leadership Group” included in this Toolkit). Often the formation of an SLG results in new collaborations and therefore requires new definitions of how the group will work together to accomplish common goals. The purpose of this tool is to assist the SLG in developing the operating principles and other agreements that will guide the group’s work. The two documents described below provide a reference for the group about the ways in which it will function and what its purpose and goals are.

### Principles of Operation

During the initial meetings of the SLG, the members should decide how the group will operate. The first step is to create a document that outlines the group’s **Principles of Operation**. This document will define the specific ways in which the group will function and the values that underline the group’s operations. The final record provides a reference for the group and ensures that expectations are clearly defined.

The SLG should consider several questions while discussing the Principles of Operation. Although the following list of questions is not exhaustive, it provides a starting point for the group’s discussion:

- Logistics
  - Are all necessary groups represented in the SLG, including internal and external groups?
  - What is the group called?
  - When and how often will meetings be held?
  - Where will meetings be held? Is a neutral location preferable?
- Group roles
  - Who will facilitate and lead the meetings?
  - Is there a smaller guiding committee of the SLG?
  - Are there critical participants without whom the meetings cannot take place?
- Decision-making
  - How will decisions be made? By consensus? Majority rule?
  - Is the group comprised of primary and secondary stakeholders, or are all members of the SLG equal?
  - How are agendas decided?
  - How is activity ownership determined? Is activity ownership uniform for each area of HRIS strengthening, or does it vary according to area of focus?
- Communication
  - How will data be shared? What policies or agreements need to be drafted to address issues of data-sharing?
  - What documentation will be produced in these meetings? Who will produce and maintain the documentation? How will the documentation be distributed to members?
  - Is there a feedback procedure?
- Membership rules
  - Are others welcome to attend or join SLG meetings?
  - What attendance record is acceptable?

- Are all members expected to contribute to the work?
- Are all members expected to act as resources for one another?

### Terms of Reference

After the Principles of Operation have been established, the SLG should discuss the Terms of Reference. The **Terms of Reference** describe the group's purpose, vision and goals. In addition, the Terms of Reference may clarify the specific activities to be undertaken, which team members are responsible for each activity and when projects should be accomplished.

The final Terms of Reference document should reflect the SLG's goals and needs. It can be organized into the following format:

- Background
  - What is the country's current HRIS system? (Describe)
  - Why was the SLG formed?
- Purpose
  - What is the overall mission and vision of the SLG? (Example: To create a central source of HRH data)
  - What are some of the SLG's specific goals and how do these goals relate to the group's larger mission? (Example: To link data from existing systems, to ensure stakeholder access to data)
  - What are the major obstacles to accomplishing these goals? How will these obstacles be addressed?
  - Does the SLG have any other specific duties?
- Structure and composition
  - To whom is the SLG accountable?
  - Who is the chairperson of the group? Who is the secretary? Are there any other roles that need to be established?
  - Are there any smaller working groups within the SLG? Who are their members? What are their functions?
- Operations
  - What is the group's scope?
  - What does the group intend to accomplish? What is the timeline?
  - What are the expected functions of the group?
- Policies
  - Who will own the group's outputs (e.g., the HR information system)? Who will have access to them?
  - Can these outputs be used for commercial purposes?

Collaboratively, the SLG can decide how detailed the Terms of Reference should be. In some cases, it may be helpful to craft the document as a general overview of the group's purpose and functions. In other cases, it may be beneficial to develop the document more fully to include objectives, scope of work and deliverables.

Once the Principles of Operation and the Terms of Reference have been drafted, they should be shared with the members of the SLG and maintained as reference documents. These documents provide a record of the expected roles, expectations and goals of SLG members and should guide the subsequent work of the group.

# Developing Human Resources Policy and Management Questions

## Building HRIS Leadership

Human resources **policy and management questions** are, very simply, questions about the health workforce that you need to answer. Think of questions that are often asked but cannot be answered because the needed information is not available, current or complete. Once data are input into a human resources information system (HRIS), they can be aggregated, reported and analyzed to provide answers to most HR policy and management questions.

### Policy and Management Question Development

Why develop questions before the data are collected? The process of defining the questions determines what data need to be collected and what reports need to be run on that data to produce the answers. When the HRIS is designed to address the most pressing HR questions, it is better able to address specific country needs and staff members spend less time collecting unnecessary information.

One of the first activities of the Stakeholder Leadership Group (SLG) is to agree on a prioritized list of policy and management questions. (Refer to “Establishing the Stakeholder Leadership Group” in this Toolkit for more information.) We recommend the following process for developing the list of questions:

1. Brainstorm policy and management questions using the examples below as a guide. Brainstorming can happen in the larger group or in small groups that then compile questions with the larger group.
2. Combine duplicate questions and identify categories for drilling down into more detail or disaggregating the data. For example, “How does the health workforce break down by cadre?” and “What is the gender distribution of health workers?” are the same question disaggregated, or displayed, in two different ways. These two questions can be combined as: “How many health workers do we have? By gender? By cadre?”
3. Evaluate whether current data and systems can answer these questions. (This task may be completed by the HRIS development team or a consultant as part of the HRIS assessment process.) Assess:
  - o Which questions can be answered now with the existing HRIS
  - o Which questions require additional data collection
  - o Which questions require linking with data in other systems.
4. Based on this feedback, prioritize the questions as follows:
  - o Immediate need
  - o Expected of the next round of system development
  - o Save for a future version.

These prioritized features are the driving force behind what your HRIS needs to be. You may also want to periodically revisit the list of questions to determine whether new questions should be included or old questions are no longer a priority. The HRIS should adapt to user needs—not the other way around.

5. Share the final list of questions with the full SLG. The features identified as the highest priority should be used to select an appropriate HRIS solution and determine what customizations need to be made to the system.

### Question Examples

Use the following examples of policy and management questions as a starting point for brainstorming. These are examples only and should not limit you in the scope or number of questions you identify. All questions should be considered during the initial brainstorming, although some may prove to be outside the bounds of an HRIS. The final list of questions should represent the HR policy and management issues that are most important to you.

- Training
  - What are primary in-service training needs?
  - Are health professionals meeting their continuing education requirements?
- Incoming workforce
  - How long are positions posted before suitable candidates are hired?
  - How many trained students pass their certification/accreditation exams?
- Deployment and planning
  - How many health workers are working in each region and where are they deployed?
  - How many staff are working in the public sector, private sector (including nongovernmental organizations and faith-based organizations) or both?
- Staff management
  - How many posts exist, and how many are filled or vacant?
  - What staff movements have taken place, including promotion, transfer, salary increase, etc.?
- Attrition
  - How many health workers are nearing retirement age?
  - What are the causes of attrition for health workers?

### **Disaggregation Category Examples**

Depending on how you want to view and use the data, you may choose to display or disaggregate, the answers to these questions by:

- Cadre
- Job classification
- Position
- Qualification(s)
- Gender
- Age
- Marital status
- Region/district
- Rural vs. urban
- Training institution (including out-of-country institutions)
- Level of education achieved
- Certifications/accreditations
- Time/length of service
- Sector (i.e., public or private)
- National vs. foreign national.

### **You May Also Want to Know**

In addition to determining the key policy and management questions, the SLG may find it helpful to collect additional information on each question. These questions will help refine the system specifications and write use cases (see the Use Case Development Tool in Section IV). For each question, try to identify:

- Who requires this information
- What goal will be accomplished with the information
- How often is the information required (i.e., daily, weekly, monthly or annually)
- How the information should be presented (as a chart, graph, tabular report, spreadsheet, etc.).



# HRIS

## STRENGTHENING IMPLEMENTATION TOOLKIT

### **Section II: Assessing and Improving Existing Systems**

**Goal:**

Identify, assess and improve existing systems and processes that support the HRIS.

**Tools:**

Conducting the HRIS Assessment

Health Information System and Strengthening  
Activity Survey

HRIS Assessment Questionnaire

Technical Brief: Data Quality Considerations in  
HRIS Strengthening

Designing Data Collection Tools and Procedures

Sample Health Worker Data Collection Form



# Conducting the HRIS Assessment

## Assessing and Improving Existing Systems

Once the Stakeholder Leadership Group (SLG) has formed an idea of what is needed in a human resources information system (HRIS), it is only natural to want to jump right into developing the new system. But it is critical at this point to pause and take a detailed look at what already exists before moving forward. This step involves a detailed inventory of the existing HRIS capabilities and infrastructure across the various ministries, councils and organizations that will be using the new HRIS solution.

This assessment should encompass all aspects of an HRIS, including existing health information systems that may link to the new system, data collection forms, processes for collecting and managing data and underlying information and communication technology (ICT) infrastructure. Specifically, the assessment documents existing hardware, software, databases, networks, Internet connectivity, data collection and quality control processes, as well as technical support procedures.

A detailed assessment of this kind may seem too time-consuming at first, especially when the needs for human resources for health (HRH) information are pressing. But the assessment will save time and money in the long run. The assessment should reveal all existing sources of HRH information and all resources available to support the HRIS. You may uncover sources of HR data that you didn't even know existed. Instead of building a full HRIS from scratch, you may find an existing system that merely needs expansion or improvement to meet your needs.

By widening the assessment to include other health information systems, you can also identify the needs that other systems have for HRH data, which may not be obvious. A single authoritative source of HRH data that can feed into other health information systems (HIS) reduces redundancy and improves the accuracy of health information overall (see the case study in Section V for more information on integrating systems). The HIS survey tool included in this section will help fit the strengthened HRIS into the broader context of the overall health system. At the very least, you will have a complete picture of the resources that are currently available and any gaps that need to be filled.

### Who Is Involved?

This section of the Toolkit includes two assessment forms: a broad survey designed to identify all health information systems, including any HRIS that are currently operating; and an assessment questionnaire that focuses on HR information systems specifically.

Schedule personal interviews with key informants working with HRH data. Look for both producers and consumers of HRH data when considering who to interview (often the person is both a producer and a consumer). The following types of people are usually involved with HR information and should be prioritized for interviewing:

- Managers of health management information systems (HMIS)
- Statisticians, usually located in the health statistics unit
- Payroll staff
- HR senior managers, personnel officers and records officers in the HR unit
- Undersecretaries, director generals or principal secretaries
- Chief nursing officers
- Health planners
- Registrars from councils, such as the nursing council
- All owners of health information systems that can be identified.

You will probably find that the key HRH informants are already members of the SLG. One-on-one interviews should be conducted with each member of the SLG during the assessment phase. In addition to evaluating

existing HRIS capabilities and limitations, these interviews will help establish expectations regarding system functionality and priority requirements that the new HRIS needs to support.

## A Sample Interview

The survey and assessment questionnaire are detailed forms for conducting the HRIS assessment. These forms may be provided to key people prior to the interview or when a person is not available for interviewing. However, you may not always be able to complete the full questionnaire.

In lieu of filling out the full questionnaire, you may choose to conduct a rapid assessment during the scheduled interview time. In those cases, make sure to collect basic information from the interviewee. Use the following questions as a guide for conducting the interview:

1. What is your name, job title and unit or organization where you work?
2. Do you use a computer at work on a regular basis?
3. Do you have a need in your work for HR software or tools? What tasks do you need to accomplish?
4. Is HR information available to you? Why or why not?
5. How easy is it to access HR information (e.g., information concerning the number of staff, positions, locations, rate of attrition or other critical personnel information)?
6. To what extent do you believe HR data are accurate and up-to-date? Why?
7. To what extent do you believe HR data are used in human resources planning?
8. What stakeholders do you think exist who have a stake in HR information?
9. Who is responsible for the collection of HRH information?
10. What specific information is collected on health workers? Provide examples of forms used, if possible.
11. How often is health worker information collected or updated?
12. What systems or processes are used to capture and track information on health workers? Consider databases, spreadsheets and paper forms as well as software.
13. Are your needs met by the system(s) you are currently using? If not, what are your three biggest needs?

If a system that manages HR information is identified, here are questions to ask anyone who works with that system:

1. Is the system electronic or paper-based?
2. How do you access the system?
3. How frequently and through what methods is the system updated?
4. What sectors of the health care workforce are included in the system?
5. What reports are available from the system and who uses them?
6. Who maintains the system or has responsibility over the system?

## Identifying the Gaps

Several areas where improvement is needed should emerge from the assessment responses. These areas can generally be divided into three categories:

- HR data quality, including data collection and management
- HR information system requirements
- ICT infrastructure needs.

Each type of need should be addressed separately. It may be helpful to list all the gaps separately by category, and then prioritize each need within that category. Consider costs and time required to address the gap as well as its relative importance.

Data quality gaps can be improved by revising data collection forms, introducing measures for ensuring data quality and improving procedures for collecting and managing data. The remaining three tools in this section will help address gaps in data quality.

HR information system requirements are any needs that the HR software should address once it is developed. Refer to this list when evaluating HRIS solutions or writing specifications for software developers. Refer to Section III for help with this.

Improvements to existing ICT infrastructure can generally be implemented quickly. Even small improvements often result in increased efficiency and productivity. The following are key ICT improvements that are often identified as gaps for supporting a mature HRIS:

- Reliable electrical power
- Computer access for HRH and ICT staff
- Backup system
- Updated software
- Access to spare parts for computer repair
- Local area network access
- Internet connectivity
- Access to shared files or resources
- Staff training in computer use
- ICT technical support
- Technical support service-level agreements
- Antivirus protection
- E-mail access
- Skype or mobile phone access.

You may find it most expedient to address ICT improvements immediately. We recommend developing an ICT infrastructure improvement plan and budget, including a timeline. Then identify local consultants and vendors to provide needed hardware, software and services. Remember to include staff training on new computers, software and procedures, as well as technical support, in any infrastructure improvement plans.



# Health Information System and Strengthening Activity Survey

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## Assessing and Improving Existing Systems

This survey is designed to be a high-level qualitative inventory of all health information systems (HIS) and system strengthening activities present in a country, including human resources information systems (HRIS), as well as other areas of information management in health care. The survey has two goals: a) to highlight opportunities for system strengthening work; and b) to facilitate interoperability between related systems and activities.

Please use the following sample form, which includes guidelines and example data, as a reference when filling out the survey. A blank template is provided to record each system or activity found. **Photocopy and complete a copy of the template for each system or activity.**

The remaining sections of the tool provide guidance for the types of business domains that most often exist within health systems to help locate and identify relevant systems and activities. The business domains are derived from the HIS strengthening work of the Health Metrics Network (HMN), a global partnership that focuses on helping countries and organizations improve health by strengthening the systems that generate health related information for evidence-based decision-making. HMN collaborated with health informatics experts to identify ten building blocks, or *domains*, of HIS. For a comprehensive assessment of HIS and more information on HIS strengthening, visit <http://www.who.int/healthmetrics/en/>.

Once you have completed the survey, review it with the Stakeholder Leadership Group (SLG) to determine where there might be overlaps in HRIS information. For example, you may find that an existing system already tracks health worker trainings or certifications, and could be linked to an HRIS in development to supply missing data on health professionals' qualifications. The survey should also clarify any gaps in health worker information that are present, such as if salary or deployment data are not being tracked in any system.

Identifying these gaps and overlaps in data will factor into the SLG's plans for strengthening the HRIS. For example, instead of building an entirely new system, the group may find it sufficient to link two existing systems and improve them incrementally. At minimum, the survey will provide a complete picture of all health information systems present in the country that the SLG and other decision makers can use as a reference going forward.

### Completed Template Example for Reference

<b>Country:</b>	Senegal	<b>Date:</b>	2009-03-15
<b>Organization:</b>	The Capacity Project/IntraHealth International		
<b>Surveyor(s):</b>	John Doe, HRIS Advisor		
<b>Mobile:</b>	011-919-555-5555		
<b>E-mail:</b>	jdoe@capacityproject.org		
<b>Business Domain:</b>	Human Resources for Health		
<b>System/Activity:</b>	Ministry of Health HRIS (Human Resources Information System)		
<b>Scope:</b> <i>What does the system or activity cover? (e.g., facility, district, national, public, private, FBO)</i>	National (Public Sector)	<b>Date:</b>	04-Aug-08
<b>Brief Description:</b> <i>Include just enough info to convey an understanding of the system or activity.</i>	The Ministry of Health's HRIS is designed to improve the country's access to public service health worker information for improved policies planning and service delivery. The system supports hires, departures, transfers, pay changes and tracking training.		
<b>Technology/Software:</b> <i>Name of established product (include web address) or custom tool (e.g., Excel, Access).</i>	iHRIS Manage ( <a href="http://www.capacityproject.com/hris">www.capacityproject.com/hris</a> )		
<b>Status:</b> <i>Is the system in the design, pilot, scaling up or operational phase?</i>	Operational		
<b>Lead Organization(s):</b> <i>Owning organization if an established system. Lead implementing organization if a strengthening activity.</i>	Ministry of Health		
<b>System Contact Name:</b>	Jane Gaye		
<b>Mobile:</b>	+(221) 33 869 55 55		
<b>E-mail:</b>	jane_gaye@minsante.sn		
<b>Supporting Donors:</b>	USAID, PEPFAR		
<b>Is HRH data collected, stored or used by this system?</b>	Yes or No		
<b>If yes, what type of HRH data?</b>	Data on health workers employed in the public sector, including deployment, salary and in-service training information.		
<b>What would be the benefit of linking this system to an HRIS?</b>	Combined with an HRIS tracking private sector health workers, these systems would provide a complete picture of health professionals in the country.		

## HIS Assessment Survey

Photocopy this sheet and complete the form for each health information system or strengthening activity found. Append the completed form to the appropriate business domain section.

<b>Country:</b>		<b>Date:</b>	
<b>Organization:</b>			
<b>Surveyor(s):</b>			
<b>Mobile:</b>			
<b>E-mail:</b>			
<b>Business Domain:</b>			
<b>System/Activity:</b>			
<b>Scope:</b>		<b>Date:</b>	
<b>Brief Description:</b>			
<b>Technology/Software:</b>			
<b>Status:</b>			
<b>Lead Organization(s):</b>			
<b>System Contact Name:</b>			
<b>Mobile:</b>			
<b>E-mail:</b>			
<b>Supporting Donors:</b>			
<b>Is HRH data collected, stored or used by this system?</b>	Yes	or	No
<b>If yes, what type of HRH data?</b>			
<b>What would be the benefit of linking this system to an HRIS?</b>			

Business Domain:	Health Services
<p>The <b>Health Services</b> domain covers systems directly involved in or informing health service delivery. Use the following as examples to discover systems and activities in this domain. Start with the Ministry of Health's HMIS group, if one exists, and any health worker associations for leads. The Regenstrief Institute's OpenMRS project, the University of Washington's School of Public Health, the CDC and John Snow Inc. are organizations with a history of strengthening health service delivery information systems. (Make a copy of the template for each system found.)</p>	
<p><b>Example systems</b> might include:</p>	
<ul style="list-style-type: none"> <li>• Individual health record (look for pilot implementations in specific facilities)</li> <li>• Disease surveillance and service statistics (such as HMIS)</li> <li>• Vital Statistics registration (births/deaths)</li> <li>• Hospital information system.</li> </ul>	
<p><b>Common software</b> used might include:</p>	
<ul style="list-style-type: none"> <li>• District Health Information System (<a href="http://www.hisp.info">www.hisp.info</a>)</li> <li>• OpenMRS (<a href="http://www.openmrs.org">www.openmrs.org</a>)</li> <li>• Care2x (<a href="http://www.care2x.org">www.care2x.org</a>)</li> <li>• Microsoft Excel or Access custom systems.</li> </ul>	
<p><b>Common strengthening activities</b> might include:</p>	
<ul style="list-style-type: none"> <li>• Pilots or scaling up any of the above</li> <li>• Establishment of standard classifications for diseases, symptoms and procedures</li> <li>• Facility infrastructure strengthening (including use of cell phones for reporting and access)</li> <li>• Health worker information and communication technology (ICT) training.</li> </ul>	

*Append a completed HIS Assessment Survey form for each system or strengthening activity found in this business domain to this sheet.*

Business Domain:	Laboratory
<p>The <b>Laboratory</b> domain covers information related to laboratory analyses and findings. This domain is at an emergent stage in many countries, so there may not be any laboratory information management systems (LIMS) or LIMS strengthening activities. Start with the Ministry of Health or any Allied Health Professions regulatory council. (Make a copy of the template for each system found.)</p>	
<p><b>Example systems</b> might include:</p>	
<ul style="list-style-type: none"> <li>• Specimen registration and tracking LIMS</li> <li>• Determination of results (look for pilot implementations at specific labs)</li> <li>• Notification of reportable diseases.</li> </ul>	
<p><b>Common software</b> used might include:</p>	
<ul style="list-style-type: none"> <li>• Open Electronic Library Information System (<a href="http://www.openelis.com">www.openelis.com</a>)</li> <li>• Microsoft Excel or Access custom systems.</li> </ul>	
<p><b>Common strengthening activities</b> might include:</p>	
<ul style="list-style-type: none"> <li>• Pilots or scaling up any of the above</li> <li>• Establishment of standard classifications for laboratory data</li> <li>• Laboratory infrastructure strengthening</li> <li>• Laboratory technician information and communication technology (ICT) training.</li> </ul>	

*Append a completed HIS Assessment Survey form for each system or strengthening activity found in this business domain to this sheet.*

<b>Business Domain:</b>	<b>Pharmaceutical</b>
<p>The <b>Pharmaceutical</b> domain tracks and manages all drugs and supplies for the health system and their pharmacies. Start with the Ministry of Health and the Pharmacist Council, if they exist. NGOs with a history of pharmaceutical information strengthening include MSH's RPM+ project and the SCMS project. (Make a copy of the template for each system found.)</p>	
<p><b>Example systems</b> might include:</p>	
<ul style="list-style-type: none"> <li>• Central stock registration and tracking</li> <li>• Facility stock registration and tracking</li> <li>• Supply chain and distribution.</li> </ul>	
<p><b>Common software</b> used might include:</p>	
<ul style="list-style-type: none"> <li>• mSupply (<a href="http://www.msupply.org.nz">www.msupply.org.nz</a>)</li> <li>• Orion@MSH (<a href="http://www.msh.org/seam/3.3.2.2.htm">http://www.msh.org/seam/3.3.2.2.htm</a>)</li> <li>• Microsoft Excel or Access custom systems.</li> </ul>	
<p><b>Common strengthening activities</b> might include:</p>	
<ul style="list-style-type: none"> <li>• Pilots or scaling up any of the above</li> <li>• Establishment of standard classifications for pharmaceutical data</li> <li>• Pharmacy infrastructure strengthening</li> <li>• Pharmacist information and communication technology (ICT) training.</li> </ul>	

*Append a completed HIS Assessment Survey form for each system or strengthening activity found in this business domain to this sheet.*

Business Domain:	Human Resources for Health
<p>The <b>HRH</b> domain covers all health workers from pre-service training until exiting the health workforce. Start with the Ministry of Health's HR department and professional regulatory councils. (Make a copy of the template for each system found.)</p>	
<p><b>Example systems</b> might include:</p>	
<ul style="list-style-type: none"> <li>• Health worker management systems</li> <li>• Health worker qualification, licensure and certification systems</li> <li>• Training information systems</li> <li>• Workforce planning systems.</li> </ul>	
<p><b>Common software</b> used might include:</p>	
<ul style="list-style-type: none"> <li>• iHRIS Suite (<a href="http://www.capacityproject.org/hris">www.capacityproject.org/hris</a>)</li> <li>• TIMS (<a href="http://www.jhpiego.jhu.edu/whatwedo/comps/tims.htm">http://www.jhpiego.jhu.edu/whatwedo/comps/tims.htm</a>)</li> <li>• I-Tech's TrainSmart (<a href="http://www.go2itech.org/itech?page=home-00-00">http://www.go2itech.org/itech?page=home-00-00</a>)</li> <li>• Microsoft Excel or Access custom systems.</li> </ul>	
<p><b>Common strengthening activities</b> might include:</p>	
<ul style="list-style-type: none"> <li>• Pilots or scaling up any of the above</li> <li>• Establishment of standard job classifications or adherence to ISCO (International Standard Classification of Occupations) codes</li> <li>• Ministry or district infrastructure strengthening</li> <li>• HRH professional information and communication technology (ICT) training.</li> </ul>	

Append a completed HIS Assessment Survey form for each system or strengthening activity found in this business domain to this sheet.

<b>Business Domain:</b>	<b>Environmental Monitoring</b>
<p><b>Environmental Monitoring</b> systems track information about factors in the environment that affect health. In many developing countries, environmental monitoring systems are an emergent area of development. Start with any environmental health program at the Ministry of Health, any environmental regulatory body or environmental research teams at local or regional universities. (Make a copy of the template for each system found.)</p> <p><b>Example systems</b> might include:</p> <ul style="list-style-type: none"> <li>• Water quality and access mapping</li> <li>• Sanitation resources and access</li> <li>• Event reporting systems.</li> </ul> <p><b>Common software</b> used might include:</p> <ul style="list-style-type: none"> <li>• Environment geographic information systems (GIS)</li> <li>• Microsoft Excel or Access custom systems.</li> </ul> <p><b>Common strengthening activities</b> might include:</p> <ul style="list-style-type: none"> <li>• Pilots or scaling up any of the above</li> <li>• GIS and ICT training in conjunction with environment projects.</li> </ul>	

*Append a completed HIS Assessment Survey form for each system or strengthening activity found in this business domain to this sheet.*

Business Domain:	Capacity Building and Communication
<p>This catch-all category refers to the use of informatics tools for skill building in support of health-service delivery, including health, ICT and other areas. This category also includes the use of ICT to support the health system by communicating health information or bringing advance skills to remote locations. Start with the Ministry of Health, especially any HRH Training and Development group, as well as local training institutions. (Make a copy of the template for each system found.)</p>	
<p><b>Example systems</b> might include:</p>	
<ul style="list-style-type: none"> <li>• E-learning (either online or through CD/DVDs and local repositories)</li> <li>• Just-in-time (JIT) learning or protocol standardization through PDAs</li> <li>• Telemedicine</li> <li>• Mobile phone referral support or emergency reporting.</li> </ul>	
<p><b>Common software</b> used might include:</p>	
<ul style="list-style-type: none"> <li>• Moodle (<a href="http://www.moodle.org">www.moodle.org</a>)</li> <li>• MSH's Virtual Leadership Development Program (<a href="http://www.msh.org/projects/lms/ProgramsAndTools/LeadingAndManaging/VLDP.cfm">http://www.msh.org/projects/lms/ProgramsAndTools/LeadingAndManaging/VLDP.cfm</a>)</li> <li>• eGranary (<a href="http://www.widernet.org/digitallibrary/">http://www.widernet.org/digitallibrary/</a>)</li> </ul>	
<p><b>Common strengthening activities</b> might include:</p>	
<ul style="list-style-type: none"> <li>• Pilots or scaling up any of the above</li> <li>• Informatics training for health workers</li> <li>• Information and communication technology (ICT) strengthening for health training institutions.</li> </ul>	

*Append a completed HIS Assessment Survey form for each system or strengthening activity found in this business domain to this sheet.*



# HRIS Assessment Questionnaire

## Assessing and Improving Existing Systems

The HRIS Assessment Questionnaire collects preliminary baseline information on the systems and processes currently used to track and manage the health workforce. Responsibility for developing and managing the health workforce within a country may be spread across a number of different ministries and institutions. Look to the Stakeholder Leadership Group (SLG) to coordinate the dissemination and completion of the HRIS Assessment Questionnaire.

We recommend assigning responsibility for completing the questionnaire to a small team or subcommittee of the SLG, which can then interview the appropriate people for each section of the questionnaire. SLG members should be able to direct the assessment team to members of their organizations or departments who can respond. If no SLG yet exists, consult the most senior official available in the Ministry of Health to advise who should complete the questionnaire.

Information from the HRIS Assessment Questionnaire will provide an initial snapshot of existing HR systems and processes. Use this assessment to begin analyzing current strengths, weaknesses and, most importantly, opportunities for HRIS strengthening activities. The questionnaire is organized into the following areas:

1. Organization information
2. Infrastructure
3. HRIS software
4. Data collection
5. Data reporting and use
6. Sustainability
7. Additional information.

A comments field for further elaboration is included at the end of each section. Fill out the questionnaire in its entirety and include the name(s), department(s) and contact information of all persons who contributed to this assessment, as well as the sections of the questionnaire to which they responded. Present the results to the Ministry of Health and all members of the SLG upon completion.

There may be more than one HRIS or organization managing human resources for health (HRH) information that needs to be assessed. For example, the following types of information systems may be present:

- HR management system for public sector health workers, private sector health workers or both
- Information system to track scholarships, pre-service trainings and/or in-service trainings
- System to manage licenses, registrations and/or certifications of health professionals
- Workforce planning or projection.

**For each system assessed, make a copy of the questionnaire and complete the full questionnaire separately.**

It is often useful to forward this questionnaire to the Ministry of Health in advance of the assessment. The questionnaire results can then be used to prepare for and plan a formal assessment. During this visit, face-to-face interviews and meetings can be conducted with identified key ministry personnel and other stakeholders to form a more complete picture of current HR systems, processes and operations used to train, develop and manage the health care workforce. The results of the assessment can then be used to develop an HRIS strengthening strategy, budget and action plan.



**Section 2: Infrastructure**

		Yes	No	Unsure
2.1	Do you have a telephone in your office or access to a telephone?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.2	Do you have a mobile phone?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.3	If yes, does your mobile phone have internet access or SMS?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.4	If you have a mobile phone, is it provided by your place of business?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.5	Do you have electrical power outlets in your work area?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.6	How many computers are there in your immediate working group?	Number:		
2.7	Do you have access to your own computer or a shared computer?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.8	Do you have network access via this computer?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.9	Do you have Internet access via this computer?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.10	Is there someone in your organization who is qualified to keep the computer(s) functioning well, and is he/she routinely available to deal with any issues?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.11	If yes, is this person located on-site?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.12	If no, how often are they available?			
	<input type="checkbox"/> On call	<input type="checkbox"/> Daily	<input type="checkbox"/> Weekly	<input type="checkbox"/> Monthly
	<input type="checkbox"/> Other (specify):			
Comments:				

### Section 3: Human Resources Information System Software

3.1	Indicate the name of your HRIS:			
3.2	What type(s) of data does your HRIS collect? Check all options that apply.			
	<input type="checkbox"/> Disease statistics	<input type="checkbox"/> Facility	<input type="checkbox"/> HMIS	<input type="checkbox"/> Human resources
	<input type="checkbox"/> Patient records	<input type="checkbox"/> Payroll	<input type="checkbox"/> Pharmacy	<input type="checkbox"/> Pre-service training
	<input type="checkbox"/> Other (explain):			
			<b>Yes</b>	<b>No</b>
				<b>Unsure</b>
3.3	Is this HRIS application paper-based? <i>(If yes, skip to Section 5.)</i>			
			<input type="checkbox"/>	<input type="checkbox"/>
				<input type="checkbox"/>
3.4	Do you receive and enter HRIS information via spreadsheets or other electronic documents?			
			<input type="checkbox"/>	<input type="checkbox"/>
				<input type="checkbox"/>
3.5	Do you receive and enter HRIS information via a database program?			
			<input type="checkbox"/>	<input type="checkbox"/>
				<input type="checkbox"/>
3.6	If so, what is the type of database?			
	<input type="checkbox"/> Microsoft Access	<input type="checkbox"/> Filemaker Pro	<input type="checkbox"/> Oracle	<input type="checkbox"/> My SQL
	<input type="checkbox"/> Other database (specify):			
			<b>Yes</b>	<b>No</b>
				<b>Unsure</b>
3.7	Does this system meet your current needs?			
			<input type="checkbox"/>	<input type="checkbox"/>
				<input type="checkbox"/>
3.8	Do you have a technical support person/team for this HRIS application?			
			<input type="checkbox"/>	<input type="checkbox"/>
				<input type="checkbox"/>
3.9	Is there a system or process for sending comments for improving this HRIS application?			
			<input type="checkbox"/>	<input type="checkbox"/>
				<input type="checkbox"/>
3.10	Are updates or changes made regularly to this HRIS application based on the feedback received?			
			<input type="checkbox"/>	<input type="checkbox"/>
				<input type="checkbox"/>
3.11	Who maintains this HRIS application? Check one option.			
	<input type="checkbox"/> Personnel (MOH)	<input type="checkbox"/> Planning (MOH)	<input type="checkbox"/> Accounting (MOH)	<input type="checkbox"/> Districts
	<input type="checkbox"/> Related ministry	<input type="checkbox"/> Outside consultant	<input type="checkbox"/> Other (explain):	
3.12	How do you access the system? Check all options that apply.			
	<input type="checkbox"/> Any computer with Internet access	<input type="checkbox"/> Networked computer	<input type="checkbox"/> Computer (without network)	<input type="checkbox"/> Printed documents
	<input type="checkbox"/> Unable to access system			
	<input type="checkbox"/> Other (explain):			

3.13	What features are available for data security? Check all options that apply.			
	<input type="checkbox"/> Secure user login	<input type="checkbox"/> Frequent data backups	<input type="checkbox"/> Unknown	<input type="checkbox"/> Other (explain):
Comments:				

## Section 4: Data Collection

		Yes	No	Unsure
4.1	Is a standard set of data collected on a regular basis? (If no, skip to section 6.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.2	Indicate the type of data collected on a regular basis. <b>Fill out a new sheet for each type of data collected.</b> Make additional copies of this section and attach.			
	<input type="checkbox"/> Disease statistics	<input type="checkbox"/> Facility	<input type="checkbox"/> HMIS	<input type="checkbox"/> Human resources
	<input type="checkbox"/> Patient records	<input type="checkbox"/> Payroll	<input type="checkbox"/> Pharmacy	<input type="checkbox"/> In-service training
	<input type="checkbox"/> Pre-service training			
	<input type="checkbox"/> Other (explain):			
4.3	How often is this dataset collected?			
	<input type="checkbox"/> Hourly	<input type="checkbox"/> Daily	<input type="checkbox"/> Weekly	<input type="checkbox"/> Monthly
	<input type="checkbox"/> Annually			
	<input type="checkbox"/> Only when requested			
4.4	On which sectors of the health workforce do you collect this dataset? Check all that apply.			
	<input type="checkbox"/> Public	<input type="checkbox"/> Private, for profit	<input type="checkbox"/> Private, FBO	<input type="checkbox"/> Private, NGO
	<input type="checkbox"/> Private, individual	<input type="checkbox"/> Private, association		
	<input type="checkbox"/> Other (specify):			
4.5	List all departments, organizations and/or people that supply this data:			
4.6	How is this dataset collected? Check all that apply.			
	<input type="checkbox"/> Paper	<input type="checkbox"/> Electronic files	<input type="checkbox"/> Personal visit	<input type="checkbox"/> Other (specify):
4.7	From first request to receipt of last entry, how long does the data collection activity take?			
	<input type="checkbox"/> An hour	<input type="checkbox"/> A day	<input type="checkbox"/> A week	<input type="checkbox"/> A month
	<input type="checkbox"/> A year			
	<input type="checkbox"/> Varies:			
4.8	How accurate are the data you receive?			
	<input type="checkbox"/> Very accurate and can be trusted	<input type="checkbox"/> Somewhat accurate but must be verified	<input type="checkbox"/> Inaccurate and cannot be trusted until verified	
		Yes	No	Unsure
4.9	Is a data-quality audit routinely performed?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.10	If routine data-quality audits are performed, how often?			
	<input type="checkbox"/> Daily	<input type="checkbox"/> Weekly	<input type="checkbox"/> Monthly	<input type="checkbox"/> Annually
	<input type="checkbox"/> Only when requested			
4.11	Provide a short description on the type of data collected in this dataset:			
4.12	Attach copies of data collection forms and/or screenshots of computerized systems.			

## Section 5: Data Reporting and Use

		Yes	No	Unsure	
5.1	Do you have a standard set of data or set of reports that you provide regularly?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
5.2	Who are the principal users of the data and/or reports? Check all options that apply.				
	<input type="checkbox"/> Senior management (MOH)	<input type="checkbox"/> Personnel (MOH)	<input type="checkbox"/> Planning (MOH)	<input type="checkbox"/> Accounting (MOH)	<input type="checkbox"/> Districts
	<input type="checkbox"/> Medical facilities	<input type="checkbox"/> Private sector	<input type="checkbox"/> All staff	<input type="checkbox"/> General public	<input type="checkbox"/> Unknown
	<input type="checkbox"/> Other (explain):				
5.3	In what format do you produce reports?				
	<input type="checkbox"/> Paper	<input type="checkbox"/> Spreadsheet	<input type="checkbox"/> Document	<input type="checkbox"/> Other (specify):	
5.4	How often are these data reports produced?				
	<input type="checkbox"/> Hourly	<input type="checkbox"/> Daily	<input type="checkbox"/> Weekly	<input type="checkbox"/> Monthly	<input type="checkbox"/> Annually
	<input type="checkbox"/> Only as requested	<input type="checkbox"/> Other (specify):			
5.5	From the time the request for a report is received, how long does it take to generate a report?				
	<input type="checkbox"/> An hour	<input type="checkbox"/> A day	<input type="checkbox"/> A week	<input type="checkbox"/> A month	<input type="checkbox"/> A year
	<input type="checkbox"/> Varies (explain)				
		Yes	No	Unsure	
5.6	Are these data used for practical decision-making (such as advocating for funds, designing program improvements or influencing policies)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
5.7	If data were easier to obtain, maintain and produce, is there opportunity for additional use in practical decision-making?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Comments:					

**Section 6: Sustainability**

		Yes	No	Unsure
6.1	Did you receive training on your HRIS and/or policies?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6.2	Is there a manual or handbook on your HRIS and/or policies?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6.3	Is there a routine review of the HRIS and/or policies for all employees in your department?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6.4	Can you submit feedback and suggested improvements to the HRIS?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6.5	Are updates routinely made to the HRIS and policies based on user feedback?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Comments:

## Section 7: Additional Information

		Yes	No	Unsure	
7.1	Are there other people or organizations you feel should be interviewed or should complete this questionnaire in order to have a complete picture of the human resources information systems in this country?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
7.2	If yes, indicate who else should be contacted for an interview or to complete this questionnaire.				
7.3	Does your organization's HRIS already link to or share information with other human resources information systems?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
7.4	In your opinion, what are the primary advantages or strengths of your organization's HRIS? Check all options that apply.				
	<input type="checkbox"/> Data accuracy	<input type="checkbox"/> Ease of access to data and reports	<input type="checkbox"/> Ease of updating records	<input type="checkbox"/> Data security	<input type="checkbox"/> Speed of report generation
	<input type="checkbox"/> Other (explain):				
7.5	What are the primary limitations of your organization's HRIS? Check all options that apply.				
	<input type="checkbox"/> Data accuracy	<input type="checkbox"/> Ease of access to data and reports	<input type="checkbox"/> Ease of updating records	<input type="checkbox"/> Data security	<input type="checkbox"/> Speed of report generation
	<input type="checkbox"/> Other (explain):				
7.6	What changes would you recommend be made to the system?				
7.7	Please provide any information about the system that could help the HRIS team to think about how the system could be strengthened.				





# **Technical Brief: Data Quality Considerations in HRIS Strengthening**

Assessing and Improving Existing Systems

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**Please look in the front folder pocket for this brief.**



## Data Quality Considerations in Human Resources Information Systems (HRIS) Strengthening

Samwel Wakibi, IntraHealth International

### Introduction

Organizations rely on data to increase their efficiency today and improve their planning for tomorrow (Rochnik and Dijcks, 2006). Poor data quality results in loss of time, money and customer confidence, and can be cause for embarrassment to an organization. It is estimated that the typical industrial data quality error rate of 1%–5% can constitute a 10% loss in revenue (Redman, 1996). As data are collected, analyzed and translated into meaningful reports for planning and decision-making, data quality problems can occur as information crosses organizational and system boundaries.

Data quality issues have been central to the program experience of the Capacity Project, a USAID-funded global project that helps developing countries strengthen human resources for health (HRH) to better respond to the challenges of implementing and sustaining quality health programs. Experience with issues of data quality has particularly been gained within the Project's focus on strengthening human resources information systems (HRIS) to support health workforce planning and management.

This brief will discuss concepts of data quality and provide examples of the importance of data management specific to the field of HRH, illustrated by the Capacity Project's experience with HRIS strengthening in developing countries.

### Basic Data Quality Concepts

One widely accepted definition of *data quality* in economics, business and medicine is "fitness for use" now and in the future—in other words, how well data meet user needs and expectations (Chapman, 2005; Carson, 2000). Data quality describes the state of data, the set of processes to achieve such a state and data accuracy. For data to be fit for use, they should be free of duplications, misspellings, omissions and unnecessary variations, and should conform to a defined structure (Chapman, 2005; Carson, 2000; Brown, Stouffer and Hardee, 2007).

Data quality addresses:

- Accuracy
- Precision
- Timeliness or currency
- Completeness
- Consistency
- Relevance.

- *Accuracy* refers to closeness of measured values, observations or estimates of the real or true value, without political or personal bias and manipulation. In other words, accuracy is a measure of the extent to which the data reflect reality. Guiding questions to achieve accuracy relate to the reliability of data sources and the process of data collection.
- *Timeliness or currency* refers to availability of data when required. Related factors are knowledge about the period when the data were collected, when they were last updated, how long they are likely to remain current and whether they are processed to give information in time to conduct daily business or inform decisions.
- *Consistency* describes the absence of apparent contradictions and is a measure of internal validity and reliability. Guiding questions to assess consistency include the extent to which the same definitions, codes and formats are followed for the same data across different sources.
- *Precision* refers to the consistency of an indicator in producing the same results. For example, a data collection form with high precision will elicit the same responses if administered repeatedly on a subject. Precision and accuracy differ in that a measure can be precise without being accurate. For example, a measure can repeatedly generate the same incorrect outcomes.
- *Completeness* refers to lack of errors of omission, such as omitted records in a dataset or a variable without data. Completeness addresses the question of whether all eligible data are included.
- *Relevance* refers to availability of required details or data. It helps to answer questions relating to the design of the database or the data collection form. For example, are appropriate data being collected and stored for current and future business initiatives? Do records collected have enough details to answer intended business questions? The default rule is that if the application of the information is unknown, the highest level of detail should be provided. This gives some additional reliability to the data, as it is easier

to discard redundant or unnecessary parts than to search for missing bits and pieces (New Zealand E-government Unit, 2004).

### Field Experience

HRIS strengthening encompasses five activity areas: participatory stakeholder leadership development; information and communications technology infrastructure strengthening; software development, deployment and training; continuous improvement of the initiative; and skills enhancement in related areas such as data-based decision-making.

The Capacity Project has facilitated HRIS strengthening activities in Uganda, Rwanda, Tanzania, Namibia, Southern Sudan, Swaziland, South Africa and Lesotho, and has initiated similar activities in other developing countries. In this process, the Project has addressed data quality issues ranging from accuracy, completeness and consistency to timeliness of both data and information produced.

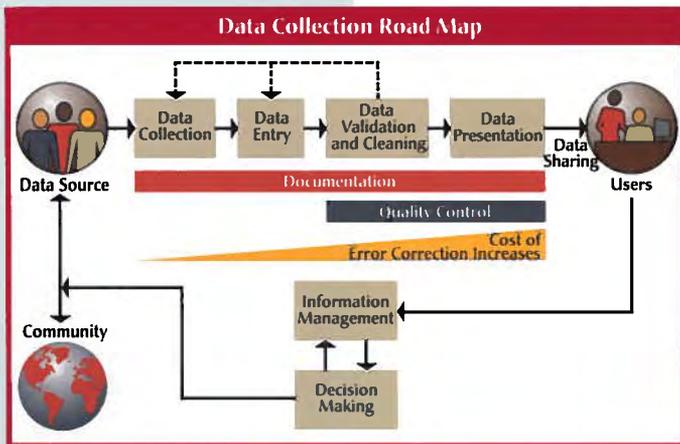


Figure 1: Data Collection Road Map  
(Adapted from Chapman, 2005)

The identified lapses in data quality have been attributed to use of inappropriate technology and operating procedures, lack of data management skills, lack of awareness about data quality and lack of appreciation of the importance of data for decision-

making. Further data quality issues have resulted from environmental influences such as vital events not documented as they happen, documents lost in war, civil strife and fire as well as defaced documents caused by poor storage and vagaries of weather.

As data move through the information management chain, issues of data quality are magnified and the cost of error correction increases (see Figure 1). In the end, without quality information health managers end up making decisions guided by false signals. This leads to inefficiencies such as a skewed distribution of the workforce, "ghost workers" (former employees who remain on the payroll but are no longer working) and delayed salaries, as has been observed in some human resource systems in countries where the Capacity Project works.

### Case Studies

The following examples are drawn from the Capacity Project's field experience.

#### Duplicate Records and Missing Data: Uganda

The Uganda Nurses and Midwives Council

(UNMC) registry tracks data about the nurses, midwives and students of nursing and midwifery who are working in Uganda. UNMC maintains data related to intake into pre-service training programs (referred to as *indexing*); examination results for student nurses and midwives; and registration, licensure and renewal for professional nurses and midwives. With the Capacity Project's assistance, the registry has been upgraded from a paper filing system to a computerized system.

During the development of the database, unique identifiers such as index numbers were found to have numerous duplicates. Previously, the index numbers were generated manually and assigned by different persons in a poorly coordinated process. As a remedy, the computer system was modified to allow generation of a unique personal identification number internally in order to identify students and qualified nurses trained in Uganda. Other data quality challenges included cases of missing records, incomplete records and lost or missing files.

Using the new database, UNMC is now able to report on the number of nurses trained in the country and their retention status, as well as the total number of student nurses by home district.

#### Inconsistencies in Data: Lesotho

The Capacity Project has helped Lesotho's Ministry of Health and Social Services (MOHSS) develop a database to manage the health workforce, and is now in the process of implementing it. Data to be managed using the database are shared between the Ministry of Finance (staff salaries), MOHSS (staff tracking and deployment) and the Ministry of Public Service, which is the hiring agent.

During database development, the team found that these three ministries maintained parallel coding systems for established posts. The ministries also classified units within the MOHSS differently; what was classified as a "program" or "department" in one ministry could be a "subprogram" in another.

While the problem of three parallel coding systems was remedied, it introduced redundancies in the database. In order to eliminate these redundancies, the computer combined the three sets of codes internally and assigned a unique number to the item.

#### Timeliness of Information and Data: Swaziland

The Capacity Project developed and implemented a "step" solution—a less elaborate database that meets short-term needs—for Swaziland. The Ministry of Health and Social Welfare is now able to update the records of its workforce regularly.

The database development process revealed delays in the manual system. These delays meant that retirees and those who left their posts remained on the payroll for a long time,

new employees had to wait for long periods before receiving salaries, employees' contracts were not monitored and payments were not made promptly. This led to lawsuits filed by new and contract staff against the government. Making matters worse, the failure of the system to recognize and respond quickly to a vacancy caused the position to remain unavailable to new hires, seriously depleting the staff available to deliver health care.

The new database has been used to validate payroll data and manage staff movements and shortages effectively. Furthermore, decisions to hire and transfer personnel are now better informed.

### Best Practices in HRIS Strengthening

Best practices in strengthening information systems are assessed in terms of quality added, time saved and reduced costs of data management (United States Department of Defense, 1999; NHS Connecting for Health, 2007). In addition, the Capacity Project addresses data quality issues while providing support in HRIS strengthening. The Project's approach incorporates a quality assurance protocol that ensures accuracy, timeliness, consistency, precision, completeness and relevance of data relative to the special needs of the client.

These best practices are based on field experience gained working with data from various HRIS in Eastern, Central and Southern African countries. Examples of the key areas and approaches adopted include the following.

#### System Development

The implemented databases are longitudinal; they record personal, professional and work-related information and changes about health workers. They cover the period from training to attrition to ensure completeness and accuracy in data required to answer policy and management questions relating to the health workforce.

The Capacity Project employs low-cost, efficient technologies to support HRIS development. Open Source software is preferred, as it is available at no cost and has the capacity to handle the anticipated data volume and processing effectively. Open Source software is computer software distributed free of charge under a license that allows anyone to study, copy, use and modify the source code and to redistribute it in modified or unmodified form, without restriction. Open Source databases developed to manage human resources data can be accessed via the Internet. This allows offsite data cleansing and entry, which minimizes delay in updating.

Information systems are strengthened in planned stages to provide quick gains without overwhelming the supporting infrastructure. Coding systems in organizations are harmonized to ensure consistency across related databases

or modules, and each record is assigned a unique identifier. The synchronized coding system also ensures that searches across databases retrieve the same results.

To minimize data entry errors, two types of data entry are used: dual data entry and spot-checking. A dual data entry system is an important feature that is integrated in database development.

- *Dual data entry* refers to the process of requiring a record to be entered at two separate times, ideally by two separate staff members. The second person to enter the record is prompted to review records that show discrepancies between the two entries, and selects the accurate entry based on the original record. This is the most accurate of the data quality methods but requires twice the cost and time of single entry.
- *Spot-checking* refers to the process of randomly generating a list of records to be checked against the original by a second staff member or supervisor. This method is necessarily less accurate but avoids the dual costs and reduces the time required for data entry.

Both methods permit logging and tracking of data entry errors; analysis of this log may be used for improved training of data entry staff, changes in operating procedures or modification of the software or user interface.

#### Data and Infrastructure Security

To ensure security of data, passwords and role-based access are used to limit accessibility to authorized users. For example, data entry staff have access to a very limited set of data, which is necessary to maintain quality, while analysts or administrators have a much higher level of access. In addition, physical access to the room where servers house databases is controlled, and a backup system is instituted.

#### Management

When necessary, data collection forms are redesigned to ensure precision and completeness. This is done in collaboration with in-country teams so that country reporting requirements are met and data collection burden (an important indirect source of error) is minimized.

Data collectors and the data management team work closely together to bolster understanding of each others' work. This feedback process improves quality of data at the point of collection, minimizing the need for correction later on in the information management chain.

Data collection is kept up to date, uniquely coded, processed regularly and made accessible to all who need it by hosting it in a network. However, access is restricted to authorized persons to ensure confidentiality and security; this practice of secure availability ensures that:

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The Capacity Project  
 IntraHealth International, Inc.  
 6340 Quadrangle Drive  
 Suite 200  
 Chapel Hill, NC 27517  
 Tel. (919) 313-9100  
 Fax (919) 313-9108  
 info@capacityproject.org  
 www.capacityproject.org

This publication is made possible by the support of the American people through the United States Agency for International Development (USAID). The contents are the responsibility of the Capacity Project and do not necessarily reflect the views of USAID or the United States Government.

- The database is kept up to date as data entry is decentralized
- The inefficient practice of creating dissipated and unstructured databases is eliminated
- Data are shared and used within and across organizations for decision-making and planning.

### Data Cleansing

Data from other sources, such as surveys and other databases, are used to detect corrupt or inaccurate data. The data are corrected or removed from the record set or database to be consistent with similar datasets in the system. Data cleansing processes and error prevention strategies occur concurrently with data collection, entry and processing in order to reinforce data quality assurance.

### Data Entry

To minimize data entry errors, original documents are used as the primary sources for creating records in the database. Typing is minimized by the use of pull-down menus, which also speed up data entry and improve consistency. Data entry is decentralized and undertaken closer to the point of data generation; it becomes part of the routine work of employees who collect the data.

### Training and Skills Development

Training sessions are provided for staff members, whose performance is continuously monitored. These trainings are work-related and target mainly data collectors, data entry operators and managers who guide the development and use of reports. Staff members are also actively involved in database development and implementation.

### Conclusion

Data quality is best defined as "fitness for use" for decision- and policy-making. Accuracy, timeliness, consistency, precision, completeness and relevance are all measures of data quality.

The Capacity Project has researched and adopted best practices for ensuring data quality in its HRIS strengthening work. The Project also equips stakeholders with skills in system development and data management to ensure quality, sustainability and continuous improvement in the systems being implemented. Managers in the health sectors are also being trained on use of the data to make informed decisions. It is expected that with high-quality data, efficient and timely systems and comprehensive training in data use, countries will quickly be able to apply regular evidence and policies to their health challenges.

### References

Carson C. What is data quality? a distillation of experience. Washington, DC: Statistics Department, International Monetary Fund, 2000. Accessed 15 June 2007 at: <http://www.thecre.com/pdf/imf.pdf>

Chapman A. Principles of data quality, version 1.0. Copenhagen, Denmark: Global Biodiversity Information Facility, 2005. Accessed 7 July 2008 at: <http://circa.gbif.net/irc/Download/kjeYAKJSmRGFqwAaUY4x8KZ1jH4pYxtv/F37w1U14R0AgTiySEZttf0yRV5bNGn/Data%20Quality.pdf>

Eckerson W. Data quality and the bottom line: achieving business success through a commitment to high quality data. TDWI Report Series. Chatsworth, CA: The Data Warehousing Institute, 101 Communications, 2002. Accessed 7 July 2008 at: <http://download.101com.com/pub/tdwi/Files/DQReport.pdf>

New Zealand E-government Unit. New Zealand E-government Interoperability Framework (NZ e-GIF), Version 2.1. Wellington, New Zealand: New Zealand E-government Unit, 2004. Accessed 6 August 2007 at: <http://www.e.govt.nz/standards/e-gif/e-gif-v-2-1/e-gif-v2-1.pdf>

NHS Connecting for Health, Department of Health (UK). Best practice guidelines. Leeds, England: NHS Connecting for Health, 2007. Accessed 15 June 2007 at: [http://www.connectingfor-health.nhs.uk/systems\\_and\\_services/data/clinicalcoding/data\\_quality/best\\_practice](http://www.connectingfor-health.nhs.uk/systems_and_services/data/clinicalcoding/data_quality/best_practice)

Redman T. Data quality for the information age. Boston, MA: Artech House Publisher, 1996.

Rochnik N, Dijcks J. Oracle Warehouse Builder 10gR2: transforming data into quality information. An Oracle whitepaper. Redwood Shores, CA: Oracle, 2006. Accessed 6 August 2007 at: <http://www.oracle.com/technology/products/warehouse/pdf/transforming%20data%20into%20quality%20information.pdf>

United States Department of Defense. Best practices for data quality oversight of environmental sampling and testing activities. Final Report. United States Department of Defense, 1999. Accessed 6 August 2007 at: <http://www.navylabs.navy.mil/Archive/BP-1999.pdf>

Brown W Stouffer R, Hardee K. Data quality assurance tool for program-level indicators. Chapel Hill, NC: MEASURE/Evaluation Project, University of North Carolina at Chapel Hill, 2007. Accessed 7 July 2008 at: <http://www.pepfar.gov/documents/organization/79628.pdf>

## The Capacity Project Partnership



a nonprofit organization strengthening health programs worldwide

# Designing Data Collection Tools and Procedures

## Assessing and Improving Existing Systems

The HRIS needs assessment may reveal gaps in data collection. Usually, the Ministry of Health (MOH) or other centralized body collects data on health workers from district offices and health care facilities, typically using paper data collection forms. Health professionals may complete additional forms when applying for a registration or license renewal, for instance.

Often there are problems with data collection forms that reduce their efficiency or effectiveness. Common problems include not asking the right questions, collecting too much or too little information or collecting redundant information. Paper forms may need to be redesigned to capture the data that are actually required to answer the key HR policy and management questions. Additional problems with data collection processes may result in incorrect or out-of-date HR data. For example, some respondents may not complete the forms on a timely basis or may submit incomplete forms.

The Stakeholder Leadership Group (SLG) should carefully review the current data collection process and, if necessary, devise or improve upon a data collection plan. This document provides helpful tips for the SLG to consider in the creation of a data collection process and is followed by two sample data collection forms that can be modified as needed.

### Keep Data Current

A routine HRIS is updated on a regular basis to record changes in health worker records as they occur, providing an accurate picture of the available health workforce in a country. Routinely maintaining and updating the HRIS presents several advantages. HR managers and supervisors can quickly note workforce changes, such as an increase in the number of out-migration requests or a drop in student enrollment, and can respond to these changes more effectively. Regularly reviewed, up-to-date data improves accuracy over time and enhances policy makers' ability to make informed decisions in order to meet future health care needs.

Data collection procedures should also be routine and occur on a regular schedule, such as biweekly, monthly or annually, depending on the data being collected. To establish a schedule for data collection, look for and build upon any existing sources of routine data, such as payroll updates, license renewals or training completions.

### Standardize Data Collection Forms to Ensure Completeness

Data completeness is critical for producing meaningful, functional reports that are used to inform decision-making. Review paper data collection forms to ensure that they match any electronic forms and database structures. Make sure that data collected are consistent across districts, facilities and cadres. Streamline forms so data are collected only once from each respondent.

Standardizing data collection forms can facilitate ease-of-use as well as data quality. A good method of standardization is to add selection menus or checkboxes to the form for lists of data, rather than requiring the respondent to fill in a response. These standardized lists may include cadres, posts or job titles, specialties, qualifications and departments.

Critically consider form design to eliminate confusion and errors. Each field on the form should meet a specific goal, such as answering one of the SLG's policy and management questions. When designing a data collection form, ask why you are asking each question. If there is no good reason, consider removing the question. This will also result in a simpler form that is easier for respondents to complete, which may help ensure compliance.

Before distributing forms on a large scale, pilot-test the forms, asking one or more people who have not previously seen the forms to complete them. The piloting process helps ensure that confusing questions or formatting can be identified and addressed before the forms are put to use.

## Reduce Errors in Data Entry

Establishing procedures to minimize data-entry errors when transferring data from paper forms to electronic format often results in improved data quality. Dual data entry, in which a paper record is entered into an electronic database at two separate times by two staff members, is the most effective way to reduce errors; any discrepancies between the two entries can be compared against the original document and corrected.

Should dual data entry be prohibitively expensive or time-intensive, a system of spot-checking, in which a randomly selected list of electronic records is checked against the originals, can be substituted. Logging data-entry errors and reviewing errors serves as a starting point for improvements in training methods, data collection forms and software modifications.

To validate data, have employees review their own records, if possible. Additionally, health professionals can validate their information when they renew their registrations or licenses. Another way to validate data is to provide regular reports to representatives at the district or facility level, which can then be reviewed and updated.

## Determine Data Flow and Obtain Compliance for Sharing Data

Enabling access to aggregated HRH data facilitates workforce planning and research across sectors, including nongovernmental organizations, academic researchers and policy makers. In addition, this kind of data-sharing improves accuracy and allows everyone to make better decisions. Processes should be put in place to facilitate the flow of data and reports between the central and district levels, as well as hospitals, health centers and other health service providers, while ensuring the security of sensitive information. This exchange of information not only improves accuracy, but also enables health planners at all levels to gain access to information valuable for policy and administrative decisions.

The SLG should determine how data should flow among health centers, hospitals and districts and to the central Ministry of Health, with reports regularly returning to each. An individual responsible for collecting and sharing data at each point should be identified. (For additional information on sharing data, see “Creating a Data-Sharing Agreement” in Section IV of this Toolkit.)

## Maintain Data Security

Although sharing data is essential for maintaining quality data and encouraging evidence-based decision-making, data integrity and security are critical elements of building trust in any system. HRIS data include personal information that must be kept secure, and therefore aggregated data should only be shared among an appropriate, approved audience.

The SLG should develop a data-security policy. Consider including the following recommendations:

- Assign roles to users with different levels of access to the HRIS. Here are some suggested roles:
  - **Database administrator access:** ICT director, system administrator and database manager
  - **Data entry staff, level 1 access:** Enters records but cannot view reports or correct records
  - **Data entry staff, level 2 access:** Enters and corrects records and views reports
  - **Full report access:** Views all reports but is unable to enter or edit records
  - **Aggregate report access:** Can only view reports with aggregated data and is unable to enter or edit records
  - **District-level access:** Enters and edits district-specific records and views district-specific reports only
- Establish a password policy where passwords are changed by the system administrator every 30 days
- Ensure data is backed up on a daily, weekly, monthly and quarterly schedule. Keep backups in a secure, off-site location.

When considering an HRIS solution, take into account data-security needs. A mature HRIS should require a secure login for each user via a username and password. Only the system administrator can establish user accounts. In addition, each user should be assigned a role in the system similar to the ones listed above. The role limits the options that are available to that user when he or she logs in and prevents the user from accessing unauthorized information. (The iHRIS suite of HR information systems fulfills all of these requirements; for more information on the iHRIS suite, see Section III of this Toolkit.)

### **Perform a Data Audit**

It is a good idea to conduct an annual data audit to identify problem areas in your HRIS and in data collection, entry and management procedures. As part of an audit, you might compare HRIS data to similar data from another source, such as a survey or census, to check for discrepancies. Another way to verify data quality is to check randomly selected electronic records against paper versions of data collection forms. Software logs should provide information on usage and maintenance of the system.

Here are some issues to watch for when conducting the data audit:

- Does the total number of records match the expected number?
- Are any duplicate records found?
- How many records are out of date (for example, a worker has changed position or left employment, but the change has not been recorded)?
- How many key fields are incomplete (such as worker contact information, cadre or job title)?
- How frequently are records being updated? Are they updated in accordance with routine maintenance procedures?
- Are there any invalid user accounts (such as for data entry staff who no longer work on the HRIS)?



# Sample Health Worker Data Collection Form (Paper Version)

## Assessing and Improving Existing Systems

This is a sample paper data collection form that can be printed, copied and used to gather data on health employees. The information collected in this form is intended to be shared with the central Ministry of Health, so there will be an accurate picture of all the health workers employed in the country. Please modify this form as needed and customize the questions and selection options (items with checkboxes) to meet your country's needs. Make sure that data collected are consistent across districts, facilities and cadres, and critically consider form design to eliminate confusion and errors. Review all questions to ensure that they match the database structures and complementary data collection formats (such as electronic forms) you will use. Each field should meet a specific goal, such as answering one of the SLG's policy and management questions. If any fields are irrelevant, delete them. This will result in simpler forms that are easier for respondents to complete, which may help ensure compliance.

*If you would like to include additional information on any field collected on this form, please use the Notes section at the end of the form.*

**Questionnaire number:** \_\_\_\_\_

**Name of person administering questionnaire:** \_\_\_\_\_

Section I: Employee Identification Details			
<b>Surname:</b>	<b>First name:</b>	<b>Other name:</b>	<b>Title:</b>
<b>Unique identification number:</b>	<b>Employee status change – check one box:</b>	<input type="checkbox"/> no change	<input type="checkbox"/> new <input type="checkbox"/> district transfer <input type="checkbox"/> update <input type="checkbox"/> departure <input type="checkbox"/> local transfer
<b>Select one option for proof of identification:</b>			
<input type="checkbox"/> Military ID number:	<input type="checkbox"/> National ID number:  Place and date of issue:	<input type="checkbox"/> Passport number:  Country of passport:	<input type="checkbox"/> Other (specify):
<b>Date of birth (dd/mm/yy):</b>		<b>Gender:</b>	<input type="checkbox"/> female <input type="checkbox"/> male
<b>Number of dependents:</b>		<b>Marital status:</b>	<input type="checkbox"/> single <input type="checkbox"/> widowed <input type="checkbox"/> nun/clergy <input type="checkbox"/> married <input type="checkbox"/> divorced
<b>Place of birth (city, town or village; country):</b>		<b>Home residence (district, country):</b>	
<b>Nationality (as stated on proof of identification):</b>			

**Section 2: Employee Contact Details****Mailing address:****Work phone:****Mobile phone (if any):****E-mail address (if any):****Section 3: Position Information****Job classification (profession) – check one box:**

- |   |  |   |
|---|--|---|
| <input type="checkbox"/> Non-health professional  | <input type="checkbox"/> Dentist                     | <input type="checkbox"/> Physiotherapist            |
| <input type="checkbox"/> Non-health support staff | <input type="checkbox"/> Dental therapist            | <input type="checkbox"/> Anesthetist technician     |
| <input type="checkbox"/> Medical doctor           | <input type="checkbox"/> Dental technician           | <input type="checkbox"/> Lab technician             |
| <input type="checkbox"/> Specialized doctor       | <input type="checkbox"/> Nutritionist                | <input type="checkbox"/> Ophthalmologist technician |
| <input type="checkbox"/> Surgeon                  | <input type="checkbox"/> Pharmacist                  | <input type="checkbox"/> Orthopedist technician     |
| <input type="checkbox"/> Nurse                    | <input type="checkbox"/> Pharmacy technician         | <input type="checkbox"/> Radiography technician     |
| <input type="checkbox"/> Midwife                  | <input type="checkbox"/> Environmental health worker | <input type="checkbox"/> Counselor                  |
| <input type="checkbox"/> Social worker            | <input type="checkbox"/> Hygienist                   | <input type="checkbox"/> Medical assistant          |

**Job title – check one box:**

- |   |   |   |
|---|---|---|
| <input type="checkbox"/> Head of Health Center        | <input type="checkbox"/> Chief Nurse                        | <input type="checkbox"/> Accountant                     |
| <input type="checkbox"/> Deputy Head of Health Center | <input type="checkbox"/> Deputy Chief Nurse                 | <input type="checkbox"/> Cashier                        |
| <input type="checkbox"/> Head of Department/Service   | <input type="checkbox"/> Nurse                              | <input type="checkbox"/> Secretary                      |
| <input type="checkbox"/> Director                     | <input type="checkbox"/> Other, health-related professional | <input type="checkbox"/> Receptionist                   |
| <input type="checkbox"/> Administrator                |   | <input type="checkbox"/> Other, non-health professional |
| <input type="checkbox"/> Coordinator                  |   |   |

<b>Current Department of Service – check one box:</b>			
<input type="checkbox"/> Anesthesiology	<input type="checkbox"/> HMIS	<input type="checkbox"/> Mutuelle Desk	<input type="checkbox"/> Reception
<input type="checkbox"/> Archive and Documentation	<input type="checkbox"/> Hygiene	<input type="checkbox"/> Nursing	<input type="checkbox"/> Recovery
<input type="checkbox"/> ARV	<input type="checkbox"/> ICT	<input type="checkbox"/> Nutrition	<input type="checkbox"/> Social Service
<input type="checkbox"/> Billing and Cashier	<input type="checkbox"/> Intensive Care	<input type="checkbox"/> Operating Room	<input type="checkbox"/> Stomatology
<input type="checkbox"/> Clinic	<input type="checkbox"/> Internal Medicine	<input type="checkbox"/> Ophthalmology	<input type="checkbox"/> Supervision
<input type="checkbox"/> Dentistry	<input type="checkbox"/> Kinesitherapy	<input type="checkbox"/> Orthopedics	<input type="checkbox"/> Supervision
<input type="checkbox"/> Dermatology	<input type="checkbox"/> Laboratory	<input type="checkbox"/> Pediatrics	<input type="checkbox"/> Surgery
<input type="checkbox"/> Ear, Nose and Throat	<input type="checkbox"/> Logistics and Procurement	<input type="checkbox"/> Pharmacy	<input type="checkbox"/> Vaccination
<input type="checkbox"/> Emergency Service	<input type="checkbox"/> Maintenance	<input type="checkbox"/> PMTCT	<input type="checkbox"/> VCT
<input type="checkbox"/> Family Planning	<input type="checkbox"/> Management	<input type="checkbox"/> Psychiatry	<input type="checkbox"/> Other, non-health professional
<input type="checkbox"/> Finance and Administration	<input type="checkbox"/> Maternity	<input type="checkbox"/> Radiography	<input type="checkbox"/> Other, health-related professional
<b>Start date:</b> ____/____/____ (dd/mm/yy)		<b>Status – check one box:</b> <input type="checkbox"/> Full-time <input type="checkbox"/> Part-time <input type="checkbox"/> Fixed contract <input type="checkbox"/> Temporary <input type="checkbox"/> Intern	
<b>Section 4: Location Information</b>			
<b>Name of the health facility where the employee works:</b>			
<b>Region or province:</b>		<b>District:</b>	
<b>How long is the journey from the employee's place of residence to work? Check one box.</b>			
<input type="checkbox"/> less than 15 minutes	<input type="checkbox"/> 15-30 minutes	<input type="checkbox"/> 30 minutes- 1 hour	<input type="checkbox"/> 1-2 hours
			<input type="checkbox"/> more than 2 hours
<b>Section 5: Salary Information</b>			
<b>Current salary grade/pay scale – check one box:</b>			
<input type="checkbox"/> Entry-level	<input type="checkbox"/> Specialist / Director	<input type="checkbox"/> Technical Specialist	
<input type="checkbox"/> Professional – Entry-level	<input type="checkbox"/> Professional – Mid-level / Managerial		
<b>Current salary (annual base salary + allowances):</b>			
<b>Source of salary – check all that apply:</b>			
<input type="checkbox"/> District	<input type="checkbox"/> Local facility	<input type="checkbox"/> NGO	
<input type="checkbox"/> Faith-based organization	<input type="checkbox"/> Ministry of Health	<input type="checkbox"/> Global Fund	
<input type="checkbox"/> Other (explain):			

**Section 6: Education History**

**Select the highest academic level achieved by the employee – check one box:**

- |                             |                             |                              |                                     |  |
|-----------------------------|-----------------------------|------------------------------|-------------------------------------|--|
| <input type="checkbox"/> A4 | <input type="checkbox"/> A3 | <input type="checkbox"/> A2  | <input type="checkbox"/> A1         | <input type="checkbox"/> A0/BA/BS      |
| <input type="checkbox"/> MA | <input type="checkbox"/> MD | <input type="checkbox"/> MPH | <input type="checkbox"/> MA/Masters | <input type="checkbox"/> PhD/Doctorate |

**Select the domain of pre-service study completed by the employee:**

*If the employee's domain of study is not listed, select Other and write it in the Notes section. If the employee has not completed a domain of study, select None.*

- |   |  |  |
|---|--|--|
| <input type="checkbox"/> Accounting                       | <input type="checkbox"/> Logistics and Procurement       | <input type="checkbox"/> Pharmacy, Technician Level    |
| <input type="checkbox"/> Anesthesiology, Technician Level | <input type="checkbox"/> Management                      | <input type="checkbox"/> Physical Therapy              |
| <input type="checkbox"/> Biochemistry                     | <input type="checkbox"/> Medical Assistant               | <input type="checkbox"/> Post Primary                  |
| <input type="checkbox"/> Counseling                       | <input type="checkbox"/> Medical Doctor                  | <input type="checkbox"/> Primary                       |
| <input type="checkbox"/> Dentistry                        | <input type="checkbox"/> Mental Health                   | <input type="checkbox"/> Psychiatry                    |
| <input type="checkbox"/> Dentistry, Technician Level      | <input type="checkbox"/> Midwife                         | <input type="checkbox"/> Public Health                 |
| <input type="checkbox"/> Environmental Health             | <input type="checkbox"/> Nursing Sciences                | <input type="checkbox"/> Radiography, Technician Level |
| <input type="checkbox"/> Finance and Administration       | <input type="checkbox"/> Nutrition                       | <input type="checkbox"/> Social Services               |
| <input type="checkbox"/> Human Resources                  | <input type="checkbox"/> Ophthalmology                   | <input type="checkbox"/> Specialized Doctor            |
| <input type="checkbox"/> Hygiene                          | <input type="checkbox"/> Ophthalmology, Technician Level | <input type="checkbox"/> Teacher                       |
| <input type="checkbox"/> ICT                              | <input type="checkbox"/> Orthopedics, Technician Level   | <input type="checkbox"/> Other                         |
| <input type="checkbox"/> Kinesitherapy                    | <input type="checkbox"/> Pharmacy                        | <input type="checkbox"/> None                          |
| <input type="checkbox"/> Laboratory, Technician Level     | Notes:   |  |

**If the employee is a doctor or nurse and currently has a specialty, select the certified specialization obtained (in addition to a basic MD or nursing degree):**

*If the specialty is not listed, select Other and include information in the Notes section. If the employee has not completed a specialty, select None. If the employee is not a doctor or a nurse, leave blank.*

<input type="checkbox"/> Allergy and Immunology	<input type="checkbox"/> Hematology	<input type="checkbox"/> Pediatrics
<input type="checkbox"/> Anesthesiology	<input type="checkbox"/> Infectious Diseases	<input type="checkbox"/> Physical Therapy
<input type="checkbox"/> Cardiology	<input type="checkbox"/> Internal Medicine	<input type="checkbox"/> Plastic Surgery
<input type="checkbox"/> Dermatology	<input type="checkbox"/> Midwife	<input type="checkbox"/> Psychiatry
<input type="checkbox"/> Diabetes	<input type="checkbox"/> Neurology	<input type="checkbox"/> Public Health
<input type="checkbox"/> Ear, Nose and Throat	<input type="checkbox"/> Obstetrics and Gynecology	<input type="checkbox"/> Radiology
<input type="checkbox"/> Emergency Medicine	<input type="checkbox"/> Oncology	<input type="checkbox"/> Renal Medicine
<input type="checkbox"/> Endocrinology	<input type="checkbox"/> Ophthalmology	<input type="checkbox"/> Respiratory Medicine
<input type="checkbox"/> Endoscopy	<input type="checkbox"/> Orthopedics	<input type="checkbox"/> Surgery
<input type="checkbox"/> Family Medicine	<input type="checkbox"/> Palliative Care	<input type="checkbox"/> Urology
<input type="checkbox"/> Gastroenterology	<input type="checkbox"/> Pathology	<input type="checkbox"/> Other
Notes:		<input type="checkbox"/> None

---

**If the employee is a doctor or nurse, are they currently working toward a specialty?**

*If yes, select the area of specialty. If no, leave blank. If the employee is not a doctor or a nurse, leave blank.*

<input type="checkbox"/> Allergy and Immunology	<input type="checkbox"/> Hematology	<input type="checkbox"/> Pediatrics
<input type="checkbox"/> Anesthesiology	<input type="checkbox"/> Infectious Diseases	<input type="checkbox"/> Physical Therapy
<input type="checkbox"/> Cardiology	<input type="checkbox"/> Internal Medicine	<input type="checkbox"/> Plastic Surgery
<input type="checkbox"/> Dermatology	<input type="checkbox"/> Midwife	<input type="checkbox"/> Psychiatry
<input type="checkbox"/> Diabetes	<input type="checkbox"/> Neurology	<input type="checkbox"/> Public Health
<input type="checkbox"/> Ear, Nose and Throat	<input type="checkbox"/> Obstetrics and Gynecology	<input type="checkbox"/> Radiology
<input type="checkbox"/> Emergency Medicine	<input type="checkbox"/> Oncology	<input type="checkbox"/> Renal Medicine
<input type="checkbox"/> Endocrinology	<input type="checkbox"/> Ophthalmology	<input type="checkbox"/> Respiratory Medicine
<input type="checkbox"/> Endoscopy	<input type="checkbox"/> Orthopedics	<input type="checkbox"/> Surgery
<input type="checkbox"/> Family Medicine	<input type="checkbox"/> Palliative Care	<input type="checkbox"/> Urology
<input type="checkbox"/> Gastroenterology	<input type="checkbox"/> Pathology	<input type="checkbox"/> Other

---

**Has the employee had any health-related, in-service continuing education or additional training during his/her professional career in health?**

Yes  
 No

---

**If yes, how many different training courses did he/she attend in last 12 months?**

1                       2  
 3                       more than 3

**Has the employee completed training in any of the following areas? Check all that apply.**

*If the employee's additional training is not listed, select Other and write in the information in the Notes field. If the employee has not completed any additional training, select None.*

- |  |                                     |                                |
|--|-------------------------------------|--------------------------------|
| <input type="checkbox"/> ART             | <input type="checkbox"/> Management | <input type="checkbox"/> TB    |
| <input type="checkbox"/> Family Planning | <input type="checkbox"/> PCIME      | <input type="checkbox"/> VCT   |
| <input type="checkbox"/> ICT             | <input type="checkbox"/> PMTCT      | <input type="checkbox"/> Other |
| <input type="checkbox"/> Malaria         | <input type="checkbox"/> SONU       | <input type="checkbox"/> None  |

Notes:

**Check the fields of continuing education that the employee deems to be most important (in terms of educational and practical courses that will help him/her improve his/her performance). Check all that apply**

- |   |                                      |  |
|---|--------------------------------------|--|
| <input type="checkbox"/> Additional training within my health field | <input type="checkbox"/> Vaccination | <input type="checkbox"/> Management        |
| <input type="checkbox"/> Infectious Diseases                        | <input type="checkbox"/> Maternity   | <input type="checkbox"/> Computer training |
| <input type="checkbox"/> Counseling                                 | <input type="checkbox"/> Nutrition   | <input type="checkbox"/> Languages         |
| <input type="checkbox"/> Family planning                            |                                      |  |

**Check all languages spoken by the employee.**

- |                                     |                                  |                                   |
|-------------------------------------|----------------------------------|-----------------------------------|
| <input type="checkbox"/> Chinese    | <input type="checkbox"/> English | <input type="checkbox"/> French   |
| <input type="checkbox"/> German     | <input type="checkbox"/> Hebrew  | <input type="checkbox"/> Japanese |
| <input type="checkbox"/> Portuguese | <input type="checkbox"/> Russian | <input type="checkbox"/> Spanish  |
| <input type="checkbox"/> Swahili    | Notes:                           |                                   |

**Section 7: Notes**

**Add any notes pertaining to the fields above – attach additional sheets if needed:**



# HRIS

STRENGTHENING  
IMPLEMENTATION  
TOOLKIT

## Section III: Developing Software Solutions

### **Goal:**

Identify requirements for, select and deploy HRIS software solutions.

### **Tools:**

Use Case Development Tool

Case Study: Developing an HRIS Step Solution

A Brief Guide to the iHRIS Software Suite

A Brief Guide to iHRIS Qualify

A Brief Guide to iHRIS Manage

A Brief Guide to iHRIS Plan



# Use Case Development Tool

## Developing Software Solutions

Before choosing or programming an HRIS, it is important to identify the functions that the system will perform and document them. Think of these functions as **goals**. What goals do you want to achieve with your HRIS? The policy and management questions that the Stakeholder Leadership Group (SLG) developed should provide a list of these goals. Once the list of goals is developed, prioritizing the goals may help when selecting an HRIS. You should look for a system that achieves as many of the goals as possible and supports all of the high-priority goals.

However, you may find that some goals cannot be accomplished in the system as it is installed. In that case, a programmer or administrator will need to customize the system to achieve those goals. For example, you may need to build a new report or add a new field to capture additional data.

A simple way to document these needed customizations is to write use cases. A **use case** describes how to achieve a specific goal or function using the system. The iHRIS documentation (available with the iHRIS software in the electronic version of this Toolkit or on our website at [www.capacityproject.org/hris/suite/](http://www.capacityproject.org/hris/suite/)) includes a full set of use cases for the three systems to help you understand the functions that each HRIS supports when it is installed. You may modify these use cases to document the customizations needed to achieve your goals, or you may use the template that follows this introduction to write use cases.

### Benefits of Use Cases

One of the most difficult aspects of system development is figuring out exactly what to build. There is often a gap between the people who understand the problem and the people who understand how to build the solution. Use cases are one of the most effective means of bridging that gap. Written in plain language, without technical jargon, use cases describe system goals in a way that can be understood by the stakeholders and users of the system *and* by the developers of the system. The set of use cases serves as a roadmap for the developer to achieve what is desired by the stakeholders.

Use cases are usually cowritten by stakeholders, users and developers. This ensures that the system includes the functions that are truly important to the people who will be using it. Use cases should focus on the goals that users want to achieve. Focusing on action-oriented goals defines the scope of the system and eliminates unnecessary requirements, reducing costs and development time.

Several related use cases may be organized into modules, called *packages*. Development of each module can then be prioritized and scheduled. This helps plan a path for development where core functions can be developed first and enhanced later by lower priority features. The core system can be used even while new functions are being developed.

However, use cases should not serve as all of the system specifications. For instance, use cases do not specify the user interface design. They don't capture nonfunctional requirements, such as performance, security and auditing requirements. Also, use cases do not describe database fields or their relationships to one another. Use cases are just one part of the full system specifications, but they are still a valuable communications tool.

Use cases should be living documents. Stakeholders, users and developers should constantly review, revise and expand the use cases during the development or customization of a system. At different stages, use cases can be used to:

- Describe a work process
- Focus discussion about system actions
- Be the functional requirements for a system
- Document the design of a system
- Serve as a mechanism for managing and tracking software development

- Generate procedures for testing a system
- Write instructional, help and training materials for end users.

Not all requirements have to be known before starting development. Use cases may be edited during development to capture additional goals, and new use cases may be written as needs for the system arise.

### The Parts of a Use Case

The use case enumerates all of the steps describing the interaction of one user—called the *actor*—with the system to achieve a goal. The use case begins at a triggering event and continues until the goal is either successfully achieved or abandoned. It collects all the possible scenarios for how the goal can be achieved *and* how it may fail.

At minimum, each use case should contain the following information:

- A *goal* to achieve
- The *actor* who is attempting to achieve the goal; the actor should be identified by a role in interacting with the system, not by a name or the name of a group
- A condition under which the use case runs; this may include any preconditions that must be true before the scenario can start and a triggering event that starts the scenario
- An end condition that must be true after the use case is finished if the goal is successfully achieved, called the *success guarantee*
- A set of action steps called the *main success scenario*
- A possible set of *extensions*, or alternate scenarios, leading toward either the success or failure of the goal.

### Guidelines for Completing the Use Case Tool

Use these guidelines to complete the blank use case template. Write a use case for each goal that has been identified for your system. A completed example is given following the guidelines.

- 1a. Use Case Number:** Assign a number to the use case for reference. It is helpful to number use cases in order of implementation or priority.
- 1b. Use Case Title:** Assign a title to the use case, generally a shortened form of the goal in action-verb-noun format.
- 2. Level:** Select *summary* for a use case that summarizes a number of activities or is outside the scope of the system; *user-level* for a use case that describes one complete activity in the system; or *subfunction* for a use case that depends on a user-level use case but is too long to include in the user-level use case.
- 3. Actor:** Write the role of the user performing the use case. It is often helpful to brainstorm and list all the possible actors on a system before beginning to write use cases.
- 4. Goal:** Write a goal statement that is longer and more detailed than the use case title. This statement describes the function that the primary actor wants to accomplish.
- 5. Preconditions:** List any preconditions for the use case. Preconditions specify what the system will ensure is true before letting the use case start. Generally, a precondition indicates that some other use case has been run to set it up.
- 6. Success Guarantee:** State the successful result that the primary actor wants. It should satisfy the stated goal and ensure that the stakeholders' interests are met.
- 7. Main Success Scenario (MSS):** Write the action steps of a typical scenario in which the goal is delivered. The first step is the trigger that initiates the use case. Each following step describes an action that the user or the system takes in reaction to the previous step to accomplish the use case goal. Ideally, there should be three to 12 steps; number each step.
- 8. Extensions:** Brainstorm and list the conditions that may cause the system behavior to branch from the steps that occur in the MSS. An extension must be detectable by the system, and the system must take

some action to handle it. Number each extension to link to the MSS step in this format: 1a, 1b... If the extension can happen at any time, precede it with an asterisk (\*) and list it first: \*a, \*b... Indent extensions to extensions and restart numbering: 1a1, 1b1... Under each extension, indent and write how the system responds, the extension-handling steps. Each extension-handling step should end back in the main success scenario, at an alternative successful exit or in failure (a system error) that stops the use case before the goal is accomplished.

9. **Notes/Issues/Reviewer Comments:** Add any comments on the use case or explanatory notes needed. This is also a good place to note any issues that have arisen regarding the use case or its implementation in the system.

### Example Use Case

<b>1a. Use Case Number:</b>	<b>9</b>	<b>1b. Use Case Title:</b>	<b>Log in</b>
<b>2. Level:</b>	Summary	User-level	Subfunction
<b>3. Actor:</b>	Any user		
<b>4. Goal:</b>	The user logs in to authenticate his or her role in the system and to perform a task in the system.		
<b>5. Preconditions:</b>	A user account has been created for the user.		
<b>6. Success Guarantee:</b>	The user can successfully access the system and perform actions appropriate for his or her role.		
<b>7. Main Success Scenario (MSS):</b>	<ol style="list-style-type: none"> <li>1. The user connects to the system.</li> <li>2. The user enters his/her username and password.</li> <li>3. The system validates the username and password.</li> <li>4. The system determines the user's role.</li> <li>5. The system displays a list of actions the user can perform based on the user's role.</li> </ol>		
<b>8. Extensions:</b>	<p>3a. The system determines that the password is incorrect for the username entered.</p> <ol style="list-style-type: none"> <li>1. The system prompts the user to re-enter the password. <ol style="list-style-type: none"> <li>3a1. The system determines that the re-entered password is incorrect.</li> </ol> </li> <li>2. The system provides the option for the user to retrieve a forgotten password.</li> </ol> <p>3b. The system determines that the username does not match a username for any account.</p> <ol style="list-style-type: none"> <li>1. The system displays an error message.</li> </ol> <p>4a. The system determines that the user has no role assigned in the system. The system does not allow the user to access the system.</p>		
<b>9. Notes/Issues/Reviewer Comments:</b>	This use case is the same for iHRIS Manage, Qualify and Plan.		
<b>Completed by:</b>	Use case writer	<b>Date:</b>	October 25, 2008
<b>Reviewed by:</b>	Use case reviewer	<b>Date:</b>	November 4, 2008

### Use Case Template

<b>1a. Use Case Number:</b>		<b>1b. Use Case Title:</b>	
<b>2. Level:</b>	Summary	User-level	Subfunction
<b>3. Actor:</b>			
<b>4. Goal:</b>			
<b>5. Preconditions:</b>			
<b>6. Success Guarantee:</b>			
<b>7. Main Success Scenario (MSS):</b> <i>(use more numbers if necessary)</i>	1. 2. 3.		
<b>8. Extensions:</b> <i>(renumber to match the corresponding MSS step)</i>	1a.		
<b>9. Notes/Issues/ Reviewer Comments:</b>			
<b>Completed by:</b>		<b>Date:</b>	
<b>Reviewed by:</b>		<b>Date:</b>	

# Case Study: Developing an HRIS Step Solution

## Developing Software Solutions

Immediate implementation of a mature software-based HRIS such as the iHRIS Suite is sometimes not feasible or appropriate (see Figure 1). For example, the required infrastructure to support this type of system may not be in place, or there might not be people on staff with the required expertise to support it. The need to implement an HRIS solution quickly can take precedence over making these long-term improvements. After assessing existing HR information systems, data management tools, processes, technical support staff and operational procedures, it may make more sense to put in place a “step solution” instead.

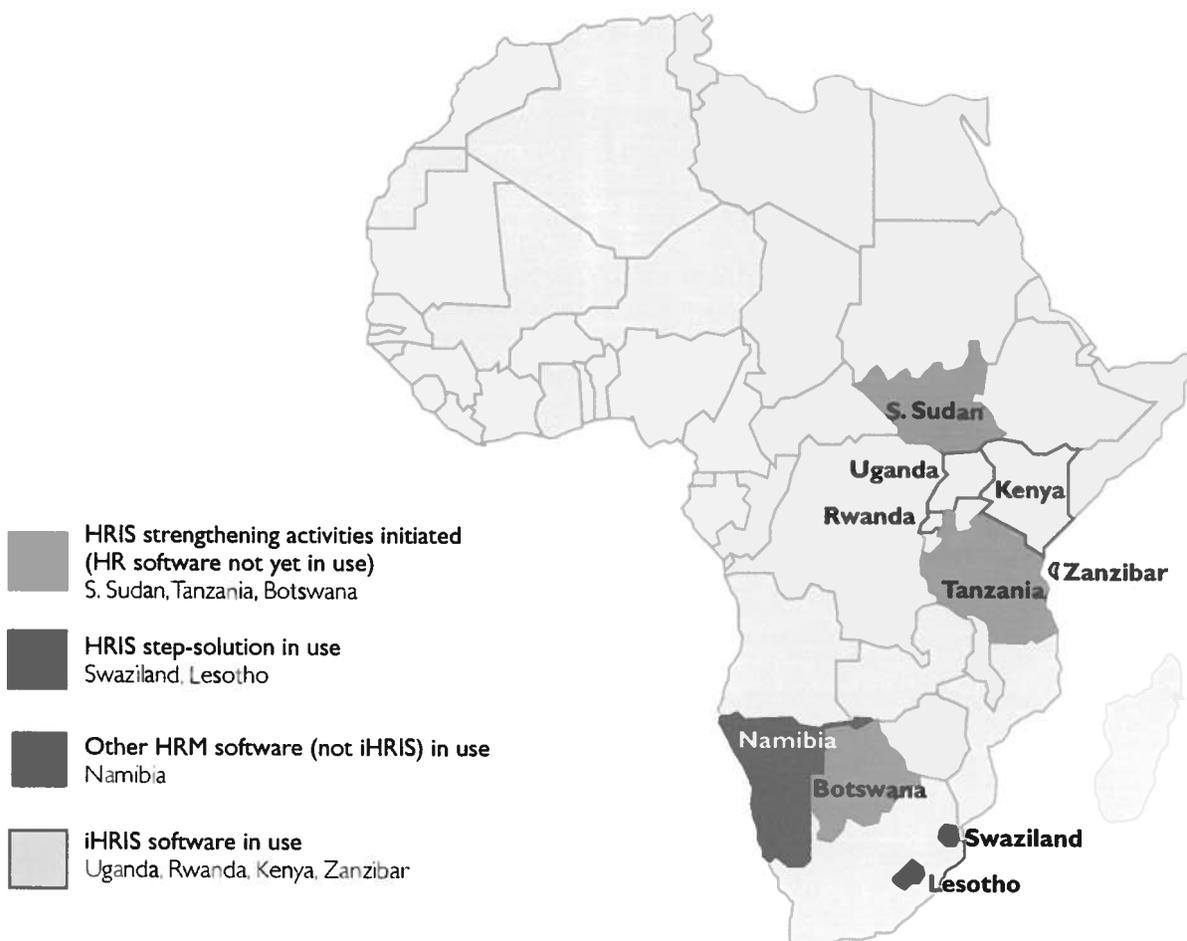


Figure 1. Over the five-year Capacity Project, HRIS strengthening activities were initiated in ten African countries; this map shows where mature HRIS were installed, where step solutions were implemented and where no HRIS is yet in place.

A **step solution** to manage human resources for health (HRH) data is an interim solution building on existing HR tools and systems, which can be deployed quickly to immediately address pressing problems. Then, you can implement gradual improvements to the step solution and proceed step by step to the final goal of a mature HRIS. This iterative process reduces the effect of too much change occurring too rapidly, creates an opportunity for capacity development among system owners and allows time to collect additional data required to address key policy and management questions. Data collectors and managers, technical support staff and decision-makers receive training at each stage, become comfortable with the new system and then take the next step when they are ready.

Some examples of step solutions include:

- Convert a paper-based system to an electronic register, using a spreadsheet program such as Microsoft Excel
- Convert an electronic register to a database, using a desktop database program such as Microsoft Access
- Expand an existing database to capture additional data
- Improve data collection forms—either electronic or paper—to reduce redundancy and inaccuracies, and ensure all required data fields are included
- Improve data-quality procedures to reduce errors in the system and validate existing datasets
- Create linkages among existing systems and improve data flow among users and producers of HRH data.

We applied all of these measures to improve the HRIS in Swaziland without installing a mature HRIS such as iHRIS Manage. This case study describes the steps we took in Swaziland to illustrate how such a step solution may be implemented, if appropriate, in your context.

### **The Situation in Swaziland**

The Ministry of Health and Social Welfare (MOHSW) in Swaziland needed better HRH data. No one had a complete understanding of where health workers were deployed or what jobs they were doing. Some employees were not taken off the payroll after leaving the Ministry's employment and became "ghost workers" in the system, receiving a paycheck even though they no longer worked for the government. Since workers were not removed from the system, replacement workers were placed in incorrect positions just so they could be put on the payroll, making the system unreliable for workforce management and planning.

An HRIS assessment in Swaziland revealed the sources of these problems. HR data were stored in separate systems, some electronic and some paper-based, which were not linked. Information flowed slowly between systems and didn't reach everyone who needed it, so that systems were not updated or errors were introduced. The systems also could not be queried to produce analyses or reports.

The country's Stakeholder Leadership Group prioritized requirements for a comprehensive solution:

- Create electronic records for all health care staff, regardless of employer (including the private sector)
- Include additional data items relevant to HRH, such as registration numbers and facility codes
- Institute tight security to protect access to data
- Complement rather than duplicate an existing Public Service HR database.

### **Implementing the Step Solution**

To quickly address these problems, the Capacity Project developed a step solution and implemented it over time. The Project took the following steps:

1. Develop a data collection form to include additional data items and distribute it to health facilities to capture a snapshot of current health worker data.
2. Program a simple database in Microsoft Access to run alongside the existing Public Service HR database and hold records of non-Public Service health workers.
3. Generate a staffing report from both databases and circulate it to all health facilities for updating and correction to validate the accuracy of the new data. Make corrections in the Microsoft Access database.
4. Institute data-quality procedures to improve the accuracy and timeliness of data inputs.
5. Establish a monthly updating process and develop forms to capture data changes. Updates are regularly made to each database separately by the owner of that database.

- Combine records from both databases to produce a single dataset that is updated monthly, enabling reports and analysis on all health workers in the country.

The Microsoft Access database is installed in a server at the Ministry of Public Service and is updated centrally by the MOHSW's Personnel department. The database is protected by a Windows login. Confidential information is only accessible by authorized staff from the office of the Principal Personnel Officer, but summary reports and simple staff listings are available to all staff.

Reporting is done through a simple user interface, making queries on HR data very easy. Several standard reports were created for regular access, while detailed queries can be completed using Microsoft Excel pivot tables. All offices at the MOHSW building are connected to the database, but access is limited to printing standard reports. The office of the Principal Personnel Officer prints and distributes reports to users who are not directly linked to the databases.

The step solution has improved information flow between various systems and among groups that use HR data (see Figure 2). Health workforce data from the original Public Service HR database are downloaded monthly into the new HRIS database. Reports from this database are sent to health facilities and departments. The facilities and departments use these reports to send monthly updates to the MOHSW.

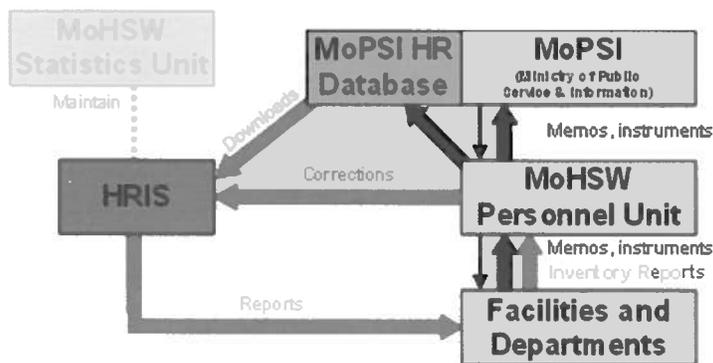


Figure 2. Information flow in Swaziland using an electronic HRIS “step solution.” The red items refer to new systems and process that were instituted as part of the step solution.

The step solution facilitated data reconciliation among the separate systems, and we identified a large number of discrepancies. These range from simple data-entry errors to the elimination of the “ghost worker” problem.

The MOHSW used new and accurate data to analyze vacancies and manage deployments, as well as to develop the country’s long-term Health Workforce Strategic Plan.



# A Brief Guide to the iHRIS Software Suite

## Developing Software Solutions

To ensure that the right health care provider is in the right place with the right skills, countries require current, accurate data on human resources for health (HRH). A strong human resources information system enables health care leaders to quickly answer the key policy and management questions affecting service delivery.

A human resources information system (HRIS) is an integrated system for managing information used in HR decision-making. A complete HRIS links all HR data from the time health professionals enter pre-service training to the time they leave the workforce. Typically, the system is computerized and consists of:

- A database for storing the information
- Software for entering and updating data
- Reporting and analysis tools.

Many developing countries already use an HRIS, but often one that relies on paper forms or electronic files in different departments that do not link together. Putting in place a centralized, electronic HRIS achieves the following goals:

- Improves the accuracy and currency of HRH data
- Tracks workers as they move through the health system
- Decreases the labor required to maintain the HRIS
- Enables decision-makers to quickly aggregate, analyze and use data.

### The iHRIS Software Suite

The Capacity Project developed Open Source HRIS solutions to supply health sector leaders with the information they need to assess HR problems, plan effective interventions and evaluate those interventions. In addition to software, we provide a program of technical assistance and expertise to ensure that the technology is transferred effectively, and we help decision-makers use data to lead and manage. Our participatory approach results in systems that are appropriate for the context in which they are used and sustainable after we leave.

The Capacity Project offers the following three core systems, each addressing a specific HRH leadership issue:

- **iHRIS Qualify.** This system resides with the licensing or certification authority for a health worker cadre. It captures information about health professionals in the cadre from the time they enter pre-service training through registration or certification and licensure. The system also tracks continuing education attained by health workers, deployments and out-migration requests.
- **iHRIS Manage.** This system resides with an employer of health workers, such as the Ministry of Health. It tracks detailed information about health workers throughout their employment, including where they are deployed, salary history, promotions, qualifications, in-service trainings completed and reasons for attrition.
- **iHRIS Plan.** This component analyzes data collected in other HRIS to enable decision-makers to project future workforce needs and make effective planning and policy decisions. It gives a picture of the current health workforce and projects how that workforce will change based on known influences such as retirement, the number of trained workers annually entering the workforce and other factors. The model compares the actual workforce to projected health workforce needs, illustrating the gap between the two.

Live working demos of all three systems are available at: [www.capacityproject.org/hris/suite/](http://www.capacityproject.org/hris/suite/)

When used together in a country setting, these three systems provide a powerful feedback loop for analyzing, planning and managing workforce resources and needs. All three solutions use the same core programming, database architecture and supporting hardware and software systems. Therefore, once one is fully deployed, the other two can be added at a significantly lower cost. Each of the three systems may also be deployed independently or integrated with software products already in place to provide a customized, contextual solution for the country, filling in any gaps that existing systems may have left.

### **Software Requirements**

Installing the full iHRIS Suite requires an Apache Web server, MySQL database software and PHP programming language. We have chosen Open Source versions of all supporting software to reduce the costs involved in deploying our information systems. A system administrator who is knowledgeable in setting up and maintaining a server computer and these software programs is essential. An Internet connection or local area network is also required to enable multiple users to access the system.

For areas that do not have reliable Internet connectivity, we have created a Windows XP desktop version of the three systems. The Windows version should be installed separately. It may be used alone or in conjunction with a centralized, server-based installation of the iHRIS systems. This is an ideal solution for decentralized management of HR information in districts and facilities that can then be aggregated for country-level reporting and analysis at the Ministry of Health.

### **Why Open Source?**

Open Source software is computer software distributed under a license that allows anyone to study, copy and modify the source code and redistribute the software in modified or unmodified form, without restriction.

Under the Open Source General Public License (GPL), all three iHRIS software programs can be downloaded, used and modified with no licensing fee. We can distribute our software at minimal cost, and by modifying the code themselves or downloading free upgrades, users can improve their systems without paying onerous upgrade fees. Employing Open Source technologies provides access to a global support community, which, on a volunteer basis, can support the software, answer questions, fix bugs and develop new modules.

A customizable Open Source system is more likely to meet a country's specific needs than off-the-shelf software. Easy to change and expand, an Open Source system can be developed rapidly in response to newly discovered needs. The result is a completely tailored but still low-cost system that can grow and adapt over time.

A customized Open Source solution addresses common barriers to entry while laying the groundwork for future system growth. Open Source applications are network-friendly and widely considered to be the most secure. Because Open Source technologies are based on standards, Open Source systems integrate well with existing systems, and all data can be easily exported if the user chooses to move to a different system in the future. All of these factors make Open Source technology the best choice for quickly implementing low-cost HRIS in developing countries.

For more detailed information about our products and our work, visit [www.capacityproject.org/hris](http://www.capacityproject.org/hris). To learn more about our individual software products, see our other one-page guides:

- A Brief Guide to iHRIS Manage
- A Brief Guide to iHRIS Qualify
- A Brief Guide to iHRIS Plan

# A Brief Guide to iHRIS Qualify

## Developing Software Solutions

To ensure that the right health care provider is in the right place with the right skills, countries require current, accurate data on human resources for health (HRH). A strong human resources information system (HRIS) enables health care leaders to quickly answer the key policy and management questions affecting service delivery. The Capacity Project has developed the iHRIS Suite, an integrated suite of free, Open Source HRIS solutions to supply health sector leaders with the information they need to assess HR problems, plan effective interventions and evaluate those interventions.

iHRIS Qualify is the health professional training, licensing and certification component of the iHRIS Suite. A licensing or certification authority for a health worker cadre (nurses, physicians, etc.) can use iHRIS Qualify to track, maintain and analyze data on a country's entire health workforce.

### Benefits of iHRIS Qualify

iHRIS Qualify captures and aggregates data on a complete cadre of health workers. The database collects information about health professionals from the time they enter pre-service training through registration and licensure. iHRIS Qualify can also track deployments, issue licenses for private practice clinics and record out-migration verification requests. Thus, it provides a country-level picture of a cadre of health workers, whether in training, employed in the public sector or working in the private sector.

A policy-maker can analyze the data captured by iHRIS Qualify to answer critical HR policy and management questions, such as:

- How many trained students pass the certification/accreditation exam?
- Of the students who pass the exam, how many register to practice?
- How many health workers are deployed in each region, and where are they working?
- How many health workers are working in the public sector, private sector or both?
- Are health professionals meeting their continuing education requirements?
- For what reasons are health workers out-migrating to work in other countries?

iHRIS Qualify is typically managed by the licensing or certification authority for a health worker cadre. This authority is usually an autonomous council that regulates the registration, operations and conduct of a cadre of health professionals within a country's health workforce. The council may be charged with enforcing minimum qualifications for students entering training programs, administering national-level examinations that qualify a graduating student to practice within the country, verifying that continuing medical education requirements have been completed before renewing licenses, issuing private practice licenses to qualified health professionals, verifying qualifications of foreign-trained health workers applying to work within the country and verifying qualifications of health workers applying to work in foreign countries. The council can use iHRIS Qualify to capture, update and report on data from all of these activities.

Typically, separate authorities regulate doctors, dentists, nurses, pharmacists and allied health professionals. Each separate authority can maintain its own iHRIS Qualify system, but data from all systems may be aggregated to provide a complete picture of the country's health workforce.

### iHRIS Qualify Features

iHRIS Qualify consists of several modules designed to store and report health professional information. Using modules as "building blocks" for the system makes it easier to add more features as needs change or disable unnecessary features.

The following modules were released in version 3 of iHRIS Qualify (currently available for download):

- **System Configuration:** Install, enable and configure modules to easily customize the system and its features from a web-based configuration screen.
- **User Management:** Create and manage password-protected user accounts to control access to the system. Accounts are role-based so that unauthorized user actions and data sets are hidden from the user.
- **Database Management:** Design a standard data structure by creating lists of items to be tracked, such as geographical locations, cadres and training institutions.
- **Records Management:** Record information about each health worker, such as citizenship, marital status, birth date, contact information, educational qualifications and identification numbers.
- **Pre-Service Training Management:** Track students entering pre-service training programs and monitor completion rates as well as reasons for training disruption.
- **Examination Management:** Track applications and results for national-level certification examinations.
- **Registration and Licensing Management:** Issue registration numbers, licenses and license renewals, track deployments, manage out-migration requests and record disciplinary actions.
- **Custom Reporting:** Aggregate, analyze and export data in a variety of ways to answer key management and policy questions, and generate facility lists and health worker directories.

The following features ensure security and accuracy of data stored in the system:

- **Error checking and data correction** by authorized data managers to ensure data integrity
- **Automated logging** of username, date and time when data are entered or changed, for auditing purposes
- **Permanent archiving** of all data changes to ensure a consistent record of each person's work history.

The Capacity Project also released a Windows-based version of iHRIS Qualify. This version is intended for use in areas that don't have a reliable Internet connection or where a single-user desktop version is needed, such as in a local office.

Planned for later releases of iHRIS Qualify are multilingual versions, data import and export and integration with geographic information systems.

## Related Systems

iHRIS Qualify is extensible to the Capacity Project's other iHRIS products:

- **iHRIS Manage**, a human resource management system
- **iHRIS Plan**, workforce planning and modeling software.

Working together, the three components of the iHRIS Suite provide a powerful feedback loop for analyzing, planning and managing health workforce resources and needs.

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- A Brief Guide to iHRIS Plan.

# A Brief Guide to iHRIS Manage

## Developing Software Solutions

To ensure that the right health care provider is in the right place with the right skills, countries require current, accurate data on human resources for health (HRH). A strong human resources information system (HRIS) enables health care leaders to quickly answer the key policy and management questions affecting service delivery. The Capacity Project has developed the iHRIS Suite, an integrated suite of free, Open Source HRIS solutions to supply health sector leaders with the information they need to assess HR problems, plan effective interventions and evaluate those interventions.

iHRIS Manage is the human resources management component of the iHRIS Suite. This system enables an HR department to collect, manage and analyze detailed information about health workers who are employed by a Ministry of Health, a health care facility such as a hospital or a private sector service delivery organization. While designed for managing the health workforce, iHRIS Manage may be readily adapted to other types of workforces and organizations.

### Benefits of iHRIS Manage

iHRIS Manage enables an organization to design a comprehensive HR strategy and manage its workforce more effectively and efficiently, while reducing costs and improving data accuracy. Using the system, the HR professional can create a hierarchy of positions for an organization based on standard titles, job classifications and job descriptions, even spread over diverse geographic locations, offices and facilities. HR staff can solicit job applications for open positions, assign employees to fill positions and maintain a searchable database of all employees, their identifying information and their qualifications. Managers can track each employee's history with the organization, including positions held, salary histories and completed in-service trainings, and record the reason for departure when the employee leaves.

A decision-maker within the organization can analyze this data to answer key HR management and policy questions, such as:

- Are employees deployed in positions that match their qualifications and education?
- Are employees optimally deployed in locations to meet needs?
- How many workers need to be recruited to fill anticipated vacancies?
- Are pay rates equitable across similar jobs?
- Are employees being promoted in alignment with competencies?
- What are the reasons for employee attrition?

### iHRIS Manage Features

iHRIS Manage consists of several modules designed to store and report employee information. Using modules as "building blocks" for the system makes it easier to add more features as needs change or to disable unnecessary features.

The following modules were released in version 3 of iHRIS Manage (currently available for download):

- **System Configuration:** Install, enable and configure modules to customize the system and its features from a web-based configuration screen.
- **User Management:** Create and manage password-protected user accounts to control access to the system. Accounts are role-based so that non-authorized user actions and data sets are hidden from the user.
- **Database Management:** Design a standard data structure by creating lists of items to be tracked in the database such as geographical locations, offices and facilities.

- **Position Management:** Create positions with standardized descriptions, codes and qualifications within the organizational structure and manage the hiring, transfer and promotion process.
- **Applicant Management:** Record information about a job applicant (including educational history, work history and interview notes), and log hiring decisions.
- **Employee Management:** Match an employee to a position, record important information about an employee and maintain a record of the employee's complete work history with the organization.
- **In-service Training Management:** Track in-service trainings that employees have completed and assess competencies and continuing education credits earned from training.
- **Custom Reporting:** Aggregate, analyze and export data in a variety of ways to answer key management and policy questions as well as generate staff lists and directories.

The following features ensure security and accuracy of data stored in the system:

- **Error checking and data correction** by authorized data managers to ensure data integrity.
- **Automated logging** of the username, date and time when data are entered or changed, for auditing purposes.
- **Permanent archiving** of all data changes to ensure a consistent record of each employee's history with the organization.

We also released a Windows-based version of iHRIS Manage. This version is intended for use in areas that do not have a reliable Internet connection or where a single-user desktop version is needed, such as in a facility or local government office.

Additional features planned for subsequent releases include multilingual versions of iHRIS Manage, data import and export and integration with geographic information systems.

## Related Systems

iHRIS Manage is extensible to the Capacity Project's other iHRIS products:

- **iHRIS Qualify**, a certification and licensing management system
- **iHRIS Plan**, workforce planning and modeling software.

Working together, the three components of the iHRIS Suite provide a powerful feedback loop for analyzing, planning and managing health workforce resources and needs.

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# A Brief Guide to iHRIS Plan

## Developing Software Solutions

To ensure that the right health care provider is in the right place with the right skills, countries require current, accurate data on human resources for health (HRH). A strong human resources information system (HRIS) enables health care leaders to quickly answer the key policy and management questions affecting service delivery. The Capacity Project has developed the iHRIS Suite, an integrated suite of free, Open Source HRIS solutions, to supply health sector leaders with the information they need to assess HR problems, plan effective interventions and evaluate those interventions.

iHRIS Plan is the workforce planning and modeling component of the iHRIS Suite. This software improves how health sector planners and program decision-makers plan for their health workforce needs in developing country settings and make effective policy decisions to meet those needs.

### Benefits of iHRIS Plan

iHRIS Plan uses data from iHRIS Qualify and iHRIS Manage—the other two components of the iHRIS suite—as well as other sources of HR data to form a complete picture of the health workforce in the country, which can be analyzed by cadre. The software projects how that workforce will change in the future based on known influences such as attrition due to retirement, illness and out-migration and the number of trained health workers annually entering the workforce. This projection is compared to the anticipated health workforce needs over the same period, calculated from a targeted health worker-to-population ratio set by cadre. The software visually displays the gap between actual workers and needed workers over time to help planners quickly assess how to meet health workforce needs. To aid with decision-making, the user can estimate the costs of training and staffing plans.

As a modeling tool, iHRIS Plan will:

- Promote data-driven decision-making among workforce planners
- Educate planners about the factors that affect human resources and workforce needs
- Strengthen stakeholder commitment and collaboration in developing workforce strategies.

Using iHRIS Plan, workforce planners and decision-makers can understand what will happen if different actions are taken to influence the health workforce or if no action is taken. These projections help prioritize policy changes by demonstrating which changes have greater or lesser impact on the workforce. The projections also alert planners to potential problems in the health workforce supply.

The workforce planning model helps planners and policy makers answer the following types of questions:

- In the absence of any policy change, what will my country's health workforce look like in ten years?
- Based on current population projections, how many more nurses should I hire to meet the need?
- If the mandatory retirement age is increased, what will be the corresponding increase of available staff over the next ten years?

### iHRIS Plan Features

iHRIS Plan will provide an interface to a standard, internationally accepted model for workforce planning, developed by the World Health Organization. The initial version of the software (available now) enables users who are new to workforce planning to quickly generate projections based on a simplified planning model and a minimum of data. In later versions, experienced users who have additional data available can choose more complex modeling options that result in more robust plans.

The software produces graphical projections for each year in the modeled timeframe that can be disaggregated by cadre for presentation to stakeholders. These projections compare the actual number of

health workers to the number required to meet the country's health care needs. In addition, users can produce tabular reports that project actual numbers as well as salary and training costs.

The following features are included in Version 1:

- Define one or more pools of human resources by health worker cadre based on current data
- Project workforce supply for any number of years by specifying the number of health workers in each defined cadre that are projected to leave or join the workforce each year
- Project health workforce targets for each defined cadre based on population change
- Generate graphical models showing the gaps between actual workforce changes and projected workforce needed over time
- Aggregate or disaggregate models by health worker cadre
- Enable and disable changes to a cadre and immediately display the effect of the changes on the model to test various interventions or policy changes on the workforce
- Project costs of health worker staffing and training plans
- Copy a projection for faster data entry
- Group projections by user-defined categories.

The following features ensure security and accuracy of data stored in iHRIS Plan:

- **Data sources** captured for verification
- **Password-protected logins** to allow only authorized users to access the data
- **Role-based user accounts** so that non-authorized user actions and datasets are hidden
- **Automated logging** of the username, date and time when data are entered or changed
- **Permanent archiving** of all data changes to ensure a consistent record.

We also released a Windows-based version of iHRIS Plan. This version is intended for use in areas that do not have a reliable Internet connection or where a single-user desktop version is needed.

Planned for future versions are data import and export, a wizard interface to guide new users through creating a projection, extensive on-screen help developed by workforce planning experts and more robust reports including a workforce plan template.

## Related Systems

iHRIS Plan can import and analyze data from the Capacity Project's other iHRIS products:

- **iHRIS Manage**, a human resources management system
- **iHRIS Qualify**, a certification and licensing management system.

Working together, the three components of the iHRIS Suite provide a powerful feedback loop for analyzing, planning and managing health workforce resources and needs.

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# HRIS

STRENGTHENING  
IMPLEMENTATION  
TOOLKIT

## Section IV: Using Data to Make Decisions

### **Goal:**

Understand and improve the use of HRH data  
for planning, decision making and sharing.

### **Tools:**

**Technical Brief: Building the Bridge from Human  
Resources Data to Effective Decisions: Ten Pillars  
of Successful Data-Driven Decision-Making**

**Technical Brief: An Overview of Human Resources  
for Health (HRH) Projection Models**

**Creating a Data-Sharing Agreement**





# **Technical Brief: Building the Bridge from Human Resources Data to Effective Decisions: Ten Pillars of Successful Data-Driven Decision-Making**

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Using Data to Make Decisions

**Please look in the back folder pocket for this brief.**



## Building the Bridge from Human Resources Data to Effective Decisions: Ten Pillars of Successful Data-Driven Decision-Making

*Ummuro Adano, Management Sciences for Health*

### Introduction

The field of health care requires the availability of well-researched knowledge supported by compelling case studies or clinical trials to make sound health-related decisions. This ensures that health innovations and new practices are informed by the best available data and research evidence. However, the same rigor is not necessarily applied in the field of human resources for health (HRH), particularly in using workforce data to make sound strategic, policy and programmatic decisions. As such, a key challenge to human resources (HR) practitioners and policy-makers is to contextualize HR data and information for more effective decision-making and subsequently for policy formulation and practice.

With external assistance, developing countries in sub-Saharan Africa are beginning to establish better human resources information systems (HRIS) as part of a comprehensive and integrated response to some of the fundamental challenges posed by the health crisis. While this is a positive development, it is equally important to begin thinking about simple, practical approaches for supporting HR planners and senior decision-makers to be effective leaders and managers of HR data.

Data-driven decision-making (DDDM) is an ongoing collaborative process of making informed HR policy and management choices based on appropriate analysis of relevant data and information.

The purpose of this technical brief is to present ten fundamental and practical pillars to aid HR managers, practitioners and policy analysts in building a bridge from HR data and reports to effective HR policy and management decisions.

### 1. Making Use of the Data

One of the major misconceptions about effective use of HR data in decision-making might be summed up as follows: *Build or gather data and they will use it.* We now have sufficient experience to know that it is not enough to make data available. Health sector leaders need a process in place for analyzing reports and information, getting it to the right decision-maker at the right time, and ensuring

the power and resources to act on the data. However, if this process is faulty or insufficiently collaborative, DDDM can produce uninformed (and incorrect) decisions or shift the focus away from priority issues.

### 2. Developing a Culture of Inquiry

Effective data utilization requires a mindset as well as an organizational ethos that actively invests in a culture of inquiry that helps people question the status quo. In the field of HRH, this culture of inquiry should be characterized by individuals, teams and work groups at different levels of the organization who are regularly probing and scanning the environment in ways that will help them determine and provide answers to a set of priority HR policy and management questions. For example, the following questions can be asked to discuss and map the use of information to support various decisions:

- What HRH data do we need to gather in order to:
  - Advocate for more workers
  - Address maldistribution of existing workers
  - "De-ghost" the payroll, by ensuring that former employees do not continue to receive payment
  - Track health workers who are leaving and determine why they leave, where they go, what they actually do when they get there
  - Influence policies on staffing norms, recruitment, deployment, career path development and continuing professional development?
- How do we actually use data; what decisions do they inform?
- What is the mechanism for facilitating the use of these data (such as department meetings, senior management meetings, annual sector review meetings, HRH working groups, HRIS stakeholder leadership groups, etc.)?
- How often does this process take place?
- What issues, if any, influence the quality and security of data use?

### 3. Context Matters

The context is the overall environment or setting in which HR data are being gathered, analyzed

### Data-Driven Decision-Making (DDDM)

*DDDM is divided into three functional areas:*

- *Collection, integration and dissemination of data*
- *Regular analysis, quality review and reporting of data*
- *Procedures for acting on the data to influence policy and practice.*

*When approached collectively, these functional areas provide an integrated process for workforce planning and management. DDDM can also be used as a road map for organizations trying proactively to address challenges or opportunities in a rapidly evolving and complex HR marketplace.*

## Presentation of Data

*The way in which data are gathered and presented can also influence decision-making and policy formulation. Compelling data that have been gathered, synthesized and disseminated with a strong advocacy slant tend to capture the attention of senior decision-makers as opposed to data shared in the form of routine reports that are only distributed in management meetings or one department.*

## Compatibility with Values, Interests and Past Experiences

*We seldom approach data and evidence as completely non-partisan or unbiased brokers. Instead, we are likely to bring to the table some of our own values and assumptions about what to expect, and that attitude sometimes determines how we initially interact with data or data sharers. The assumption here is that if the data bring up an issue that we deeply care about, then we are more likely to notice and pick it out (and vice versa).*

and used to make policy and management decisions. It is important for HR planners and managers to understand the various dimensions and determinants of the context within which data are used to make decisions, as it is essential for effective policy-making and practice. Some important elements of the context include:

- **Social, political and other forces at work in the HR policy environment throughout the country.** Some decisions will require the engagement of political actors at different levels of government. As such, depending on the nature of the decision to be made, it is essential to engage in some political risk assessment to determine if the information resonates with senior policy-makers, politicians or professional associations. In other instances, several key agencies—such as the Public Service Commission or the directorate of personnel management that are often located outside the Ministry of Health but still exercise major responsibilities and HR “decision space” over what happens to the health workforce—need to see the issue as important and value the decision or action that may be taken as a result of it.
- **Historical and cultural factors.** For example, if there is a historical trend in the health sector or the country that tends to support a larger, more proactive role for government-funded institutions to supply all health workers, such a context may inhibit a new data-driven idea that supports the introduction of other actors (e.g. the private sector) as new suppliers of health workers.
- **Health system factors.** Sometimes capable and influential HRH “knowledge brokers” are needed to work the system.
- **Resource contexts.** Sometimes the factors (human, financial, infrastructural, skills-related) required to influence policy development and decision-making often gain strength at the expense of the data. In other words, the data may be perfectly legitimate but the resource context in terms of implementation may impede the decision-making process.

## 4. Aligning Different Forces, Interests and Beliefs

Policy analysis theory suggests that data “affects existing beliefs of important people about significant features of the problem under study and how it might be solved or mitigated” (Bardach, 2000). However, HR planners and policy-makers are faced with a unique challenge: they may have access to different types of HR information from multiple sources, in a variety of forms and perhaps at different times and frequencies. The decisions that need to be made using these data may also involve different people across multiple agencies who do not work together all the time. These connections and relationships will need to be acknowledged and aligned by HR planners and managers

for the decision-making process to be fruitful. Otherwise, there is potential for conflict, paralysis or failure to use the data.

Additionally, it is insufficient for only a few people in an organization to examine HRH data and information as part of their daily functions and expect to make sound, binding decisions. One approach that is being considered in Uganda is the development of a simple framework for analyzing and presenting HR data and making the data available for discussion during annual joint review meetings of the health sector. Such a streamlined and collaborative approach to sharing HR data is important given the sensitive nature of HRH, and ways in which such data are used in effective decision-making are largely determined by a broad range of actors. Similarly, whether or not data will generate any decisions will also depend on the beliefs, past experiences, values and skills of these players. Other important factors include timing and economic costs of those decisions.

## 5. Preparing for Data Skeptics

Data users determine the usefulness of a data set by asking such questions as:

- **What is new here? How is this different from what we already know or have?** As data collectors and sharers, we may be telling people information they have known for years but never acted upon. Part of the solution may lie in combining these messages with ways of unpacking the mindset that generates such complacency or skepticism in the first place.
- **What do these reports mean?** The complexity of the reports and evidence may elicit the feeling that more work is needed just to understand the evidence, which can lead to a lack of interest or unwillingness to engage.
- **What are the perceived benefits of change?** Individuals often tend to avoid change, but they are also influenced by the perceived benefits of change (Stocking, 1985). As a result, if HR planners and managers are able to identify within the organization a critical mass of active seekers of new ideas who are favorable to change and even willing to take risks, then there are higher chances of success.

## 6. The Power of the Individual

Individuals are key participants in decisions about how data should or should not be used, as it is individuals who decide whether to accept or reject new data findings. Even when presented with compelling data, people tend to accept or reject new ideas based upon individual preferences. Evidence from the literature suggests that these individual decisions are influenced by a raft of personal qualities and capacities that any decision-making process must take into consideration (Rogers, 1983). At the individual level, these factors include:

- Complexity of what is being presented
- Values and beliefs, including current position on certain issues
- Risk perception, or the extent to which an individual avoids change
- Position or status of the individual within the organization
- Knowledge and skill sets
- Organizational support for change
- Partnership links, an ability to network and share knowledge across the social system.

## 7. The Power of the Organization

Several organizational factors bear on the decision-making process:

- Organizational structure, function, values, culture, clout, composition and socioeconomic context (Stocking, 1985)
- The nature of staff (age, gender, racial composition), degree of skills and level of training (Kaluzny et al, 1974)
- The extent to which new ideas are welcomed by management figures, and the kind of support available for innovation of action
- The influence of interest group activity or public opinion on the organizations with HRH-related decision-making functions
- The extent to which data can generate perceptions of legitimacy, an environment of trust and collaborative partnerships among different players within the same organization and among the various organizations that need to work together.

## 8. Navigating Difficult Conversations

From time to time data will produce instances that involve difficult conversations within a team or organization that can cause instability or chaos. This normally happens when new data challenge a particular status quo or policy issue that has been in place for a long time, in ways that lead to differences in opinion among team members. If the ensuing interactions are not handled with tact and sensitivity, the situation can easily slip into an insidious team conflict. Generally speaking, many people are uncomfortable with conflict and they fear the escalation of negative emotions in difficult conversations (Senge et al, 1994). Or, if people believe they want a decision to come out a certain way, they may feel apprehensive about sharing certain data that may produce a negative outcome. Fears of difficult conversations can often lead to avoiding or postponing important discussions because people are worried about controversy and damage to workplace relationships.

Part of the strategy for strengthening DDDM includes an interactive session that uses a skilled facilitator and a communication-based model for reflecting on, understanding and

responding to difficult conversations. One method is to use a humorous, all-inclusive, nonthreatening communication style and provide plenty of relatable examples to guide groups of decision-makers through potentially difficult conversations that data may generate, ultimately reaching a mutually beneficial common ground. In most cases, the facilitator does not aim to “correct” or impose order on the group conversation, but might point out the presence of polarizing viewpoints, encourage some ways to suspend assumptions and steer the conversation toward common ground. A second key factor is to present potential conflict-producing data using clear and nonjudgmental language, always leaving open the possibility that users might see and hear the data and still make a decision to de-emphasize or even ignore the information.

## 9. Process and Relationships

People make strategies, plans and data successful by transforming them into policies, practices and results. As such, the nature of relationships between the potential data users within an organization is one of the most critical dynamics determining success or failure. However, this dynamic is often underestimated or even overlooked in the process of DDDM. This is unfortunate because when correctly executed, the process can:

- Bring core issues to the forefront
- Allow participants to overcome individual, professional and organizational barriers
- Build a greater sense of joint ownership
- Increase communication and understanding
- Build a cohesive leadership team focused on moving the business of HR planning and management in the right direction.

## 10. A Journey, Not a Destination

Theorists supporting DDDM contend that evidence-based decision-making is not a one-time solution or a standard tool to be applied *ad hoc* or at random. Rather, it is an ongoing knowledge-driven process that requires continuous collection, analysis and sharing of data, because that is the only way in which trends—both positive and negative—can be discovered and acted upon (Doyle, 2002).

DDDM is also a dynamic, collaborative process; it is a core function that must be embedded into the ethos of ministries of health. It provides decision-makers with the collective ability to grapple with the most important HR questions of the day, weigh the available evidence, consider several options and think both strategically and practically about the decisions that they make. HR planners and managers need to lead this journey and act as agents of change. Without their commitment, it will be difficult for HR data to become an integral part of health

## Social Networking

*Organizational affiliations that individuals maintain tend to impact their values, beliefs and orientations, creating what is commonly referred to in the DDDM literature as the “bandwagon effect”—because if you see data that are compatible with your personal and professional values and those of your social network, you are more likely to adopt them and vice versa (Dobbins et al, 2002).*

Visit the HRH Global Resource Center to find, share and contribute human resources for health knowledge and tools. For those working at the country or global level, the HRH Global Resource Center provides information to:

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The Capacity Project  
IntraHealth International, Inc.  
6340 Quadrangle Drive  
Suite 200  
Chapel Hill, NC 27517  
Tel. (919) 313-9100  
Fax (919) 313-9108  
info@capacityproject.org  
www.capacityproject.org

This publication is made possible by the support of the American people through the United States Agency for International Development (USAID). The contents are the responsibility of the Capacity Project and do not necessarily reflect the views of USAID or the United States Government.

sector operations. They can start to model data use and encourage it by sharing the benefits and successes. They can also schedule time for departmental teams, senior management and even multisector teams to meet, review, query and discuss reports needed to inform decisions.

### Conclusion

The primary aim of any HRIS should be to promote better use of data to drive effective decision-making. This objective is shared by many organizations including development partners such as the United States Agency for International Development and the World Bank. Similarly, ministries of health may want

to know that data collection efforts yield maximum value in real, human terms and lead to effective decisions—and do not just result in more reports. As such, it is important to invest in developing a sustainable process and culture that actively encourages people to engage in dialogue opportunities around HR data and information, and ultimately make effective policy and management decisions. On a final note, it is worthwhile to periodically assess how access to quality data has actually resulted in more strategic decision-making and then share those examples to help foster the culture of DDDM.

### References

Bardach E. *A practical guide for policy analysis: The eightfold path to more effective problem solving*. New York, NY: Chatham House Publishers, 2000.

Dobbins M, Ciliska D, Cockerill R, Barnsley J, DiCenso A. A framework for the dissemination and utilization of research for health-care policy and practice. *Online Journal of Knowledge Synthesis for Nursing* 2002;9:7. Accessed 8 July 2008 at: [http://health-evidence.ca/downloads/A\\_framework\\_for\\_dissemination\\_\(2002\).pdf](http://health-evidence.ca/downloads/A_framework_for_dissemination_(2002).pdf)

Doyle D. Knowledge-based decision-making: moving beyond intuition through data-laced wisdom leading to informed actions. *School Administrator*. Dec 2002. Available at: [http://findarticles.com/p/articles/mi\\_m0JSD/is\\_11\\_59/ai\\_94893402](http://findarticles.com/p/articles/mi_m0JSD/is_11_59/ai_94893402)

Kaluzny A, Veney J, Gentry J. Innovations of health services: a comparative study of hospitals and health departments. *The Millbank Memorial Fund Quarterly Health and Society*. 1974;52(1).

Rogers E. *Diffusion of innovations*. New York, NY: Free Press, 1983.

Senge P, Kleiner A, Roberts C, Ross R, Smith B. *The fifth discipline fieldbook: strategies and tools for building a learning organization*. New York, NY: DoubleDay, 1994.

Stocking B. *Initiative and inertia: case studies in the NHS*. London, UK: Nuffield Provincial Hospitals Trust, 1985.

### Additional Sources

Capacity Project. Drawing on data: effective decision-making for the health workforce. Voices from the Capacity Project No. 21. Chapel Hill, NC: Capacity Project, 2008. Available at: [http://www.capacityproject.org/images/stories/Voices/voices\\_21.pdf](http://www.capacityproject.org/images/stories/Voices/voices_21.pdf)

Capacity Project. Global HRIS strengthening [website]. Chapel Hill, NC: Capacity Project, 2008. Available at: <http://www.capacityproject.org/hris/>

Wakibi, S. Data quality considerations in human resources information systems (HRIS) strengthening. Capacity Project Technical Brief No. 10. Chapel Hill, NC: Capacity Project, 2008. Available at: [http://www.capacityproject.org/images/stories/files/techbrief\\_10.pdf](http://www.capacityproject.org/images/stories/files/techbrief_10.pdf)

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# **Technical Brief: An Overview of Human Resources for Health (HRH) Projection Models**

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Using Data to Make Decisions

**Please look in the back folder pocket for this brief.**



## An Overview of Human Resources for Health (HRH) Projection Models

*Pamela McQuide, Julie Stevens and Dykki Settle, IntraHealth International*

### Why Are Workforce Projections Valuable?

Health workforce planning is necessary in order to ensure that trained and knowledgeable health workers are available to deliver health care services when and where they are needed. Ensuring adequate human resources for health (HRH) is crucial in order to continue progressing toward the realization of the Millennium Development Goals (Dreesch et al, 2005). The purpose of workforce planning is to determine the most appropriate balance among the mix, distribution and number of health workers. As Thomas Hall has noted, workforce surpluses or shortages can decrease productivity and efficiency, deplete scarce resources and squander worker capabilities (2003). Training health workers requires a significant investment of time and resources; therefore, restoring balance to a system in which the health workforce supply is out of sync with the demand for health services can be a lengthy process. In this context, health workforce projections can be very useful.

The aim of this technical brief is to provide a rapid review of different health workforce projection approaches. A list of references serves as a guide for those who would like more information on this subject.

### HRH Projection Approaches

This brief will discuss six different HRH projection approaches, based on a review of the current literature. Although the main unit of analysis in these approaches is the number of health care providers, the method chosen to estimate human resources requirements reflects the political and economic choices and social values of a health system (Dreesch et al, 2005). Since most countries do not have integrated administrative data systems to track training, licensing, deployment and financing of health care across the various sectors, some of the required data sources may not be available. The Capacity Project, in collaboration with HRH projection experts, is implementing an integrated HRH information system with a module for workforce projections to assist countries—especially resource-constrained countries—to have the information available for making informed health workforce projections.

### Needs-Based Approaches

Needs-based approaches estimate future health workforce needs based on the projected health service needs (both met and unmet) of the current population, adjusted for age and gender (O'Brian-Pallas et al, 2001a; O'Brian-Pallas et al, 2001b; Dreesch et al, 2005). Professional norms and expertise regarding manpower requirements for health services delivery are also incorporated into this approach, in order to discover the most cost-effective method of meeting health care needs.

■ **Assumptions:** This approach seeks to address all health care needs and assumes that the use of resources will be prioritized based on need (O'Brian-Pallas et al, 2001a; O'Brian-Pallas, et al, 2001b; Hall and Mejia, 1978; Markham and Birch, 1997; O'Brian-Pallas et al, 2001a, as cited in Dreesch et al, 2005).

■ **Advantages:** This approach is centered on improving the efficiency of a combination of HRH resources to deliver health care services. Additionally, compared to some of the other HRH projection methods, the needs-based approach is somewhat easier to explain and understand, and therefore can be helpful for advocacy (Hall and Mejia, 1978; Markham and Birch, 1997; O'Brian-Pallas et al, 2001a, as cited in Dreesch et al, 2005).

■ **Limitations:** Drawbacks to this approach include the need for models to be restructured in response to changes in medical or other technologies that alter service delivery efficiency. Furthermore, potential problems exist when defining what constitutes "need" in terms of both coverage and quality. Finally, projections generated by needs-based models may call for an unrealistic number of health care providers without adjusting for disparities in the distribution of health services, particularly for disadvantaged populations.

### Utilization-Based Approaches

Utilization-based approaches (demand-based approaches) project future health service requirements based on present health service utilization (O'Brian-Pallas et al, 2001a; O'Brian-Pallas et al, 2001b; Dreesch et al, 2005). This approach may incorporate projected trends in the current workforce, such as demographics, turnover, attrition rates, etc.

### Good Projection Model Criteria:

- Are based on clearly-identified goals
- Focus on specific, quantifiable problems
- Use data of acceptable quality (either available or collected)
- Are regularly updated to accommodate more reliable data and to reflect new developments in population trends and patterns of health services utilization
- Make projections far enough in advance to allow for time to take action.

(Source: Byrnick et al, 2002; Ryten, n.d.; O'Brian-Pallas et al, 2001a)

## Forecasting Methods

*HRH projection approaches use different types of forecasting methods to make predictions about the future of the health workforce. Health service research borrows methodologies from demography, epidemiology, economics and industrial engineering when forecasting the health workforce (O'Brian-Pallas et al, 2001a).*

### **Population-based models:**

*Population-based forecasting methodology assumes that the factors that influence workforce supply are linked to demographic and utilization trends (O'Brian-Pallas et al, 2001a). This methodology adjusts for influential variables such as attrition rates and full- and part-time employment patterns, but assumes that neither the behavior of age cohorts nor the use of health services will change over time. While potentially valuable for short-term predictions, this method's limitations may produce inaccuracies when used for long-term projections.*

*Econometric models: Projections based on econometric modeling consider the relationships between demand factors, such as vacancies and population requirements, and market factors, such as budgets, salaries and workforce supply (O'Brian-Pallas et al, 2001a).*

*These models successfully account for some of the financial forces that affect workforce supply; however, such models are less able to address the influence of policy, budget constraints, social factors and quality of care.*

*Simulation models: Simulation modeling, either deterministic sensitivity analysis or stochastic simulation, uses mathematical methods that account for uncertainty in population trends, health care needs and service efficiency (O'Brian-Pallas et al, 2001a). Simulation models are able to adapt to real-world, "what if?" scenarios, and can be run repeatedly to accommodate adjustments in hypotheses or model parameters. Limitations of these models include the cost of implementation and the amount and level of detail of the data they require as compared to other models.*

■ **Assumptions:** Utilization-based approaches assume that the population currently uses a suitable mix of health services. Future health care needs can be estimated based on predictable trends in population fertility, mortality and migration.

■ **Advantages:** Because future service utilization rates are closely linked to present utilization rates, projected HRH goals tend to remain financially attainable.

■ **Limitations:** This approach is based on the status quo and therefore may not address existing inadequacies in the quality or accessibility of health services. Furthermore, using the status quo does not permit the model to account for future changes in behavior patterns, employment trends or environmental factors (O'Brian-Pallas et al, 2001b). Finally, inaccurate assumptions may lead to considerable miscalculations in the projections.

### **Health Workforce-to-Population Ratio**

A health worker-to-population ratio estimates the current ratio as well as the desired future ratio of doctors to population and of other health professionals to doctors. This method uses a base year ratio, estimating annual changes in future numbers of health workers (Hall, 2001). Projected future health worker supply is compared with projected need and projected costs are compared with projected available funds. Assumptions about growth rates are adjusted until desired ratios are reached. For example, the World Health Report (World Health Organization, 2006) states that countries need a population density of at least 2.28 doctors, nurses and midwives per 1,000 population to ensure skilled attendance at birth. This health worker-to-population density is used across many countries.

■ **Assumptions:** Using a health workforce-to-population ratio assumes that the relative proportion of health workers in a given area is the most important determinant of ability to deliver health services. Additionally, this approach assumes that reasonable decisions can be made about the preferred doctor-to-population and health worker-to-doctor ratios. Assumptions about desired ratios may be based on the ratio of a region or reference country selected as a comparator (Hall Mejia, 1978; Markham and Birch, 1997; O'Brian-Pallas et al, 2001a, as cited in Dreesch et al, 2005).

■ **Advantages:** This approach is quick, relatively simple and may be satisfactory if realistic assumptions are made about growth rates (Hall, 2001).

■ **Limitations:** The health workforce-to-population ratio does not take into account the effects of changes in health services utilization or changes in health workforce mix, productivity, task shifting etc. (Hall and Mejia,

1978; Markham and Birch, 1997; O'Brian-Pallas et al, 2001a, as cited in Dreesch et al, 2005). Furthermore, disparities in health worker distribution that exist in the base year will likely continue through the target year.

### **Service Target-Based Approaches**

Target-based approaches set targets for specific health care services, based on health worker supply or health services demand (Hall, 2001). Targets are created using information about current services provided, technologies in use, demand and expert opinion (Dreesch et al, 2005). These targets are then translated into staffing requirements for personnel and productivity norms for health care facilities (Dreesch et al, 2005; Hall, 2001).

■ **Assumptions:** The service-target approach assumes that health services standards can be met by health workers and facilities within a specified amount of time (Hall and Mejia, 1978; Markham and Birch, 1997; O'Brian-Pallas et al, 2001a, as cited in Dreesch et al, 2005).

■ **Advantages:** Projections based on the service-target approach account for some of the complexity of the relationships between variables and can complement other projection methods. This approach may be useful in planning critical health care services or services for small populations served by a single institution (Hall, 2001).

■ **Limitations:** This approach may depend on unreliable assumptions.

### **Adjusted Service Target-Based Approaches**

Adjusted service target-based approaches are useful for specific health intervention programs. Targets are established based on priority health services needs, as determined by population demographics, expert opinion and the incidence and prevalence of health problems (Dreesch et al, 2005). Specific interventions addressing priority needs are identified and functional job analyses are used to determine the health worker skills required to carry out each intervention. Health worker time requirements are also estimated and converted into full-time equivalents (FTEs) for each intervention.

■ **Assumptions:** The adjusted service target-based approach assumes that evidence-based interventions can be effectively implemented in all circumstances (Dreesch et al, 2005).

■ **Advantages:** This competency-based approach identifies critical health workforce skills, providing guidance for future training initiatives. Planning is based on the skills and competencies required to provide health services, rather than inserting job titles or positions into plans. In addition, this type of analysis has the potential to improve efficiency through the reduction of overlapping skills and the combination of skill sets that work in synergy.

■ **Limitations:** In order to make projections using this approach, current infrastructure and resources must be available to assist and maintain the health workforce. Projections also require a significant amount of information, including a comprehensive review of the health workforce or accurate health professional expertise.

### Facilities-Based Approaches

Facilities-based approaches range from simple to complex methods of target-setting for health care facilities. Thomas Hall has described a sector-level, facilities-target approach focused on improving individual health center capacity, facility mix, geographic distribution of health care facilities and adjustments to the private-to-public sector ratio (2001). Targets are founded on staffing standards in each type of facility, student-to-faculty ratios, the quantity of public health personnel and funding levels required to pay salaries. For example, Uganda estimates its workforce needs based on staffing norms for each type of health facility and estimates the required number of facilities based, in part, upon the population (Ministry of Health, 2007).

■ **Assumptions:** The facilities-based approach assumes that adjustments to the number, size and type of health care facilities, as well as changes in facility staffing standards, will improve the ability of the larger health sector to address health service needs.

■ **Advantages:** Projections created using this approach provide more detailed information and can explore different policy options more easily than the health workforce-to-population ratio, while remaining focused on the point of health services delivery.

■ **Limitations:** This approach cannot easily accommodate information about the quality of health services or patient needs.

Additionally, Keith Hurst has detailed a range of facility-based methods used to make projections about the nursing workforce (2002). For brevity, each method will be described only cursorily.

The *professional judgment method* relies on a simple formula and expert opinion to quickly determine the number of nurses needed based on the number of hours in each shift. Although easy to use, this approach is considered too subjective and inflexible by some managers and does not account for nursing quality.

The *nurses per occupied bed method* uses a ward staffing formula based on a study of 308 hospitals in the United Kingdom. This simple, top-down approach allows for benchmarking, but has been criticized due to its inability to adjust to both differing standards of care and patient needs.

The *acuity quality method* is sensitive to patient needs and occupancy rates, and can be adjusted to reflect individual shifts as well as performance indicators. However, this method is much more

complex and requires detailed data about the nursing workforce and the patient population.

The *timed task/activity method* is a complex approach that combines patient care needs with the time required for 450 nursing interventions. The use of more detailed data may result in increases in projection accuracy. Downsides include the substantial cost and effort to track patient needs and nursing activities.

The *regression analysis method* predicts the necessary number of nurses based on the amount of activity in a health facility. In contrast to some of the other methods, this method requires a smaller investment of time and resources to monitor day-to-day changes in patient needs and nurse activities. However, this model cannot easily adjust to differing levels of productivity or account for qualitative variables.

### Suggestions for Choosing a Projection Model

Choosing a projection approach or forecasting method requires deliberate consideration since the type of model used can have a significant effect on the resulting outcomes and recommendations. For example, in a study estimating nursing workforce requirements in Canada, the use of a needs-based model resulted in a projected need for 70,808 nurses, while a utilization-based model using the same data projected a need for 112,000 nurses (Birch et al 1994 as cited in O'Brian-Pallas, 2001a).

Using multiple, complementary projection approaches may provide insight for planning and decision-making, but may also be unfeasible due to the amount of time and data required as well as the increased complexity inherent in combining approaches.

Projection approaches should be selected with consideration of practicality and feasibility, given the data and resource constraints of a given situation. Useful projection models should address a clearly defined, quantifiable objective or problem. Additionally, models should be flexible enough to respond to new data and updated information. Model choice should also take the available data (or the data to be collected) under consideration. For example, using a sophisticated model that requires a large amount of data may produce inaccurate projections if the available data are unreliable, whereas collecting a smaller amount of less detailed but more trustworthy data and using a simpler projection model may lead to more accurate results.

### Suggestions for Optimizing the Results of HRH Projections

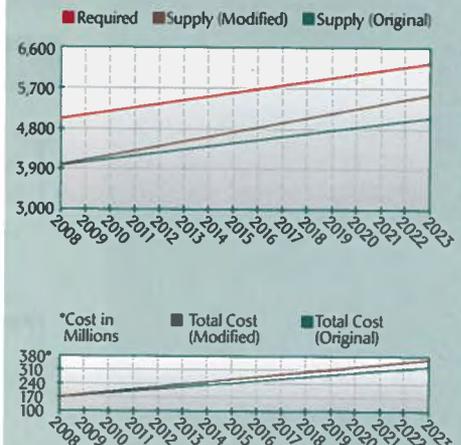
In order to take steps to address the demands on the future health workforce, decision-makers must be able to

## HRH Workforce Planning Model Workshop

In December 2007, the Capacity Project organized a health workforce planning model workshop in order to choose a standard workforce projection model on which to base an Open Source software program. Participants decided to use the WHO HRH Workforce Projection Model developed in 1992 by Thomas Hall and Peter Hornby because this model is well-known, powerful and concentrates on the health sector. iHRIS Plan, the Capacity Project's software based on a modified John Dewdney model, initially focuses on short-term HRH workforce planning (see [www.capacityproject.org/hris/suite/ihris\\_plan.php](http://www.capacityproject.org/hris/suite/ihris_plan.php)). Subsequent versions will be based on the WHO model. The software is designed to be user-friendly, enabling decision-makers to model the effects of potential workforce policy reforms. All workshop materials are available at: [www.capacityproject.org/workforce\\_planning\\_workshop/index.html](http://www.capacityproject.org/workforce_planning_workshop/index.html). See Figure 1 as a sample of the type of reports available with iHRIS Plan.

**Figure 1: Sample Report from iHRIS Plan**

The following is an example of the type of reports that can be created using iHRIS Plan. The upper graph shows the projected 15-year health workforce requirements and the expected supply of health workers with the current retirement policy as well as the change in supply that could be achieved by adjusting the retirement age, moving the supply closer to the requirements. The lower graph shows total costs for the health workforce supply with the current retirement policy and the increased cost of changing the retirement age.



## An Overview of Human Resources for Health (HRH) Projection Models

*Pamela McQuide, Julie Stevens and Dykki Settle, IntraHealth International*

### Why Are Workforce Projections Valuable?

Health workforce planning is necessary in order to ensure that trained and knowledgeable health workers are available to deliver health care services when and where they are needed. Ensuring adequate human resources for health (HRH) is crucial in order to continue progressing toward the realization of the Millennium Development Goals (Dreesch et al, 2005). The purpose of workforce planning is to determine the most appropriate balance among the mix, distribution and number of health workers. As Thomas Hall has noted, workforce surpluses or shortages can decrease productivity and efficiency, deplete scarce resources and squander worker capabilities (2003). Training health workers requires a significant investment of time and resources; therefore, restoring balance to a system in which the health workforce supply is out of sync with the demand for health services can be a lengthy process. In this context, health workforce projections can be very useful.

The aim of this technical brief is to provide a rapid review of different health workforce projection approaches. A list of references serves as a guide for those who would like more information on this subject.

### HRH Projection Approaches

This brief will discuss six different HRH projection approaches, based on a review of the current literature. Although the main unit of analysis in these approaches is the number of health care providers, the method chosen to estimate human resources requirements reflects the political and economic choices and social values of a health system (Dreesch et al, 2005). Since most countries do not have integrated administrative data systems to track training, licensing, deployment and financing of health care across the various sectors, some of the required data sources may not be available. The Capacity Project, in collaboration with HRH projection experts, is implementing an integrated HRH information system with a module for workforce projections to assist countries—especially resource-constrained countries—to have the information available for making informed health workforce projections.

### Needs-Based Approaches

Needs-based approaches estimate future health workforce needs based on the projected health service needs (both met and unmet) of the current population, adjusted for age and gender (O'Brian-Pallas et al, 2001a; O'Brian-Pallas et al, 2001b; Dreesch et al, 2005). Professional norms and expertise regarding manpower requirements for health services delivery are also incorporated into this approach, in order to discover the most cost-effective method of meeting health care needs.

■ **Assumptions:** This approach seeks to address all health care needs and assumes that the use of resources will be prioritized based on need (O'Brian-Pallas et al, 2001a; O'Brian-Pallas, et al, 2001b; Hall and Mejia, 1978; Markham and Birch, 1997; O'Brian-Pallas et al, 2001a, as cited in Dreesch et al, 2005).

■ **Advantages:** This approach is centered on improving the efficiency of a combination of HRH resources to deliver health care services. Additionally, compared to some of the other HRH projection methods, the needs-based approach is somewhat easier to explain and understand, and therefore can be helpful for advocacy (Hall and Mejia, 1978; Markham and Birch, 1997; O'Brian-Pallas et al, 2001a, as cited in Dreesch et al, 2005).

■ **Limitations:** Drawbacks to this approach include the need for models to be restructured in response to changes in medical or other technologies that alter service delivery efficiency. Furthermore, potential problems exist when defining what constitutes "need" in terms of both coverage and quality. Finally, projections generated by needs-based models may call for an unrealistic number of health care providers without adjusting for disparities in the distribution of health services, particularly for disadvantaged populations.

### Utilization-Based Approaches

Utilization-based approaches (demand-based approaches) project future health service requirements based on present health service utilization (O'Brian-Pallas et al, 2001a; O'Brian-Pallas et al, 2001b; Dreesch et al, 2005). This approach may incorporate projected trends in the current workforce, such as demographics, turnover, attrition rates, etc.

### Good Projection Model Criteria:

- Are based on clearly-identified goals
- Focus on specific, quantifiable problems
- Use data of acceptable quality (either available or collected)
- Are regularly updated to accommodate more reliable data and to reflect new developments in population trends and patterns of health services utilization
- Make projections far enough in advance to allow for time to take action.

(Source: Byrick et al, 2002; Ryten, n.d.; O'Brian-Pallas et al, 2001a)

# Creating a Data-Sharing Agreement

## Using Data to Make Decisions

### Why Should We Consider Sharing Our HRIS Data?

Data-sharing is an important way to increase the ability of researchers, scientists and policy-makers to analyze and translate data into meaningful reports and knowledge. Sharing data discourages duplication of effort in data collection and encourages diverse thinking, as others are able to use the data to answer questions that the initial data collectors may not have considered. Sharing data also encourages accountability and transparency, enabling researchers to validate one another's findings. Finally, data from multiple sources can often be combined to allow for comparisons that cross national and departmental lines.

### What Is a Data-Sharing Agreement and Why Is It Necessary?

A data-sharing agreement is a formal contract that clearly documents what data are being shared and how the data can be used. Such an agreement serves two purposes. First, it protects the agency providing the data, ensuring that the data will not be misused. Second, it prevents miscommunication on the part of the provider of the data and the agency receiving the data by making certain that any questions about data use are discussed. Before any data are shared, both the provider and receiver should talk in person or on the phone to discuss data-sharing and data-use issues and come to a collaborative understanding that will then be documented in a data-sharing agreement.

It is important to recognize that the process for setting up data-sharing agreements varies from country to country as well as the type of data that is being shared.

### What Should Be Addressed in a Data-Sharing Agreement?

Following is a list of items that are typically found in a data-sharing agreement. Although this list may cover the basics, additional concerns may be relevant to a particular dataset or provider agency. Ideally, these added concerns should be addressed in the data-sharing agreement to facilitate clear communication and, if needed, establish additional safeguards:

- **Period of agreement:** Clearly define when the provider will give the data to the receiver and how long the receiver will be able to use the data. Once the receiver agency no longer has the right to use the data, what will happen? Will the data be returned to the provider or will it be destroyed (deleted from hard drives, shredded, burned, etc.)?
- **Intended use of the data:** State as specifically as possible how the receiver will use the data. What studies will be performed, what questions will be asked and what are the expected outcomes? Can the receiver use the data to explore additional research questions without the approval or consent of the provider?
- **Constraints on use of the data:** List any restrictions on how the data or data findings can be used. Is the receiver required to document how the data are used? Can the receiver share, publish or disseminate data findings and reports without the approval or review of the provider? If the receiver generates a report based on the data, does the report belong to the receiver or the provider? Can the receiver share, sell or distribute data findings or any part of the database to another agency?
- **Data confidentiality:** Describe the required processes that the receiver must use to ensure that data remain confidential. Because HRIS data contain information that can be linked to individuals, it is important to put safeguards in place to ensure that sensitive information (e.g., salaries, exam results) remains private. Personal data should remain confidential and should not be disclosed verbally or in writing to an unauthorized third party, by accident or otherwise. Will the receiver report information that identifies individuals? What safeguards are in place to prevent sensitive information from becoming public?
- **Data security:** Describe the methods that the receiver must use to maintain data security. Hard copies of data should be kept in a locked cabinet or room and electronic copies of data should be

password protected or kept on a secure disk. Will everyone at the receiver agency have the same level of access to data, or will some people have restricted access? What kind of password protections need to be put in place? Who will have physical access to the data, including the servers and the paper files? What will happen to the data after the data-sharing period ends?

- **Methods of data-sharing:** Identify the way in which data will be transferred from the provider to the receiver. Will data be transferred physically or electronically? If data are to be sent over the Internet, how can a secure connection be guaranteed? Will the data be encrypted before being transferred?
- **Financial costs of data-sharing:** Clarify who will cover the monetary costs of sharing the data. Will there be expenses related to sharing the data? Will the provider or the receiver share the costs, or will one agency pay for all data-sharing expenses?

### **What Happens If the Data-Sharing Agreement Is Violated?**

Data-sharing agreements can vary in their formality. Due to the sensitive nature of much HRIS data, we recommend the use of an official, legally binding contract rather than an informal contract. Compensatory or other consequences for violating the data-sharing agreement, if any, should be clearly stated in the agreement.

However, we recognize that laws vary from country to country, and the development of a legally binding data-sharing agreement may not be feasible. Under these circumstances, we recommend that the agency providing the data and the agency receiving it document their agreements in an informal data-sharing agreement. The process of creating a data-sharing agreement gives the provider and the receiver an opportunity to come to a mutual understanding about expectations and responsibilities regarding the shared data, which can reduce and possibly even prevent future misunderstandings and disagreements.



# HRIS

## STRENGTHENING IMPLEMENTATION TOOLKIT

### **Section V: Ensuring Sustainability**

**Goal:**

Develop procedures and access resources to ensure ongoing support and improvement of the HRIS.

**Tools:**

HRIS Performance Monitoring Plan

Case Study: Integrating HR Information Systems

Resources for Implementing HRIS Strengthening



# HRIS Performance Monitoring Plan

## Ensuring Sustainability

A human resources information system (HRIS) is an integrated system for managing information used in HR decision-making. A complete HRIS links all human resources data from the time professionals enter pre-service training to when they leave the workforce. HRIS performance measures are benchmarks for evaluating how efficient and effective HRIS investments are and how they can be improved to obtain better results to support HRIS strengthening objectives.

Continuous monitoring and evaluation is vital in determining what an HRIS is accomplishing, what needs to be improved and whether results are being achieved. This document provides basic guidance in the systematic monitoring and evaluation of an HRIS system. The goal of any performance monitoring plan (PMP) is not to focus on what is wrong and condemn it; rather, it is to highlight the positive aspects of the system that make it work, as well as to identify what went wrong as a basis for improving the system.

### Implementing a HRIS Performance Monitoring Plan

Ideally, a working group—often a subcommittee of the Stakeholder Leadership Group (SLG)—whose members have a key interest in monitoring the HRIS strengthening process is responsible for implementing the PMP. These stakeholders may include the HRIS manager, chief information officer, chief security officer, SLG secretary or chair and other key representatives of the organization hosting the information system (Chew 2008). This group will be responsible for managing the generic steps necessary to implement the HRIS monitoring and evaluation plan (WHO 2004):

1. Develop a plan for the systematic monitoring and evaluation of the system:
  - What will be monitored and evaluated?*
  - How will it be done?*
  - Who will do it?*
  - How frequently will it be conducted?*
  - How will the results be systematically disseminated?*
  - How will action resulting from the evaluation results be generated?*
2. Identify the resources needed to implement the monitoring and evaluation plan
3. Prioritize the activities, based on availability of resources and need
4. Implement the monitoring and evaluation plan
5. Document and disseminate the results of monitoring and evaluation activities
6. Make recommendations based on the results of monitoring and evaluation activities.

We recommend institutionalizing monitoring efforts to ensure that it becomes a regular activity and will be allocated the corresponding resources and technical expertise.

### Suggestions for HRIS Performance Monitoring Indicators

At the end of this document is a set of suggested indicators for the quantitative and continuous monitoring of HRIS performance. The proposed indicators generally fall in five categories:

1. System indicators
2. Security indicators
3. Data indicators
4. Stakeholder Leadership Group indicators
5. Usage indicators.

For each indicator, data collection must be as nonintrusive as possible and would ideally be automated. In addition, country-specific laws and regulations concerning privacy or protection of individual rights might apply to the HRIS and therefore would need to be examined and included.

## HRIS Evaluation Strategy

In addition to continuous monitoring of system performance, periodic evaluation studies can be conducted to assess the strengths and weaknesses of HRIS data supply and demand. Figure 1 is a matrix that can be used to evaluate HRIS strengths or weaknesses on both the data supply and data demand side (MEASURE/Evaluation 2007).

		Data	
		Weak ←	→ Improving
Data demand/Information use	Weak ↑	1. Statistics and other sources of evidence are weak, and policymakers and program managers make little use of them. Evidence-based program- and policymaking are not practiced.	2. The quantity and quality of statistics and other sources of evidence are improving, but they are not used for decision making because policymakers and program managers lack the incentives and/or the capacity to utilize them.
	Improving ↓	3. Statistics and other sources of evidence are weak but are increasingly used by policymakers and program managers for a variety of purposes. Data deficiencies reduce the quality of decision making.	4. Statistics and other sources of evidence are improving and are being increasingly used for decision making. This results in better policy and program design and implementation.

Figure 1: HRIS Evaluation Matrix (Source: MEASURE/Evaluation 2007)

Since “strengthening” is relative to the country’s specific baseline conditions, the matrix helps to contextualize results of strengthening activities relative to initial conditions. In the MEASURE/Evaluation model, the data demand and information use (DDIU) assessment distinguishes technical, individual and organizational factors applied on either the supply or the demand side, which determine where a country might fall in this matrix.

An evaluation strategy includes conducting focus group and/or qualitative interviews focusing on four key groups:

1. **Development and management:** HRIS program developers involved in maintaining the system locally and project managers involved in managing the HRIS and responsible for compiling results to be provided to decision-makers
2. **Decision-makers and key stakeholders:** Participants of the HRIS SLG and decision-makers who have used the HRIS and can provide valuable input on how HR information was used in planning
3. **HR personnel and common HR users:** Users of human resources information on a daily or regular basis, including personnel departments, heads of departments, council registrars and regional health managers or matrons
4. **Regional stakeholders:** Individuals who are involved in strategic regional HRIS development, such as participants in the WHO Observatory or the Eastern Central Southern African Health Secretariat, as well as other senior-level stakeholders.

A list of suggested respondents includes the following:

- Principal secretary (MOH)
- Undersecretary/director general (MOH)
- Chief nursing officer (MOH)
- Chairperson of Stakeholder Leadership Group
- Key additional members of Stakeholder Leadership Group

- Members of regional health management team (nurse managers, regional health administrators, etc.)
- HR Unit principal personnel officer (MOH)
- HR Unit senior manager, preferably from training/human resources development (MOH)
- HR Unit record officer (MOH)
- Key members of related ministries involved in HRIS or HRH
- Planning Unit health planner (MOH)
- Health Statistics Unit statistician (MOH)
- HRIS consultants/advisors
- HRIS system analyst (MOH)
- Registrars of nursing and other councils.

Ideally, access to these respondents should be negotiated with the assistance of local informants, such as HRIS managers or the chair of the SLG. The informants consulted should be active participants in HRIS management, known and trusted in the HRIS development community and able to provide insight into the best mix of participants who can give the broadest diversity of perspectives. As local partners in the evaluation, a sense of ownership is a strategic asset in obtaining access to key informants. As a general rule, it is advisable not to seek assistance from people who are controversial.

The key informants should provide a list of potential respondents with their respective departments and contact information. Interviews can proceed only with informed consent by the respondents. Documentary data collection includes an analysis of country-specific baseline assessments conducted in each of the target countries. In addition, progress reports and other documentation can be used to contextualize qualitative findings.

A list of suggested HRIS evaluation interview themes follows.

## References

Chew E, et al. Performance Measurement Guide for Information Security. National Institute of Standards and Technology. Accessed 16 January 2009 at: <http://csrc.nist.gov/publications/nistpubs/800-55-Rev1/SP800-55-rev1.pdf>

MEASURE/Evaluation. Data Demand and Information Use in the Health Sector. MEASURE/Evaluation Report. December 2007. Accessed 3 February 2009 at: <http://www.cpc.unc.edu/measure/publications/pdf/sr-08-44.pdf>

World Health Organization. Developing Health Management Information Systems: a practical guide for developing countries. Accessed 16 January 2009 at: [http://www.wpro.who.int/NR/rdonlyres/3A34C50D-C035-425A-8155-65E8AD3CB906/0/Health\\_manage.pdf](http://www.wpro.who.int/NR/rdonlyres/3A34C50D-C035-425A-8155-65E8AD3CB906/0/Health_manage.pdf)

### Suggested HRIS Evaluation Interview Themes (After WHO 2004)

Area	Major Variables to Be Covered	Mode of Data Collection	Collector
Data generation and report complication	Data quality (timeliness, completeness, accuracy, reliability) Correct computing indicators Appropriateness of data sources Extent and nature of problems met by health center staff on data entry and report generation Adequacy of forms to meet the needs of the national, provincial, district and village levels.	Key informant interviews and/or focus group discussion	HRIS Evaluation Team
Data utilization	Extent and nature of interaction among staff at different levels on the HRIS forms and reports By whom and how data generated from the HRIS are utilized at the national, provincial, district and village levels.	Key informant interviews and/or focus group discussion	HRIS Evaluation Team
Computer software and hardware	Extent and nature of problems in data entry and report generation at the national, provincial, district and village levels Adequacy of the software to meet the needs of the provinces and districts, as well as at the national level Problems met with the software.	Review of logbook of computer problems	IT Specialist
Training	Assessment of the training of data users and data providers Assessment of the training of trainers Assessment of the training on the use of the software Assessment of the user's manual for the software.	Key informant interviews and/or focus group discussion	HRIS Evaluation Team
Monitoring	Monitoring activities and strategies used at the national, provincial and district levels. Of particular importance are monitoring activities for the following areas: System sustainability and security Data quality Stakeholder Leadership Group and sustainability Utilization. Monitoring activities at the national and provincial level on the use of the software.	Key informant interviews and/or focus group discussion  Review of records and logbook	HRIS Evaluation Team
General	Supply forms, computer supplies and other materials needed	Key informant interviews	HRIS Evaluation Team

Area	Major Variables to Be Covered	Mode of Data Collection	Collector
	for the various components of the HRIS Forms and sources of additional support needed at the national, provincial, district and village levels.	and/or focus group discussion	

### HRIS PMP Indicators

#	Category	Performance Indicator	Precise Definition of and Justification for Indicator	Calculation of Indicator	Target	Data Source	Frequency	Responsible Party
1	Systems	<b>Ratio of number of national or sub-national interoperable HRIS to number of national or sub-national standalone ("silo") HRIS</b>	"Interoperable" HRIS databases are systems that communicate with multiple heterogeneous HRIS and appear as a single homogenous entity. "Standalone" HRIS refers to a system being self-contained or not interlinked to other HRIS ("silo"). The reason to measure the ratio is to promote interoperability.	Number of national or sub-national interoperable HRIS divided by the number of national or sub-national standalone ("silo") HRIS	Higher than 1 (more interoperable HRIS than standalone HRIS)	MOH, HMIS	Annually	HRIS Manager

#	Category	Performance Indicator	Precise Definition of and Justification for Indicator	Calculation of Indicator	Target	Data Source	Frequency	Responsible Party
2	Systems	<b>Percentage of geographical sub-level (districts/provinces) HRIS subsystems connecting or linking to centralized (national) HRIS</b>	"Connecting" or "linking" implies that a system is put in place that synchronizes data between the district/provincial level and the central level, essentially integrating the systems. Calculating the percentage of districts/provinces that are connected to the central system provides insight into the extent to which the system is a true "national" system.	Number of geographical sub-level (districts/provinces) HRIS subsystems connecting or linking to centralized (national) HRIS / Total number of sub-levels (district/provinces) in the country	0.8	MOH, HMIS	Quarterly	HRIS Manager
3	Systems	<b>Number of other subsystems incorporated into the comprehensive HRIS to which the HRIS is automatically linked</b>	Linkages to other HRIS indicate usability and strength of the system. A well-linked system forges collaboration and innovative data use. <i>Automatic</i> means digitally, or without the interference of manual hard copies, signatures or postal deliveries.	Count	At least 2: Payroll and HMIS	MOH, HMIS	Semi-annually	HRIS Manager

#	Category	Performance Indicator	Precise Definition of and Justification for Indicator	Calculation of Indicator	Target	Data Source	Frequency	Responsible Party
4	Systems	<b>Percentage of system uptime (in hours)</b>	Number of hours a system is "up" (applications running and functioning) is an indication of its stability and reliability. The indicator measures the percentage of hours per week that the system is online or running on average, based on a 24-hour period. Not being "up" can be caused by outage, performance degradation, incomplete functionality or other reasons. Sometimes a slow system can be classified as an "outage," even though it's actually an application or network problem and not an OS or hardware problem.	(Number of hours per week that the system is online or running / 168) * 100	0.9	Funder, MOH, Finance	Quarterly	IT Manager
5	Systems	<b>Dollars spent on system development</b>	<i>System development</i> is defined as systems analysis and design (feasibility study, general design, use cases, prototyping, detail design, functional and nonfunctional specifications); user signoff on design; programming (design, coding, testing, documentation); implementation (training, conversion, installation); and/or activities that measure user acceptance of new design (usability studies).		Actual dollar figure is country-specific. Target is to observe a decline in dollars spent to minimal level.	Funder, MOH, Finance	Quarterly	

#	Category	Performance Indicator	Precise Definition of and Justification for Indicator	Calculation of Indicator	Target	Data Source	Frequency	Responsible Party
6	Systems	<b>Dollars spent on data demand and information use technical support</b>	<i>Data demand and information use (DDIU) is defined as interventions that increase local demand for information and promote or facilitate its use, which are critical to improving the effectiveness and sustainability of the system. Fostering evidence-based decision making is the primary function of a HRIS. DDIU also includes promoting transparency in the decision-making process and motivating accountability of health decisions.</i>		Actual dollar figure is country-specific. Target is to observe a decline in dollars spent to minimal level.	Funder, MOH, Finance	Quarterly	

#	Category	Performance Indicator	Precise Definition of and Justification for Indicator	Calculation of Indicator	Target	Data Source	Frequency	Responsible Party
7	Systems	<b>Dollars spent on system maintenance</b>	System <i>maintenance</i> is defined as: (1) hardware maintenance, or the testing and cleaning of equipment; (2) information system maintenance, or the routine updating of master files, such as adding and deleting employees; (3) software or program maintenance, or the updating of applications to meet changing requirements, such as adding new functions and changing data formats; this includes fixing bugs and adapting software to new hardware devices; (4) disk or file maintenance, or the periodic reorganizing of disk files that have become fragmented due to continuous updating.		Actual dollar figure is country-specific. Target is steady-state.	Funder, MOH, Finance	Quarterly	

#	Category	Performance Indicator	Precise Definition of and Justification for Indicator	Calculation of Indicator	Target	Data Source	Frequency	Responsible Party
8	Systems	<b>Frequency with which system is incrementally backed up</b>	Backups should be made regularly as part of a recovery strategy to protect data against the possibility of loss in the event of a hardware or software failure. An <i>incremental backup</i> is a backup method where multiple backups are kept (not just the latest one). These backups will be incremental if each original piece of backed-up information is stored only once and successive backups only contain the information that changed since a previous backup.		Daily		Quarterly	

#	Category	Performance Indicator	Precise Definition of and Justification for Indicator	Calculation of Indicator	Target	Data Source	Frequency	Responsible Party
9	Systems	<b>Frequency with which system is fully backed up</b>	Backups should be taken regularly as part of a recovery strategy to protect data against the possibility of loss in the event of a hardware or software failure. In information technology, <i>backup</i> refers to making copies of data so that these additional copies may be used to restore the original after a data-loss event. These copies are typically called <i>backups</i> . Backups are useful primarily for two purposes: to restore a state following a disaster (called <i>disaster recovery</i> ), and to restore small numbers of files after they have been accidentally deleted or corrupted.		Monthly		Quarterly	
10	Security	<b>Percentage of the organization's information system budget devoted to HRIS information security</b>	This indicator strategically ensures an environment of comprehensive security and accountability for personnel data. Further, it provides resources necessary to properly secure agency information and HR information systems.	(HR Information security budget / Total information security budget) * 100		Office of budget	Annually	HRIS Manager, HRH Financial Officer, Chief Information Officer

#	Category	Performance Indicator	Precise Definition of and Justification for Indicator	Calculation of Indicator	Target	Data Source	Frequency	Responsible Party
11	Security	<b>Number of information security incidents within timeframe per applicable incident category</b>	How many incidents were reported during the period? Possible categories: unauthorized access; denial of service; malicious code; improper usage; scans/probes/attempted access; under investigation.	For each category a frequency count of total number of reported incidents		Incident database, audit logs, incident tracking database (if available)	Monthly	Chief Information Officer
12	Security	<b>Percentage of remote access points used to gain unauthorized access</b>	Restrict information system access to individuals and machines that are identifiable, known, credible and authorized.	(Number of remote access points used to gain unauthorized access / total number of remote access points used) * 100		Incident database, audit logs, network diagrams	Monthly	Chief Information Officer
13	Security	<b>Average frequency of audit records analyzed for inappropriate activity</b>	Create, protect and retain information system audit records to the extent needed to enable the monitoring, investigation and analysis of unauthorized, unlawful or inappropriate activity. Logging needs to be activated on the system, and the organization should clarify its definition of evidence for "inappropriate activity."	Average frequency of inappropriate activity / total activity	High frequency	Audit log reports	Monthly	Chief Information Officer

#	Category	Performance Indicator	Precise Definition of and Justification for Indicator	Calculation of Indicator	Target	Data Source	Frequency	Responsible Party
14	Security	<b>Percentage of HRIS users who have authorized access to the HRIS after they sign a statement saying they understand the rules and behavior of the HRIS</b>	The goal of this indicator is to encourage, develop, document, implement and periodically update security plans for organizational information systems and confidential data that describe the security and confidentiality controls in place or planned for information systems and the rules of behavior for individuals accessing these systems, including the confidential nature of HR data.	(Number of users who are granted system access after signing rules of behavior / total number of users with system access) * 100	1	Repositories of signed rules of behavior	Quarterly	HRIS Manager
15	Data	<b>Return rate of HRIS data collection updates</b>	The <i>return rate</i> refers to the number of data collection tools that are returned from the field and entered into the HRIS database to update the existing information. A low return rate is an indication of problems with data collection and can affect the quality of the HRIS.	The % of districts or data collection points returning data collection forms "completely"	1	HRIS data manager records	Quarterly	HRIS Manager
16	Data	<b>Number of individual HR records entered into the HRIS database</b>	Records entered into HRIS database(s) will provide an indication of the completeness and usefulness of the database and its significance. <i>Individual records</i> means that an effort is made to not double-count individuals.	Count of individual frequencies	Country-specific: relative to the total number of medical professionals	HRIS	Quarterly	HRIS Data Entry Manager

#	Category	Performance Indicator	Precise Definition of and Justification for Indicator	Calculation of Indicator	Target	Data Source	Frequency	Responsible Party
17	Data	<b>Estimated percentage of health professionals represented in the dataset (data completeness) (by cadre)</b>	The percentage of individual records entered relative to the total number of health professionals, as best determined, indicates data completeness. The reference population can be obtained from recent surveys or cross-checking the HRIS with similar systems. It is possible that no valid reference is available. In this case, a sampling of a district or zone can be used to estimate the completeness of the database.	For each cadre: Number of health workers listed in the database / Estimated total number of health workers	1	HRIS, surveys	Quarterly	HRIS Manager
18	Data	<b>Number of updates (or changes) made in the HRIS after verifications of records during registration and /or licensing of a health worker</b>	This indicator is a proxy for data accuracy. There is often a process in place when a health worker is in contact with the health system where the existing health worker data is verified. The aim is to monitor the number of changes made as a result of this process. Over time, the number of verifications should decline as the database matures and becomes increasingly valid. At the same time, environmental or contextual issues can influence the number of changes in the health workforce. This indicator will illustrate the relative stability of the HR content.	Count	Unknown	Verification logs	Quarterly	HRIS Data Entry Manager

#	Category	Performance Indicator	Precise Definition of and Justification for Indicator	Calculation of Indicator	Target	Data Source	Frequency	Responsible Party
19	Data	<b>Percentage of data entered accurately into the HRIS</b>	A routine random sample contrasting data accuracy between the HRIS and any existing paper-based information system to assess data accuracy. This can occur as part of the standard quality-control process.	% of data judged accurate during quality control checks	1		Quarterly	
20	Data	<b>Frequency of data updates</b>	The frequency of data updates indicates the quality of the system.	Frequency count of the number of update in the period	Monthly		Quarterly	
21	SLG	<b>Number of key stakeholder positions regularly involved in HRIS development and planning</b>	The stakeholder leadership approach suggests that a committee of stakeholders dedicated to guiding HRIS development and management provides sustainability to the system. "Ongoing" membership positions refers to SLG members who have participated in the group for <i>more than one</i> meeting.	Frequency count	10	SLG meeting minutes	Quarterly	SLG Secretary
22	SLG	<b>Frequency of SLG meetings in which 60% of the quorum attended</b>	This is an indicator of the commitment of the SLG in making decisions. The quorum is needed in order to be able to make decisions.	Frequency count	10	SLG meeting minutes	Quarterly	SLG Secretary

#	Category	Performance Indicator	Precise Definition of and Justification for Indicator	Calculation of Indicator	Target	Data Source	Frequency	Responsible Party
23	SLG	<b>Percentage of policy and management questions asked by the SLG for which HRIS data is made routinely available.</b>	<i>Routinely available</i> means that regular reports are created or the data are made accessible to SLG members in a relatively short period of time.	Number of policy and management questions asked by the SLG for which HRIS data is made routinely available / Total number of clearly identifiable and mutually exclusive policy and management questions	10	SLG meeting minutes	Quarterly	SLG Secretary
24	HR	<b>Number of health-relevant personnel trained on the use of the HRIS</b>	Training on HRIS usage is crucial for keeping the system running. Training can include a focus on management, data entry, data collection, data collation, database development or report generation. This number can be lower than the number of users who have received the authority to access the system.	Cumulative across monitoring periods: we count those who are trained and those who leave	Country-specific	SLG meeting minutes	Quarterly	SLG Secretary
25	HR	<b>Number of staff responsible for HRIS data entry</b>	This is to track the adequacy of staffing levels to manage the HRIS on an ongoing basis.	Frequency count	1	HR records	Semi-annually	HRIS Manager

#	Category	Performance Indicator	Precise Definition of and Justification for Indicator	Calculation of Indicator	Target	Data Source	Frequency	Responsible Party
26	HR	<b>Number of staff qualified for HRIS database maintenance and development</b>	This is to track the adequacy of staffing levels to manage the HRIS on an ongoing basis.	Frequency count	1	HR records	Semi-annually	HRIS Manager
27	HR	<b>Number of staff responsible for HRIS data management and reporting creation</b>	This is to track the adequacy of staffing levels to manage the HRIS on an ongoing basis.	Frequency count	1	HR records	Semi-annually	HRIS Manager
28	Usage	<b>Number of times the HRIS has been accessed</b>	Automated counts of users accessing the HRIS for information.	Frequency count		HRIS use log	Monthly	HRIS Manager

#	Category	Performance Indicator	Precise Definition of and Justification for Indicator	Calculation of Indicator	Target	Data Source	Frequency	Responsible Party
29	Usage	<b>Percentage of central-level senior health management staff having direct access to an operational HRIS to obtain HRH information</b>	<p><i>Direct access</i> means that health management staff have computer-enabled access (with password protection) to the data in their office or close to their office. Senior staff include:</p> <ul style="list-style-type: none"> <li>• HMIS managers</li> <li>• Health Statistics Unit (statisticians)</li> <li>• Payroll Unit</li> <li>• HR Unit (Principal Personnel Officer, HR Unit Senior Manager, HR Unit Record Officer)</li> <li>• Undersecretary/Director General or Principal Secretary</li> <li>• Chief Nursing Officer</li> <li>• Planning Unit (health planner)</li> <li>• Registrars from professional councils (such as the Nursing Council)</li> </ul>	Percentage of central-level senior health management staff having direct access to an operational HRIS to obtain HRH information / Total number of central-level senior health management staff	1	MOH, key informants	Monthly	HRIS Manager

#	Category	Performance Indicator	Precise Definition of and Justification for Indicator	Calculation of Indicator	Target	Data Source	Frequency	Responsible Party
30	Usage	<b>Percentage of district-level senior health management staff having direct access to an operational HRIS to obtain HRH information</b>	<p><i>Direct access</i> means that health management staff have computer-enabled access (with password protection) to the data in their office or close to their office. Senior staff include:</p> <ul style="list-style-type: none"> <li>• HMIS managers</li> <li>• Health Statistics Unit (statisticians)</li> <li>• Payroll unit</li> <li>• HR Unit (Principal Personnel Officer, HR Unit Senior Manager, HR Unit Record Officer)</li> <li>• Undersecretary/Director General or Principal Secretary</li> <li>• Chief Nursing Officer</li> <li>• Planning Unit (health planner)</li> <li>• Registrars from professional councils (such as the Nursing Council)</li> </ul>	Percentage of district-level senior health management staff having direct access to an operational HRIS to obtain HRH information / Total number of district-level senior health management staff	1	MOH, key informants	Monthly	HRIS Manager

#	Category	Performance Indicator	Precise Definition of and Justification for Indicator	Calculation of Indicator	Target	Data Source	Frequency	Responsible Party
31	Usage	<b>Total number of different HR reports generated by the HRIS at the central level</b>	<i>Generated</i> means created for the specific purpose of data analysis. A report includes, but is not limited to, printing the data or transferring the data to be included as a table, appendix or other type of reference in a reporting document. A report can also include an external communication for media, public relations or otherwise significant audience. To be "different," a report needs to have unique content and not be an exact copy of a previous report.	Frequency count		HRIS use log	Monthly	HRIS Manager
32	Usage	<b>Total number of different HR reports generated by the HRIS at the district/province level</b>	<i>Generated</i> means created for the specific purpose of data analysis. A report includes, but is not limited to, printing the data or transferring the data to be included as a table, appendix or other type of reference in a reporting document. A report can also include an external communication for media, public relations or otherwise significant audience. To be "different," a report needs to have unique content and not be an exact copy of a previous report.	Frequency count		HRIS use log	Monthly	HRIS Manager

#	Category	Performance Indicator	Precise Definition of and Justification for Indicator	Calculation of Indicator	Target	Data Source	Frequency	Responsible Party
33	Usage	<b>Number of central-level HRIS reports that are used to improve health management</b>	<i>Health management</i> is the act of getting people together to accomplish desired health goals. Health management comprises planning, organizing, staffing, leading or directing and controlling an organization (a group of one or more people or entities) or effort for the purpose of accomplishing a health outcome. Resourcing encompasses the deployment and manipulation of financial, technological, natural and human resources. Health management can include (but not be limited to) managers involved in managing finance, government relations, HRIS, marketing and public affairs, material management (purchasing of equipment and supplies), medical staff relations, nursing administration, patient care services and planning and development.	Frequency count		HRIS use log	Monthly	HRIS Manager

#	Category	Performance Indicator	Precise Definition of and Justification for Indicator	Calculation of Indicator	Target	Data Source	Frequency	Responsible Party
34	Usage	<b>Number of district/province-level HRIS reports that are used to improve health management</b>	<i>Health management</i> is the act of getting people together to accomplish desired health goals. Health management comprises planning, organizing, staffing, leading or directing and controlling an organization (a group of one or more people or entities) or effort for the purpose of accomplishing a health outcome. Resourcing encompasses the deployment and manipulation of financial, technological, natural and human resources. Health management can include (but not be limited to) managers involved in managing finance, government relations, HRIS, marketing and public affairs, material management (purchasing of equipment and supplies), medical staff relations, nursing administration, patient care services and planning and development.	Frequency count		HRIS use log	Monthly	HRIS Manager

#	Category	Performance Indicator	Precise Definition of and Justification for Indicator	Calculation of Indicator	Target	Data Source	Frequency	Responsible Party
35	Usage	<b>Number of central-level HRIS reports that are used for decisions on program design and improvements</b>	<i>Program design</i> is the process of creating relevant services to address the specific needs of targeted populations. These services include assistance in understanding the entire scope of public health programming from design to implementation.	Frequency count		HRIS use log	Monthly	HRIS Manager
36	Usage	<b>Number of district/province-level HRIS reports that are used for decisions on program design and improvements</b>	<i>Program design</i> is the process of creating relevant services to address the specific needs of targeted populations. These services include assistance in understanding the entire scope of public health programming from design to implementation.	Frequency count		HRIS use log	Monthly	HRIS Manager
37	Usage	<b>Number of central-level HRIS reports that are used for policy and decision making</b>	<i>Decision-making</i> can be regarded as an outcome of mental processes (cognitive process) leading to the selection of a course of action among several alternatives. Every decision-making process produces a final choice. The output can be an action or an opinion of choice.	Frequency count		HRIS use log	Monthly	HRIS Manager

#	Category	Performance Indicator	Precise Definition of and Justification for Indicator	Calculation of Indicator	Target	Data Source	Frequency	Responsible Party
38	Usage	<b>Number of district/ province-level HRIS reports that are used for policy and decision-making</b>	<i>Decision-making</i> can be regarded as an outcome of mental processes (cognitive process) leading to the selection of a course of action among several alternatives. Every decision-making process produces a final choice. The output can be an action or an opinion of choice.	Frequency count		HRIS use log	Monthly	HRIS Manager

# Case Study: Integrating HR Information Systems

## Ensuring Sustainability

Health care decision-makers need reliable, high-quality information in order to make effective, evidence-based decisions. This critical information includes reports and analyses of the current health workforce in the country. A human resources information system (HRIS) collects the human resources for health (HRH) data. The HRIS generates reports that display or aggregate the HRH data in various ways to aid analysis or to answer key HR policy and management questions.

Other types of health-related resources are also useful for aiding decision-making. Too often, though, these resources are scattered and difficult to access. The problem is aggravated when the resources are published by a variety of sources in many different formats, including paper and electronic files. Developing a knowledge management (KM) system provides a single point of access for these resources to be collected, organized and made easily searchable. When the KM system is made available online, remote offices are relieved of the burden of maintaining their own collection of resources. It is also important to ensure that health planners outside the central level have access to the collection so that their decision-making does not suffer by comparison.

Management of the KM system is an important consideration. Since it supports decision-making, the system must be updated regularly to provide accurate information and remove outdated or incorrect materials. Furthermore, a process should be put in place to evaluate the quality and applicability of resources. In the best case, inaccurate or unfounded reports are a nuisance and weaken trust in the reliability of the collection as a whole. In the worst case, poor information may be used to make inefficient, expensive or harmful health policy decisions.

### Addressing Health Information Needs in Uganda

The Ministry of Health (MOH) identified several HRH and other health information needs within the country. Each of the four health professional councils in the country had implemented iHRIS Qualify to address the need for data about health worker education, registration and deployment. At the central and district levels, iHRIS Manage was installed to enable the MOH to better track job placement and vacancy information. These systems improved access to health worker information to better inform health policy and planning decisions in Uganda.

Despite the improved reporting, only those directly involved with the iHRIS software at the central level had access to the reports. Health decision-makers, both at the policy and provider level, needed these reports as well as additional information to make effective health decisions. The MOH had a simple digital library in place, but software limitations kept it from meeting the needs of the decision-makers. The software could only be used from a single desktop computer at the MOH Library, which was not connected to a network. The proprietary software only supported PDF-format documents, and storage space was limited to the desktop's hard drive. Finally, the system was vulnerable to any computer failures because there were no backups or dedicated maintenance.

### Developing a Knowledge Management System

The Capacity Project's goal was to help the MOH develop an electronic KM system that would meet user needs. The system was called the Knowledge Management Portal, or KM Portal, since it would serve as a gateway to different types of HRH information.

The MOH wanted to design a KM system that would fulfill the following parameters:

- Information must be easy to find, use and share
- Information should be available over the Internet to encourage accessibility
- Sensitive information should be limited to internal access by the MOH and should be secure
- Information should be reviewed regularly to assure accuracy and quality.

The Capacity Project linked the following HR information resources to the KM Portal:

- MOH Resource Center, including an new digital library system
- HRH Global Resource Center, a digital library of HRH resources developed by the Capacity Project ([www.hrhresourcecenter.org](http://www.hrhresourcecenter.org))
- HRH Action Framework, an HRH planning aid ([www.capacityproject.org/framework](http://www.capacityproject.org/framework))
- District websites with contacts for district personnel
- Static versions of standard HRIS reports.

The MOH decided to use a combination of Open Source software programs to develop the KM Portal in order to customize the system to meet specific needs and to avoid costs associated with using proprietary software. The developers created a customized search tool for searching multiple sites linked to the Portal and standard user access levels in order to protect sensitive information. Along with developing the new KM system, the MOH librarians instituted a process for reviewing and updating the resources in the new digital library.

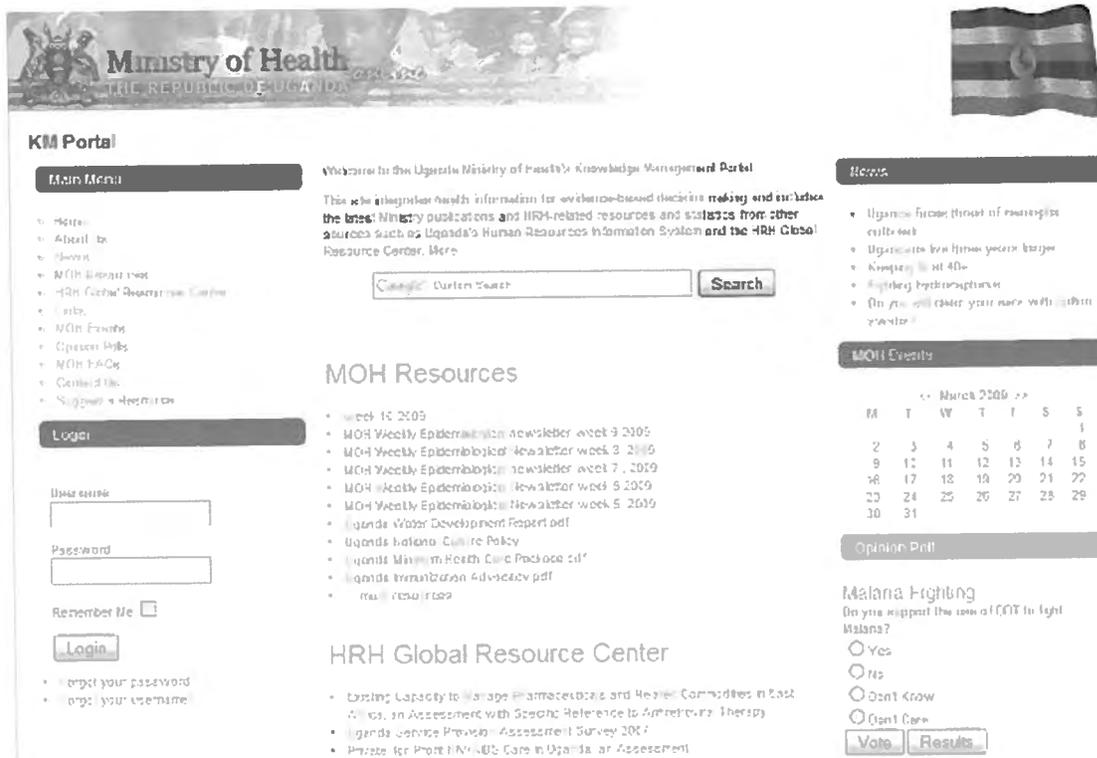


Figure 1. The Knowledge Management Portal implemented in Uganda.

## **Interoperability: Making HRIS Reports Available on the KM Portal**

The HR information systems implemented in Uganda's four health professional councils and at the Ministry of Health are valuable sources of information about health workers deployed throughout the country. Data and reports from these systems can be very useful for health planning at different levels. However, access to the HRIS is restricted for reasons of confidentiality. Although the HRIS software was designed to be straightforward and easy to use, the system does require some training to create and view reports.

In order to allow health planners at all levels to access the country-level HRIS reports while ensuring that access to the HRIS itself remained restricted, we developed a mini-database of the HRIS data. This database generates static reports that are updated monthly to ensure timeliness. We selected the reports based on their relevance and usefulness to health planners who would not typically have access to the full HRIS. This solution enabled health planners to quickly and easily obtain up-to-date information specific to the current Ugandan health workforce, without requiring training on the HRIS software or compromising the security of the country's HR data.

### **Conclusion**

- By leveraging several Open Source software projects, the Capacity Project was able to quickly develop and implement a KM system for the MOH in Uganda that provided access to a large collection of resources for health workers and decision-makers across the country. These resources included standard reports of health worker data drawn from the various HRIS installed in Uganda.
- When the Capacity Project put this system in place and demonstrated its capabilities for the KM workers, their excitement was palpable. They recognized that the new system's ability to read and use a variety of document formats meant that much less time needed to be spent on manually converting files. That the KM server resided in the MOH's professional hosting facility instead of on a desktop computer in the library ensured that any technical issues could be dealt with immediately.
- The Capacity Project technical staff observed the KM system being used and documents being added on a monthly basis through the end of 2008. The Open Source nature of the KM system and its new location in a hosted, networked environment increased the accessibility and reliability of the health care resource collection maintained by MOH Library.



# Resources for Implementing HRIS Strengthening

## Ensuring Sustainability

This Toolkit provides the basic tools and information you need to implement the HRIS strengthening process. However, many additional resources are available to assist with this work that could not be included in this Toolkit. All of these resources are free and can be accessed on the Internet.

### General Resources

#### HRIS Strengthening Website

<http://www.capacityproject.org/hris/>

Our project website provides an electronic version of this Toolkit, demonstrations and free downloads of all of the iHRIS software, and additional case studies, in-depth information and resources.

#### HRH Global Resource Center

<http://www.hrhresourcecenter.org/>

The Capacity Project's HRH Global Resource Center is a digital library of resources on the topic of human resources for health (HRH), focusing on developing countries. Check the subject guide for information systems resources.

#### Asia-Pacific Development Information Program (APDIP) Case Studies

<http://www.apdip.net/resources/case>

<http://www.apdip.net/elibrary>

The site provides over 100 case studies on ICT for development topics, including access and infrastructure, capacity building and education, free and open source software, and health and medicine. Also explore the E-Library for free electronic books, brochures and primers on ICT issues such as governance, free and open source software, policy, planning and project implementation.

#### Human Resources for Health Dossier

<http://www.eldis.ids.ac.uk/go/topics/dossiers/human-resources-for-health>

The human resources for health dossier from Eldis offers practical, up-to-date information about how to address human resources problems and issues, drawing upon evidence about what works and identifying innovations in approaches, policy and practice.

#### The Manager's Electronic Resource Center

<http://erc.msh.org/>

This website connects an international network of health professionals to share management experience. Of particular interest are the topic area, Managing Information, and the Health Manager's Toolkit, a compendium of tools designed to assist health professionals at all levels of the organization.

#### The World Bank: Human Resources for Health

<http://go.worldbank.org/XR4K48D5M0>

This website is devoted to understanding the critical contribution of HRH to health systems development. It includes key topics in HRH, news and events, statistical data, readings on critical HRH issues, a document library, a glossary and links to related resources.

## **Section I: Building HRIS Leadership**

### **Africa Health Workforce Observatory**

<http://www.afro.who.int/hrh-observatory/index.html>

The Africa Health Workforce Observatory promotes, develops and sustains the knowledge base for HRH in the African region. It provides evidence for policy decisions to strengthen health systems and improve health service delivery.

### **Asia-Pacific Action Alliance on Human Resources for Health**

<http://www.aaahrh.org/>

The Asia-Pacific Action Alliance on Human Resources for Health is a regional partnership of 15 member countries. It was established to strengthen country capacity for HRH planning and management.

### **HRH Action Framework**

<http://www.capacityproject.org/framework/>

The HRH Action Framework is designed to assist governments and health managers to develop and implement strategies to achieve an effective and sustainable health workforce.

### **Virtual Leadership Development Program**

<http://www.msh.org/projects/lms/ProgramsAndTools/LeadingAndManaging/VLDP.cfm>

The Virtual Leadership Development Program is a blended-learning program that extends leadership development opportunities into the workplace for health managers and their teams, who seldom have the time or the resources to attend offsite leadership development programs. Program materials, including interactive exercises, are presented through a website that also promotes dialogue among experienced facilitators, individual participants and work teams. During the program, participants apply their leadership capacity by identifying an organizational challenge and developing an action plan to address it with feedback and support from program facilitators.

## **Section II: Assessing and Improving Existing Systems**

### **Assessing the National Health Information System**

<http://www.who.int/healthmetrics/tools/hisassessment/en/index.html>

A crucial early step is an effective assessment of the existing national health information system, both to establish a baseline and to monitor progress. This tool describes in detail how to undertake a first baseline assessment.

### **Health Metrics Network**

<http://www.who.int/healthmetrics/en/>

The Health Metrics Network facilitates better health information at the local, country and global levels. The strategic goal is to increase the availability and use of timely and accurate health information by catalyzing the joint funding and development of core country health information systems.

### **Human Resources for Health Assessment Data Collection Training**

<http://www.healthsystems2020.org/content/resource/detail/1939/>

The trainer's manual contains a suggested workshop design for use by individuals and organizations planning HRH assessments. These materials can be used to train supervisors and data collectors to conduct an HRH assessment.

## **The World Bank Data and Research**

<http://www.worldbank.org/data>

The World Bank provides high-quality ICT data and statistics for many countries, with indicators for access, quality, affordability, institutional efficiency and sustainability, and ICT applications. In the sidebar, select Data and By Topic, then click the Information and Communication Technologies link.

## **Section III: Developing Software Solutions**

### **iHRIS Suite hosting site**

<https://launchpad.net/ihris-suite/>

On the hosting site you can download the iHRIS software, access the code for customization, report bugs, translate the user interface into additional languages and ask questions of the software development team.

### **iHRIS wiki**

[http://open.intrahealth.org/wiki/Main\\_Page](http://open.intrahealth.org/wiki/Main_Page)

The wiki provides technical documentation for the iHRIS software suite, as well as development timelines and other resources pertaining to the software.

### **iHRIS Announce mailing list**

<http://lists.intrahealth.org/mailman/listinfo/ihris-announce>

Subscribe to this mailing list to receive announcements of new releases of the iHRIS suite of software.

### **iHRIS Developers mailing list**

<http://lists.intrahealth.org/mailman/listinfo/ihris-developers/>

Subscribe to this mailing list to ask questions or discuss issues with the iHRIS software development team and other developers working on iHRIS.

## **Free Software and Open Source Foundation (FOSS) for Africa**

<http://www.fossfafa.net/>

FOSSFA promotes the use of free and Open Source software and the FOSS model in African development, and the organization supports the integration of FOSS in national policies. FOSSFA also coordinates, promotes and adds value to African FOSS initiatives, creativity, industry, expertise, efforts and activities at all levels.

### **Open Source Africa**

<http://www.opensourceafrica.org/>

Open Source Africa raises awareness about the benefits (and pitfalls) of Open Source software on the ground in Africa and provides practical information on using Open Source tools.

## **The Open Group Architecture Framework (TOGAF)**

<http://www.opengroup.org/architecture/togaf8-doc/arch/>

The Open Group Architecture Framework (TOGAF) is a detailed method and a set of supporting tools for developing an enterprise architecture. It enables IT users to design, evaluate and build the right architecture for their organization, and reduces the costs of planning, designing and implementing architectures based on open systems solutions.

### **Open of Course**

<http://www.open-of-course.org/courses/>

This site provides free online courses in programming basics, including courses in understanding Linux, using Ubuntu and web design fundamentals.

## Section IV: Using Data to Make Decisions

### Data Demand and Information Use

<http://www.cpc.unc.edu/measure/our-work/strategies/data-demand-and-information-use>

To support evidence-based decision-making, MEASURE Evaluation has developed a conceptual framework and set of tools to aid policymakers and stakeholders in implementing data demand and information use strategies. In this framework, there is a clear and consistent link between the use of health information and the commitment to improving the quality and availability of data.

### Data Sharing for Demographic Research (DSDR)

<http://www.icpsr.umich.edu/DSDR/producers.html>

DSDR is a project of the Interuniversity Consortium for Political and Social Research. The DSDR website provides information for data producers about data sharing and archiving.

### HRH Planning Tools

<http://www.who.int/hrh/tools/planning/en/index.html>

WHO provides a collection of tools for estimating HRH needs, developing health workforce strategic plans and monitoring health service performance.

## Section V: Ensuring Sustainability

### Toolkit for Monitoring Health System Strengthening

[http://www.who.int/healthinfo/statistics/toolkit\\_hss/en/index.html](http://www.who.int/healthinfo/statistics/toolkit_hss/en/index.html)

This toolkit describes a set of indicators and related measurement strategies covering the core health system building blocks of service delivery, information systems, financing, human resources, medical products and governance. The toolkit enables decision-makers to track the impact of health system strengthening in terms of improved health indicators.

### Uganda Ministry of Health Knowledge Management Portal

<http://library.health.go.ug/jla/>

The Uganda MOH Knowledge Management Portal demonstrates how HRIS and health information from other sources can be brought together in an easy-to-use resource.

### Wikipedia List of Open Source Healthcare Software

[http://en.wikipedia.org/wiki/List\\_of\\_open\\_source\\_healthcare\\_software](http://en.wikipedia.org/wiki/List_of_open_source_healthcare_software)

Consult this comprehensive list of Open Source software to extend information systems support beyond HRIS with freely available, compatible solutions for health care applications, such as electronic medical records, health information systems and telemedicine.

If you have further questions or needs for assistance, please e-mail the HRIS Strengthening team at [hris@capacityproject.org](mailto:hris@capacityproject.org), or contact us at the address or telephone number below.

The Capacity Project  
IntraHealth International, Inc.  
6340 Quadrangle Drive, Suite 200  
Chapel Hill, NC 27517 USA  
Tel. (919) 313-9100

### How are you using the toolkit?

The Capacity Project would like to hear your feedback on this Toolkit. Please let us know how you are using this Toolkit in your HRIS strengthening efforts, and share any comments or suggestions you may have for improving it. Contact us directly by email at [hris@capacityproject.org](mailto:hris@capacityproject.org). Thank you!