Handbook on Monitoring and Evaluation of Human Resources for Health

with special applications for low- and middle-income countries

World Health Organization

THE WORLD BANK

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Handbook on Monitoring and Evaluation of Human Resources for Health

with special applications for low- and middle-income countries

Edited by Mario R Dal Poz, Neeru Gupta,
Estelle Quain and Agnes LB Soucat

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Preface

THE LATEST MEDICINE and the newest technologies can have little impact on human health unless there are systems in place to deliver them. The reality today, however, is that health systems all over the world are suffering from years of neglect. One of the most obvious manifestations of that neglect is a crippling lack of trained health workers.

In many countries, lack of personnel is one of the most important constraints to strengthening the delivery of primary and other health services, including curative, promotional, preventive and rehabilitative services. In sub-Saharan Africa, the health workforce crisis is so great that 36 countries are considered to have a critical shortage of health care professionals to provide minimum coverage of even the most basic services in maternal, newborn and child health. In many of the poorest countries of the world, the situation is worsened by the continual loss of health personnel seeking better opportunities elsewhere.

The effects of poor workforce planning and development are felt everywhere. In Asia and the Pacific, many countries have a shortage of health workers capable of treating chronic and emerging diseases. In Europe, the countries of the newly independent states of the former Soviet Union inherited a workforce that was especially ill-suited to the demands facing modern health care systems.

Clearly, if countries are to get anywhere near meeting their health system objectives, including the health-related Millennium Development Goals, they need to be able to provide better access to appropriately trained health workers.

The first step is to work out where the gaps are. Yet many countries currently lack the technical capacity to accurately monitor their own health workforce: data are often unreliable and out-of-date, common definitions and proven analytical tools are absent, skills and experience for assessing crucial policy issues are lacking.

This Handbook aims to increase that technical capacity. It offers health managers, researchers and policy makers a comprehensive, standardized and user-friendly reference for monitoring and evaluating human resources for health. It brings together an analytical framework with strategy options for improving the health workforce information and evidence base, as well as country experiences to highlight approaches that have worked.

We gratefully acknowledge here the support provided by the three collaborating partners: the United States Agency for International Development, the World Bank and the World Health Organization. All three will continue to support countries in their application of the Handbook to national contexts, as one more way to accelerate country action towards building a trained, sufficient and motivated health workforce.

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Acronyms and abbreviations

COFOG	Classification of the Functions of Government
COPP	Classification of the Outlays of Producers According to Purpose
CPC	Central Product Classification
EVIPNet	Evidence-Informed Policy Network
HFA	health facility assessment
HFC	Health Facility Census
HRH	human resources for health
HRIS	human resources information system
ICSE	International Classification of Status in Employment
IPUMS	Integrated Public Use Microdata Series
ISCED	International Standard Classification of Education
ISCO	International Standard Classification of Occupations
ISIC	International Standard Industrial Classification of All Economic Activities
JICA	Japanese International Cooperation Agency
OECD	Organisation for Economic Co-operation and Development
PAHO	Pan American Health Organization
PALOP	Países Africanos de Língua Oficial Portuguesa
PHR*plus*	Partners for Health Reform*plus*
SAM	Service Availability Mapping
SHA	System of Health Accounts
SIGRAS	*sistema de informação sobre a graduação em saúde*
SIGRHS	*sistema de informação e gestão de recursos humanos em saúde*
SNA	System of National Accounts
SPA	Service Provision Assessment
USAID	United States Agency for International Development
VCT	voluntary counselling and testing
WHO	World Health Organization

Part I:
OVERVIEW

1 Monitoring and evaluation of human resources for health: challenges and opportunities

MARIO R DAL POZ, NEERU GUPTA, ESTELLE QUAIN, AGNES LB SOUCAT

1.1 Introduction

Health systems and services depend critically on the size, skills and commitment of the health workforce. It is now evident that in many low- and middle-income countries, meeting key Millennium Development Goal targets, specifically those relating to health, requires a significant increase in the numbers of health workers (*1–3*). The global shortage is estimated at around 2.3 million physicians, nurses and midwives, and over 4 million health workers overall. In some parts of the world, notably in sub-Saharan Africa, the current workforce needs to be scaled up by almost 140% in order to overcome the crisis (*4*). And simply assessing numbers of health workers in relation to a given threshold does not necessarily take into account all of a health system's objectives, particularly with regard to accessibility, equity, quality and efficiency.

Countries with critical shortages and imbalances of health workers also often lack the technical capacity to identify and assess crucial policy issues related to the health workforce. As a result, fundamental questions regarding the status of the workforce, its level of performance and the problems health workers face remain largely unanswered. In addition, the lack of comprehensive, reliable and up-to-date data, and the absence of commonly agreed definitions and analytical tools, have made the task of monitoring the health workforce all the more difficult in all settings, from the global and regional to the national and subnational levels. Such challenges remain significant to many governments striving to maintain a sufficient, sustainable and effective health workforce in their respective jurisdictions.

This Handbook is a response to the need to have a comprehensive, standardized and user-friendly reference on health workforce monitoring and evaluation as a means to develop in-country capacity to build the knowledge base needed to guide, accelerate and improve country action (Box 1.1) (*5, 6*). This introductory chapter begins with an overview of recent global initiatives for supporting human resources for health (HRH) development; continues with a discussion on key challenges on the uses of health workforce information for planning, policy and decision-making; and proposes a comprehensive framework for HRH monitoring. Presentation of this overview and framework orients readers to the contents of the rest of the volume.

This publication is the result of a collaborative effort between the United States Agency for International Development (USAID), the World Bank and the World Health Organization (WHO) to document methodologies and share experiences in measuring and monitoring HRH, to encourage countries and partners to build upon these experiences and to compile recommendations for ministries of health and other stakeholders for health workforce monitoring and evaluation. It builds upon and complements other internationally coordinated efforts for monitoring the building blocks of health systems, including human resources (Box 1.2) (*7*). It is anticipated that this Handbook will contribute to effective use of existing data and improve future data collection efforts for maximum utility of quantitative and qualitative HRH assessments within countries, across countries and over time. The publication should be seen as a work in progress that will result in an enhanced understanding of HRH and contribute significantly to the growing body of tools and applied research designed to address the challenge of measuring and improving health workforce outcomes, strengthening health systems and, ultimately, improving population health.

1.2 Global initiatives on HRH and information systems

The health workforce is increasingly recognized as key for scaling up health interventions for achieving the Millennium Development Goals (Box 1.3) (*8*). Even with additional funds available in recent years from international, multilateral, bilateral and private sources, such as through poverty reduction strategies and debt

Box 1.1 Defining monitoring and evaluation

Monitoring. The ongoing process of collecting and using standardized information to assess progress towards objectives, resource usage and achievement of outcomes and impacts. It usually involves assessment against agreed performance indicators and targets. In conjunction with evaluation information, effective monitoring and reporting should provide decision-makers and stakeholders with the knowledge they need to identify whether the implementation and outcomes of a project, programme or policy initiative are unfolding as expected and to manage the initiative on an ongoing basis.

Evaluation. The systematic and objective assessment of an ongoing or completed initiative, its design, implementation and results. The aim is to determine the relevance and fulfilment of objectives, efficiency, effectiveness, impact and sustainability. The development of an evaluation framework entails consideration of a range of matters, including identification of the types of data that could inform an evaluation.

Indicator. A parameter that points to, provides information about or describes a given state. Usually represented by a data element for a specified time, place and other characteristics, it gives value as an instrument used in performance assessment.

Data. Characteristics or information, often numerical, that are collected through observation. Data can be considered as the physical representation of information in a manner suitable for processing, analysis, interpretation and communication.

Sources: Adapted from Deloitte Insight Economics (*5*) and Organisation for Economic Co-operation and Development (*6*).

Box 1.2 Toolkit for monitoring health systems strengthening

The ability to plan, monitor and evaluate health systems functioning is essential in order to correctly target investments and assess whether they are having the intended impact. Health systems can be described in many ways. The WHO framework delineates six core building blocks: service delivery, health workforce, financing, information, leadership and governance, and medical products and technologies. Through collaboration between WHO, the World Bank, country health information and systems experts and many other organizations working in this field, a toolkit was developed proposing a limited set of indicators and related measurement strategies covering each of the building blocks. As of mid-2008, the *Toolkit for monitoring health systems strengthening* was being made available while still in draft form to invite comments from a wide array of potential users.

Source: World Health Organization (*7*).

alleviation programmes, or through newer modalities such as the Global Fund to Fight AIDS, Tuberculosis and Malaria (*9*), the GAVI Alliance (*10*) and the United States President's Emergency Plan for AIDS Relief (*11*), country capacity to absorb funds and to put them to work can be severely crippled by the crisis in HRH. In many countries there is simply insufficient human capacity at all levels to absorb, deploy and use efficiently the financing for scaling up health services delivery offered by recent initiatives.

A series of high-level forums on the health Millennium Development Goals (*12*), the HRH strategy report of the Joint Learning Initiative (*13*), the WHO flagship publication *The world health report 2006: working together for health* (*4*), the resolutions of World Health Assemblies on health workforce development (*14*), and the launch of the Global Health Workforce Alliance (*15*), as well as certain regional partnership mechanisms such as the Asia-Pacific Action Alliance on Human Resources for Health (*16*), were among a cluster of international activities that alerted national, regional and international policy-makers and stakeholders, including the media, civil society and the general public, to the critical importance of HRH worldwide, especially the HRH crisis in sub-Saharan Africa.

Box 1.3 Health-related Millennium Development Goals

In September 2000, at the United Nations Millennium Summit, all countries committed to collectively working towards a series of eight goals and 18 related targets for combating poverty and its determinants and consequences, under a compact known as the Millennium Development Goals. Much investment was subsequently allocated for measuring progress towards the achievement of these targets, including a strong focus on monitoring coverage of prioritized health interventions and population health outcomes. More recently, attention has been directed to addressing and monitoring the health systems inputs, processes and outputs that impede or facilitate progress.

Goals	Related targets
1. Eradicate extreme poverty and hunger	Halve, between 1990 and 2015, the proportion of people who suffer from hunger
4. Reduce child mortality	Reduce by two thirds, between 1990 and 2015, the under-five mortality rate
5. Improve maternal health	Reduce by three quarters, between 1990 and 2015, the maternal mortality ratio
6. Combat HIV/AIDS, malaria and other diseases	Have halted by 2015 and begun to reverse the spread of HIV/AIDS Have halted by 2015 and begun to reverse the incidence of malaria and other major diseases
7. Ensure environmental sustainability	Halve by 2015 the proportion of people without sustainable access to safe drinking-water and sanitation
8. Develop a global partnership for development	In cooperation with pharmaceutical companies, provide access to affordable, essential drugs in developing countries

Source: World Health Organization (*8*).

Raising awareness of the critical role of HRH places the health workforce high on global public health agendas. Countries, donors, international agencies and other stakeholders are increasingly willing not only to invest in but also to contribute to HRH development overall. The critical role of human resources in the achievements of health systems objectives is more and more recognized and valued.

At the same time, there is an increased demand for transparency and performance measurement. For instance, the Global Fund and GAVI Alliance, which spearhead the principles of performance-based release of donor funding, have recognized the need to channel more of their disease-specific funds towards sustainable, comprehensive health care that is accessible and affordable to all. Other recent international initiatives seeking to accelerate progress towards achieving the health-related Millennium Development Goals, together with all major stakeholders, including the International Health Partnership (*17*) and the Global Campaign for the Health Millennium Development Goals (*18*), emphasize the principles of health systems support to achieve improved health outcomes. Increased opportunities for funding health systems strengthening through primary health care means more opportunities for investing in improving the quality of human resources.

To this end, countries are called upon to provide clear and consistent evidence in their requests for both new and ongoing resources for HRH development. This is also true for decision-making and allocation of resources from national sources. Ministries of health in many low- and middle-income countries face additional challenges posed by the effects of decentralizing responsibilities for both budget and information systems to district authorities, with often incomplete or inconsistent transfers of authority hampering proper decision-making processes.

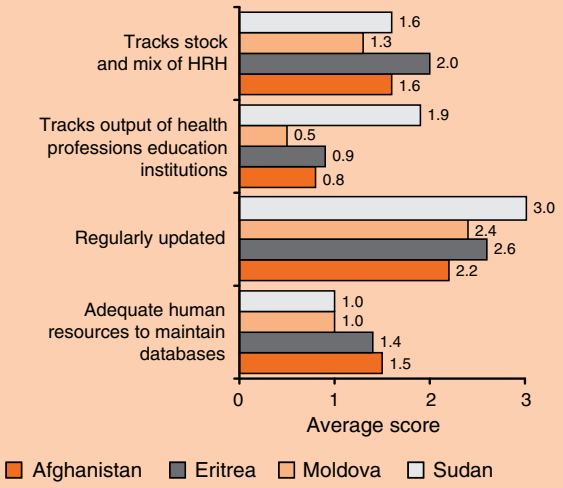
Box 1.4 Assessment and strengthening of HRH information systems

Assessment and strengthening of national HRH information systems are integral components of efforts to strengthen the evidence base on the health workforce. An assessment of the capacity of a country's HRH information system to support decision-making may include consideration of:

- timeliness of the system;
- validity of the information contained within the system;
- consistency across information sources (to allow for comparisons within and across countries and over time);
- level of disaggregation of the information within the system, to allow for in-depth analysis on issues of relevance to HRH strategic planning.

In 2006–2007, in collaboration with the Health Metrics Network (*19*), assessments of the national health information system were conducted in selected low- and middle-income countries, drawing on a standard assessment and monitoring tool. Using a scaled questionnaire in relation to four core dimensions of national capacity and contents of the HRH database, results of the self-evaluations showed a score of 6.1 out of a possible 12 in Afghanistan, 6.9 in Eritrea, 5.2 in the Republic of Moldova and 7.5 in Sudan (see graph). Of the four core dimensions, tracking the output of health professions education institutions was ranked lowest in most countries.

Results of an assessment of the HRH information systems in selected countries, 2006–2007



The importance of sound empirical evidence for informed policy development, decision-making and the monitoring of progress towards achieving HRH development and strengthening health systems is widely recognized. Evidence is needed to support countries to make the case for HRH both in national budget allocation and in their cooperation with donors. However, knowledge about what works and what does not is still very limited, signalling a need for more evidence and further research. The launch of the Health Metrics Network (*19*), a partnership aiming to increase the availability and use of timely and accurate health information by catalysing the joint funding and development of core country health information systems, was a big step forward in improving the information and evidence base, including on HRH (Box 1.4).

However, despite the global initiatives to assist in this core area of health systems strengthening, there is little consistency between countries in how HRH strategies are monitored and evaluated (*20*), thereby limiting the capacity of stakeholders to rationalize the allocation of resources. In many countries, the problem partly emanates from the fragmentation of HRH information and the shortages in human, financial and infrastructural resources available to collect, compile and analyse health workforce data (Boxes 1.5–1.7) (*21–24*). Moreover, the lack of standard tools, indicators, definitions and systems of classifying health workers has placed further constraints on using HRH information for evidence-informed decision-making.

Strengthening HRH information and monitoring systems requires a better foundation for policy-making, planning, programming and accountability. A range of tools and resources exists to assist countries in developing a national HRH strategic plan (*25–27*); technical assistance for developing and costing these plans can be sought, but having the necessary underlying data is a prerequisite. The Kampala Declaration and Agenda for Global Action, adopted by the First Global Forum on Human Resources for Health (*28*), called upon governments, in cooperation with international organizations, civil society, the private sector, professional

Box 1.5 Financial resource needs for strengthening HRH information systems

Little research has been undertaken into the financial investment levels needed to ensure a sound human resources information and monitoring system, which can vary according to a country's overall level of development. Estimates of the cost of a comprehensive health information system, including a strong HRH component, range from US$ 0.53 to US$ 2.99 annually per capita (*21*). In general, guidelines suggest that health information, monitoring and evaluation costs comprise between 3% and 11% of total project funds (*22*).

Box 1.6 Human resource needs for strengthening HRH information systems

Improvements to information systems require attention to be given to the training, deployment, remuneration and career development of human resources at all levels. At the national level, skilled epidemiologists, statisticians, demographers and computer programmers and technicians are needed to oversee data quality and standards for collection, and to ensure the appropriate analysis and utilization of information. At the district and facility levels, health information staff should be accountable for data collection, reporting and analysis. Too often, such tasks are given to overburdened health service providers, who see this as unwelcome additional work that detracts from their primary role. Appropriate remuneration and supervision is essential to ensure the availability of high-quality staff and to limit attrition. This implies, for example, that health information positions in ministries of health (and other bodies mandated with data analysis and use) should be graded at a level equivalent to those of major disease programmes.

Source: Health Metrics Network (*23*).

Box 1.7 Technological resource needs for strengthening HRH information systems

Many countries lack access to the necessary information and communications technologies for strengthening their HRH information systems. For instance, a 2004 study conducted by the WHO Regional Office for Africa showed that 22% of health workforce departments of ministries of health in the region did not have computer facilities, 45% had no electronic mail access, and fax machines were available in only 32% of the surveyed departments. Under these circumstances, even a modest investment could yield significant returns.

Source: World Health Organization (*24*).

associations and other partners, to "create health workforce information systems, to improve research, and to develop capacity for data management in order to institutionalize evidence-based decision making and enhance shared learning".

1.3 Key issues and challenges

It is an unfortunate truth that countries most in need of strengthening their HRH tend to have the most fragmented and unreliable data and information. Most, if not all, countries lack a harmonized dedicated system for collecting, processing and disseminating comprehensive timely information on their health workforce, including stock, distribution, expenditures and determinants of change. Different pieces of information may be derived from health professional regulatory bodies, district health information records on health facility staffing, population or establishment censuses or surveys, payroll records, work permits or other sources. As a result, ministries of health and other stakeholders often depend on ad hoc reports compiled from different sources, for which the completeness, timeliness and comparability are widely variable.

An additional challenge is that most countries do not have comprehensive data that capture the multitude of health workforce engaged in the preservation, promotion and restoration of health. For instance, few countries routinely collect and disseminate official statistics on their health system management and support workforce, which includes a large range of managerial, administrative, professional and clerical occupations as well as many others working in the health sector who are not necessarily formally trained in health services provision. In *The world health report 2006*, barely a third of countries reported such data (*4*). Yet, these workers – who are a critical component of the health workforce – are estimated to account for close to a third of all HRH worldwide; excluding them from official counts results in a substantial underreporting of the health workforce stock and neglects a sizeable potential to strengthen health systems performance. Many countries also lack timely and reliable information on the various dimensions of HRH imbalances, such as distribution by sector, geography, gender, labour force activity, place of work and remuneration.

Even in countries where data are relatively available, the translation of information into evidence that is useful for planners, decision-makers and stakeholders has been greatly hindered by the lack of consistency in occupational classification and the challenges of combining information from multiple sources. Given the differences in national developments and culture that result in variations in the roles and tasks of health workers, any attempt to enhance cross-national and time-trend comparability needs to focus on ways to harmonize data collection, processing and dissemination approaches.

A further challenge in the development and strengthening of HRH information systems comes from the lack of consensus on standardized indicators and underinvestment in measurement strategies, which are core for monitoring and evaluation of HRH interventions. Important efforts are still needed to harmonize a minimum set of indicators that are broadly reflective of the various dimensions and complexities of HRH dynamics, simple and ready to measure, but comprehensive enough to be of use for public health decision-making in the area of HRH. There are as yet no commonly agreed and systematically reported indicators internationally, apart from density of the most common categories of health professionals (physicians, nurses and midwives). Even this indicator has serious limitations for policy and planning, as its relevance in setting periodic targets may be influenced by changes in population structure, burden of disease, health workforce skill mix and other factors.

1.4 Framework for health workforce monitoring: the working lifespan approach

The present Handbook uses a "working lifespan" approach to monitoring the dynamics of the health workforce. Introduced in *The world health report 2006* (*4*), this approach focuses on the need for monitoring and evaluating each of the stages when people enter (or re-enter) the workforce, the period of their lives when they are part of the workforce, and the point at which they make their exit from it. The lifespan approach (Figure 1.1) of producing, attracting, sustaining and retaining the workforce offers a worker perspective as well as a systems approach to monitoring the dynamics of the health labour market and the strategies of each stage.

From policy and management perspectives, the framework focuses on modulating the roles of both labour markets and state action at key decision-making junctures:

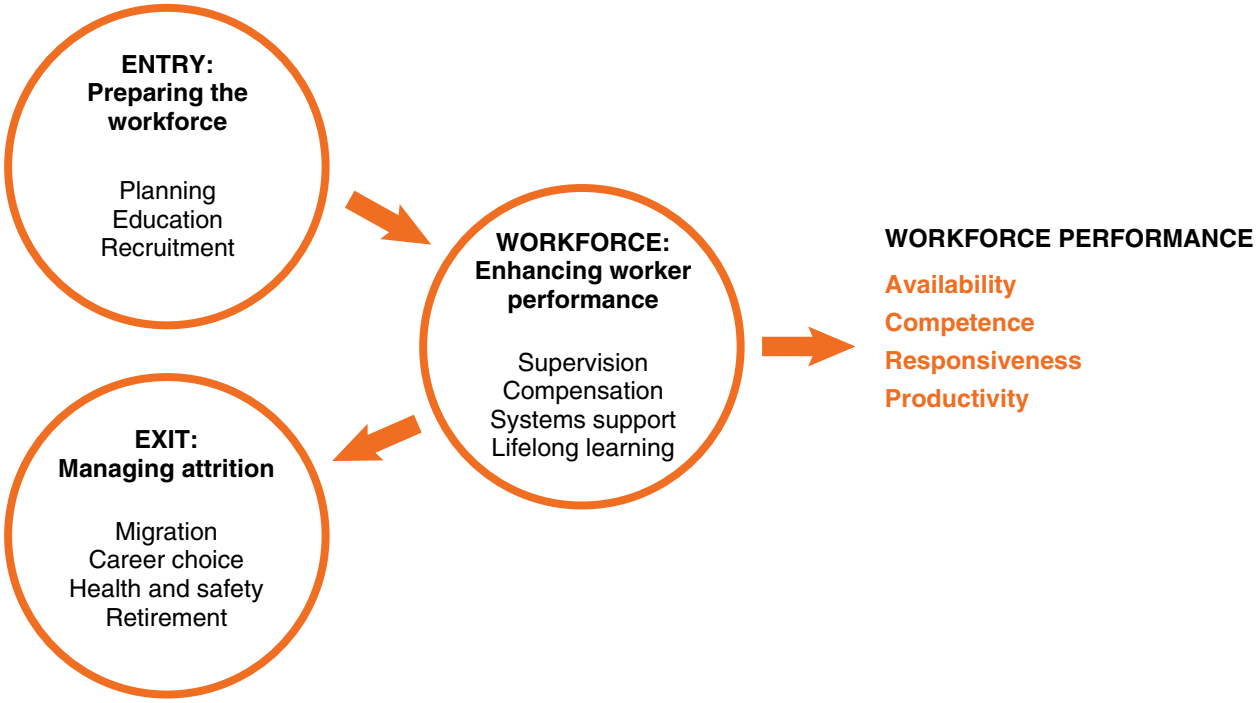
- entry: preparing the workforce through strategic investments in education and effective and ethical recruitment practices;
- active workforce: enhancing workforce availability, accessibility and performance through better human resources management in both the public and private sectors;
- exit: managing migration and attrition to reduce wasteful loss of human resources.

A central objective of policy and programmatic interventions at the entry stage is to produce and prepare sufficient numbers of motivated workers with adequate technical competencies, whose geographical and sociocultural distribution makes them accessible, acceptable and available to reach clients and populations in an efficient and equitable manner. To do so requires active planning, management and budgeting across the health workforce production pipeline, with a focus on building strong health professions education institutions, enhancing quality control mechanisms for skilled workers and strengthening labour recruitment capabilities.

Strategies to improve the performance of the active health workforce focus on the availability, competence, appropriateness, responsiveness and productivity of those currently engaged in the health sector. This generally involves assessment of HRH within the context of health services delivery among a wide variety of workplaces, and across the broader context of national labour markets.

Unplanned or excessive exits or losses of health workers may compromise health systems performance

Figure 1.1 **Working lifespan approach to the dynamics of the health workforce**



Source: World Health Organization (*4*).

and exacerbate the fragility of some already weak systems. In some regions, worker illnesses, deaths and out-migration (to other sectors or countries) together constitute a haemorrhaging that threatens workforce stability. Strategies to counteract workforce attrition include managing the market pressures that can lead to migration, improving workplace conditions so that the health sector is viewed as a favourable career choice, and reducing risks to health workers' health and safety.

At each of these stages, and for each of the policies and interventions in place, there is a need to develop and measure appropriate indicators to inform strategy development and monitor the impacts and cost-effectiveness over time.

1.5 Road map

The following chapters in this Handbook present in detail the opportunities, challenges and country experiences in approaches to monitoring and evaluating these key aspects of health workforce dynamics and the utility of different potential information sources and analytical techniques. The volume is structured in 12 chapters, including this introductory chapter. While each chapter may be read on its own, a number of cross-references to other chapters are also included at various junctions to help guide readers towards a broader vision. Although many of the approaches presented here have been selected with the expectation of being applied in low- and middle-income countries, illustrative examples from countries with developed market economies are also included in order to optimize the sharing of experiences and best practices.

In Chapter 2, Hunter, Dal Poz and Kunjumen discuss the definition of the health workforce and its operationalization, reviewing the current uses of internationally standardized classifications relevant for statistical delineation, description and analysis of the health workforce. The timeliness of this chapter is manifest, given the recent 2008 revision to the International Standard Classification of Occupations.

In Chapter 3, Rigoli and colleagues detail the approaches to and means of monitoring the active health workforce. They identify core indicators for characterizing those currently participating in the health labour market and review potential sources of data. The chapter continues with illustrative examples using case studies from various countries and sources, and concludes with recommendations for strengthening HRH information and monitoring systems within countries.

Tulenko, Dussault and Mercer explore in **Chapter 4** ways in which entry into the health workforce can be monitored and assessed, and how the appropriate data can lead to formulation and evaluation of policies and programmes to address shortages and maldistribution of health workers. They identify a set of core indicators, and existing and new sources of data for their measurement.

In **Chapter 5**, Zurn, Diallo and Kinfu discuss the major factors influencing transition within and exit from the health workforce, and propose comprehensive but readily measurable performance indicators. Using relevant data, the chapter also provides illustrative analyses with discussion of the implications of observed patterns for policy and planning.

In **Chapter 6**, Hernandez, Tan-Torres and Evans aim to encourage a greater number of countries to monitor expenditure on HRH to inform decision-making. Several lines of action are presented, intended to be a how-to guide for operational use by those actually monitoring these expenditures. An introduction to the main procedures for data collection and the associated results or indicators that would be generated is included, as well as country cases to illustrate various procedures. The chapter focuses on issues of data collection and use at country level, describing how to begin to construct and maintain a database on HRH expenditure.

The next four chapters are each centred on a specific measurement tool that can potentially be a rich source of policy-relevant information. In **Chapter 7**, Fapohunda and colleagues highlight the usefulness of health facility assessments for HRH analysis, reviewing a broad array of data collection techniques that focus on facility-based service delivery points.

In **Chapter 8**, Lavallée, Hanvoravongchai and Gupta present approaches to using population census data for exploring gender dimensions of the health workforce, drawing on multicountry empirical applications. The authors conclude with recommendations for promoting the use of sex-disaggregated data, notably from census sources, as a step towards monitoring and evaluation of gender-sensitive human resources policy planning and management.

In **Chapter 9**, McQuide and colleagues provide an overview of the essential elements and lessons learnt to date from various experiences in the implementation of human resources information systems drawing on administrative data sources. They present a series of case studies in developing and strengthening routine information systems from selected low- and middle-income countries.

Qualitative measurement strategies for HRH analysis are the focus of **Chapter 10**. Qualitative studies are used to understand health workers' attitudes and motivations, looking behind the numbers produced in quantitative research. Lievens, Lindelow and Serneels provide some practical guidance on how to design and implement qualitative health workforce studies, drawing on a rich methodological literature and a wealth of applied research, including case studies from Ethiopia and Rwanda.

Given the diversity of potential HRH information sources, a strategy of triangulation – or cross-examination and synthesis of the available data from different sources – can be effective in supporting decision-making, as it allows for a rapid understanding of the situation and makes optimal use of pre-existing data. This is the rationale behind **Chapter 11,** in which Nigenda and colleagues present three country case studies (from Mexico, India and Zambia) on the uses of triangulation for HRH analysis, each focusing on a central theme.

Lastly, Gedik and colleagues take stock of various global, regional and national initiatives in place to build effective cooperative mechanisms for sharing of knowledge and best practices**. Chapter 12** closes the Handbook with a discussion on conceptual contributions and frameworks intending to link health workforce research, information and analysis to policy dialogue and decisions. The authors highlight the potential role and experiences of regional and national HRH observatories for getting information and evidence into policy-making and practice.

1.6 Further information and comments

This Handbook is part of broader efforts to enhance country capacities to generate, analyse and use data to assess health workforce performance and track progress towards their HRH-related goals. Requests for further information on any of the tools, methods or approaches described here are welcomed. In order to ensure that future revisions of the Handbook are improved and remain responsive to country needs and situations, comments, feedback and suggestions are solicited from readers and potential users. Some specific issues on which feedback are welcome include user-friendliness of the Handbook; feasibility and sustainability of the recommended indicators and related measurement and analysis strategies; and the Handbook's helpfulness in stimulating country ownership and demand for strengthened HRH information, monitoring and evaluation systems.

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2 Boundaries of the health workforce: definition and classifications of health workers

DAVID HUNTER, MARIO R DAL POZ, TEENA KUNJUMEN

2.1 Introduction

The health workforce represents one of the key building blocks of health systems and has been identified as a priority for action for strengthening those systems (*1*). However, international assessments of human resources or other non-monetary inputs to health systems tend to be less widespread than comparisons of health-care expenditures (*2*). This is in part due to lack of a common framework and adequate data for comparative health workforce analysis. Imprecise professional boundaries and differences in defining and categorizing certain types of health workers across much of the world present further challenges in analysing health workforce data. For instance, a "nurse" in one country may be characterized by different educational requirements, legislation and practice regulations, skills and scope of practice than a "nurse" elsewhere. In order to monitor trends in the health workforce situation across countries or over time, or for countries to share experiences and best practices, it is necessary to know how health workers are defined and classified in the original information source (*3*).

This chapter discusses the definition of the health workforce and its operationalization. Current uses of internationally standardized classifications for statistical delineation, description and analysis of the health workforce are reviewed, and some options for future consideration are outlined.

2.2 Who are health workers?

Any health workforce analysis requires precise definition of health workers. The World Health Organization (WHO) defines the health workforce as "all people engaged in actions whose primary intent is to enhance health" (*4*). This statement reinforces the WHO concept of health systems as comprising "all organizations, people and actions whose primary intent is to promote, restore or maintain health" (*1*). This infers, for example, that family members looking after the sick and other informal caregivers and volunteers who contribute to the improvement of health should also be counted as part of the health workforce. But in practical terms, these are not often counted, due to lack of information on the unpaid workforce and the ensuing difficulty with regard to establishing the boundaries of what constitutes a health system.

Even then, the definition of a health action for classifying paid workers is not straightforward. Consider a nurse employed by a manufacturing company to provide on-site health-care services for its employees: the main goal of the actions of the nurse is to improve health, although the main goal of the actions of the employer is not. Then take the case of a gardener employed by a hospital: the gardener's own actions do not directly improve health, although the actions of the employer – the hospital – do. There are many such non-clinical workers in health industries, such as managers, computer operators, clerks and trades workers, who provide managerial and infrastructural support. There are also many skilled health-care providers who work outside facility-based service delivery points, including those in government ministries and departments, public health offices, health and health systems research agencies, health professions education and training institutions, company and school-based clinics, residential care settings, rehabilitation centres, correctional facilities, military service and others. A classification system that considers the actions of the individual alone, or those of the place of work alone, may fail to capture them all in the health workforce.

In order to provide comparable and consistent data to inform decision-making, it is necessary to define the health workforce operationally. While there is no single measure of the health workforce, it is important to specify which elements of the definition and classification structure are being considered. For example, if one study includes the above-mentioned nurse working for a private company while another does not, then the comparability of data from the two studies is compromised.

Table 2.1 Framework for defining the health workforce

Individual's training, occupation & place of work	Working in the health industry	Working in a non-health industry or unemployed/inactive
Training in health and employed in a health occupation	A. For example, physicians, nurses, midwives working in health-care facilities	C. For example, nurses working for private companies, pharmacists working at retail outlets
Training in health but not employed in a health occupation	A. For example, medically trained managers of health-care facilities	C. For example, medically trained university lecturers, unemployed nurses
Training in a non-health field or no formal training	B. For example, economists, clerks, gardeners working in health-care facilities	D. For example, primary school teachers, garage mechanics, bank accountants

Table 2.1 provides a useful framework to capture health workers employed (or not employed) in the health and non-health industries. Three categories of workers relevant for health workforce analysis can be distinguished:

A. those with health vocational education and training working in the health services industry;
B. those with training in a non-health field (or with no formal training) working in the health services industry;
C. those with health training who are either working in a non-health-care–related industry, or who are currently unemployed or not active in the labour market.

Categories A and C together form the trained (skilled) health workforce (active or inactive) available in a given country or region, while A and B represent the workforce employed in the health industry. The sum of the three elements A, B and C provides the total potential health workforce available. A fourth category, D, encapsulates all non-health workers, that is, those workers without training for a health occupation and not working in the health industry.

The advantage of this framework lies in the fact that it integrates the elements of training, current occupation and industry. In this context, "training" refers to the (formal and informal) education undertaken by individuals to equip them with the skills necessary to perform the tasks required for competent performance in a job, "occupation" refers to the tasks and duties performed in a job by individuals, and "industry" refers to the activities of the establishments or enterprises in which individuals are employed. Considering all three elements is essential to gain an understanding of the dynamics of the workforce.

The framework can be a useful tool for identifying potential data sources and gaps for health workforce analysis. A number of sources can be used to provide information and evidence to inform policy – notably, population censuses and surveys, health facility assessments and routine administrative records (including records on public expenditure, staffing and payroll, professional training, registration and licensure). Health facility assessments or payroll records will only provide data for categories A and B, while data from professional regulatory associations tend to be limited to A and C. In contrast, nationally representative population censuses and labour force surveys with properly designed questions on occupation, place of work and field of training can provide information on all three components.

2.3 Health workforce classification

Health workers play different roles and often have different national history, culture and codes of practice. Any attempt to compare the size and characteristics of the health workforce across countries or over time requires some level of harmonization of the available information. In order to compare and integrate data from different sources and countries, it is necessary to use internationally consistent or harmonized classification systems. Although some countries disseminate data using national educational, occupational or industrial classifications that are not always comparable, most use classification systems that are either based on or linked to internationally standardized classifications, such as the International Standard Classification of Education (ISCED), the International Standard Classification of Occupations (ISCO) and the International Standard Industrial Classification of All Economic Activities (ISIC). These classifications provide a coherent framework for categorizing fields and levels of training, occupations and industries of employment, respectively, according to shared characteristics (*5–7*).

2.3.1 Classification of education and training

There are important challenges in clearly identifying the different types of education and training programmes for health workers from different institutions, having different

Table 2.2 Relevant levels of education and training for health occupations according to the International Standard Classification of Education (ISCED-1997)

Level	Name	Description	Typical duration	Complementary dimensions
3	Upper secondary education	Typically begins at the end of full-time compulsory education for those countries that have a system of compulsory education.	Typically requires the completion of some 9 years of full-time education since the beginning of basic (primary) education.	Considerations for classifying this level include type of subsequent education or destination; programme orientation; and cumulative theoretical duration. Level 3 corresponds to the typical minimum entrance requirement for education and training for a health occupation.
4	Post-secondary non-tertiary education	Programmes that straddle the boundary between upper secondary and post-secondary education from an international point of view, even though they might clearly be considered as upper secondary or post-secondary programmes in a national context.	Typical full-time equivalent duration of between 6 months and 2 years.	May include three programme orientations: (i) general education; (ii) prevocational or pretechnical education; and (iii) vocational or technical education. Includes adult education (for example, technical courses given during an individual's professional life on specific subjects).
5	First stage of tertiary education	Tertiary programmes having an advanced educational content (but not leading directly to the award of an advanced research qualification).	Typical full-time equivalent duration of at least 2 years, although some programmes are of 4 or more years.	Programmes usually giving access to occupations with high skills requirements. Includes programmes leading to a master's degree.
6	Second stage of tertiary education	Tertiary programmes leading to the award of an advanced research qualification (i.e. entails advanced study and original research, not only coursework).		Very restricted scope at this level.

Source: United Nations Educational, Scientific and Cultural Organization (*8*).

entrance criteria, curricula and durations of training, and then grouping them into categories that are nationally and internationally comparable. Comparability can be enhanced through the collection, processing and dissemination of data following the ISCED standard, which provides a framework for the compilation and presentation of national and international education statistics and indicators for policy analysis and decision-making, whatever the structure of the national education systems and whatever the stage of economic development of a country (*8*). ISCED covers all organized and sustained learning activities for children, young people and adults. It allows a variety of types of education programmes to be classified by level and field of education, such as initial formal education, continuing education, non-formal education, distance education, apprenticeships, technical-vocational education and special needs education.

The latest version of ISCED (referred to as ISCED-97) classifies seven educational levels, and nine broad fields (in other words, at the one-digit coding level) and 25 subfields (two-digit level). Table 2.2 shows the ISCED educational levels relevant for education and training leading to a health occupation. Most relevant specializations fall by level under subfield 72, "health", including education in medicine, medical and health services, nursing and dental services.

Certain tools also exist that aim at providing guidelines on how to apply the ISCED classification. In one such manual, the two-digit fields of education from ISCED-97 are expanded to the three-digit level, capturing more details for vocational education and training while still ensuring cross-national comparability (*9*). The manual is intended to serve as a guide in countries where

comprehensive national classifications are not developed, based on an analysis of the descriptions of the content of training programmes. Table 2.3 presents the three-digit details for health-related specializations.

2.3.2 Classification of occupations

Another useful classification system for health workforce analysis is ISCO, developed by the International Labour Organization (*10*). This system of classification enables jobs to be arranged into a hierarchical system specified according to the precision needed, in major (one-digit level), sub-major (two-digit level), minor (three-digit level) and unit (four-digit level) groups. The basic criteria used to define the grouping system are the "skill level" and "skill specialization" required to carry out the tasks and duties of the occupations (*6*). Skill level refers to the complexity and range of tasks required for the job. Skill specialization is related to the field of knowledge required, tools and machinery used, the materials worked on or with and the goods or services produced.

In the most recent version of ISCO, revised in 2008 (known as ISCO-08), the main occupations of interest with health care-related specialization fall within two sub-major groups: sub-major group 22, "health professionals" (generally well-trained workers in jobs that normally require a university degree for competent performance); and sub-major group 32, "health associate professionals" (generally requiring knowledge and skills acquired through advanced formal education and training but not equivalent to a university degree). Health professionals include medical doctors (an occupational title used interchangeably with "physicians" in this Handbook), nursing and midwifery professionals, and others such as dentists and pharmacists. Health associate professionals include medical and pharmaceutical technicians, nursing and midwifery associate professionals and others such as dental assistants, physiotherapy technicians and dispensing opticians (Table 2.4, page 18).

For the earlier version of ISCO (adopted in 1988, or ISCO-88) – against which currently available data were being classified at the time of publication of this Handbook – the relevant information needed to be coded to a degree of detail that minimally corresponded to the three-digit level in order for health occupations to be properly identified. Information at the two-digit level did not allow distinction of health occupations from other life sciences occupations. However, drawing on consultations between the International Labour Organization, WHO and other stakeholders, the newly adopted 2008 version stemmed from the recognition that the previous version was outdated in some areas (*11*).

Most health occupations can be identified at the two-digit or three-digit levels of ISCO-08. However, a four-digit code is needed to distinguish practitioner specializations (such as dentists from pharmacists), and also to separately identify some other allied health workers, such as psychologists and social work professionals, classified in the same minor group as other social scientists, including economists and sociologists.

A significant improvement in ISCO-08 for the purposes of health workforce analysis is the creation of additional unit groups, notably for distinguishing generalist from specialist medical doctors, and for identifying a number of types of allied health workers. For example, a growing number of countries, especially low-income countries with critical shortages of highly skilled medical and nursing professionals, are turning to "community health workers" – community health aides selected, trained and working in the communities from which they come – to render certain basic health services (*12*). This category is specified in ISCO-08 (unit group code 3253).

Another improvement is in the treatment of veterinary occupations. In ISCO-88, veterinary occupations were found in the same minor groups as human health occupations; therefore coding was needed at the four-digit level to distinguish veterinarians and veterinary assistants. However, in ISCO-08, these two occupational groups are now classified in separate minor groups. As a result, data disseminated at even the three-digit level will allow human health occupations to be distinguished from veterinary occupations at both the professional and associate professional levels.

Other occupations of interest include managers and personal care workers in health services. In ISCO-08, managers of health and aged care services are separately identified at the four-digit level (unit group codes 1342 and 1343, respectively). "Personal care workers in health services" are identified in a separate minor group (code 532), which includes unit groups for health-care assistants and home-based personal care workers. Information classified according to the previous ISCO-88 was required at the most detailed four-digit level in order to differentiate childcare workers from personal care workers in health services.

Certain documents produced by the International Labour Organization guide countries on how to develop, maintain and revise a national occupation classification and its mapping to the international standard (*13, 14*). The most up-to-date information and latest advice can be found on the ISCO web site (*10*).

Table 2.3 Fields of vocational training related to health according to *Fields of training* manual

Code	Field	Description
Fields of training directly related to health		
721	Medicine	The study of the principles and procedures used in preventing, diagnosing, caring for and treating illness, disease and injury in humans and the maintenance of general health. Principally, this field consists of training of physicians. Programmes with the following main content are classified here: medicine, medical science, medical training. Medical specializations are included here, such as anaesthesiology, anatomy, cardiology, dermatology, epidemiology, forensic medicine, gerontology, haematology, internal medicine, neurology, obstetrics and gynaecology, oncology, ophthalmology, paediatrics, preventive and social medicine, psychiatry, surgery.
722	Medical services	The study of physical disorders, treating diseases and maintaining the physical well-being of humans, using non-surgical procedures. Training programmes classified here comprise a wide range of services such as ambulance service, chiropractic, hearing aid technology, medical laboratory technology, medical X-ray techniques, nutrition and dietetics, occupational therapy, optometry, orthopaedic prosthetics, emergency paramedical technologies, pharmacy, physiotherapy, radiotherapy, speech pathology and therapy, vocational rehabilitation.
723	Nursing	The study of providing health care for the sick, disabled or infirm and assisting physicians and other medical and health professionals diagnose and treat patients. Training programmes with the following main content are classified here: assistant nursing, basic nursing, care of old people, care of the disabled, infant hygiene (nursing), midwifery, nursing aide/orderly, psychiatric nursing.
724	Dental studies	The study of diagnosing, treating and preventing diseases and abnormalities of the teeth and gums. It includes the study of designing, making and repairing dental prostheses and orthodontic appliances. It also includes the study of providing assistance to dentists. Training programmes with the following main content are classified here: clinical dentistry, dental assisting, dental hygiene, dental laboratory technology, dental nursing, dental science, dental surgery, odontology, orthodontics.
Fields of training associated with health		
762	Social work and counselling	The study of the welfare needs of communities, specific groups and individuals and the appropriate ways of meeting these needs. The focus is on social welfare with emphasis on social policy and practice. Among the training programmes classified here: alcohol and drug abuse counselling, crisis support, social practice, social work (welfare).
850	Environmental protection	The study of the relationships between living organisms and the environment in order to protect a wide range of natural resources. Programmes in services to the community dealing with items that affect public health, such as hygiene standards in food and water supply, are included here. Among the training programmes classified here: air pollution control, community sanitation, environmental toxicology, garbage disposal, water pollution control.
862	Occupational health and safety	The study of recognizing, evaluating and controlling environmental factors associated with the workplace. Among the training classified here: ergonomics (occupational health and safety), health and safety in the workplace, labour welfare (safety), occupational health and industrial hygiene, stress at work.

Source: Adapted from European Centre for the Development of Vocational Training and Eurostat (*9*).

Table 2.4 Occupational titles related to health according to the International Standard Classification of Occupations (ISCO), 1988 and 2008 revisions

ISCO-2008				ISCO-1988			
Group code			Occupational title	Group code			Occupational title
Sub-major	Minor	Unit		Sub-major	Minor	Unit	
22			**Health professionals**	**22**			**Life science and health professionals**
	221		**Medical doctors**		**222**		**Health professionals (except nursing)**
		2211	Generalist medical practitioners			2221	Medical doctors
		2212	Specialist medical practitioners				
	222		**Nursing and midwifery professionals**		**223**		**Nursing and midwifery professionals**
		2221	Nursing professionals			2230	Nursing and midwifery professionals
		2222	Midwifery professionals				
	223		**Traditional and complementary medicine professionals**				
		2230	Traditional and complementary medicine professionals				
	224		**Paramedical practitioners**				
		2240	Paramedical practitioners				
	226		**Other health professionals**		**222**		**Health professionals (except nursing)**
		2261	Dentists			2222	Dentists
		2262	Pharmacists			2224	Pharmacists
		2263	Environmental and occupational health and hygiene professionals				
		2264	Physiotherapists				
		2265	Dieticians and nutritionists				
		2266	Audiologists and speech therapists				
		2267	Optometrists and ophthalmic opticians				
		2269	Health professionals n.e.c.			2229	Health professionals (except nursing) n.e.c.
32			**Health associate professionals**	**31**			**Physical and engineering science associate professionals**
	321		**Medical and pharmaceutical technicians**		**313**		**Optical and electronic equipment operators**
		3211	Medical imaging and therapeutic equipment technicians			3133	Medical equipment operators
		3212	Medical and pathology laboratory technicians				
				32			**Life science and health associate professionals**
					322		**Modern health associate professionals (except nursing)**
		3213	Pharmaceutical technicians and assistants			3228	Pharmaceutical assistants
		3214	Medical and dental prosthetic and related technicians				

Continues…

ISCO-2008				ISCO-1988			
Group code			Occupational title	Group code			Occupational title
Sub-major	Minor	Unit		Sub-major	Minor	Unit	
	322		**Nursing and midwifery associate professionals**		**323**		**Nursing and midwifery associate professionals**
		3221	Nursing associate professionals			3231	Nursing associate professionals
		3222	Midwifery associate professionals			3232	Midwifery associate professionals
	323		**Traditional and complementary medicine associate professionals**		**324**		**Traditional medicine practitioners and faith healers**
		3230	Traditional and complementary medicine associate professionals			3241	Traditional medicine practitioners
	325		**Other health associate professionals**		**322**		**Modern health associate professionals (except nursing)**
		3251	Dental assistants and therapists			3225	Dental assistants
		3252	Medical records and health information technicians				
		3253	Community health workers				
		3254	Dispensing opticians			3224	Optometrists and opticians
		3255	Physiotherapy technicians and assistants			3226	Physiotherapists and related associate professionals
		3256	Medical assistants			3221	Medical assistants
		3257	Environmental and occupational health inspectors and associates			3222	Sanitarians
		3258	Ambulance workers				
		3259	Health associate professionals n.e.c.			3229	Modern health associate professionals (except nursing) n.e.c.
53			**Personal care workers**	**51**			**Personal and protective workers**
	532		**Personal care workers in health services**		**513**		**Personal care and related workers**
		5321	Health care assistants			5132	Institution-based personal care workers
		5322	Home-based personal care workers			5133	Home-based personal care workers
		5329	Personal care workers in health services n.e.c.				
			Additional health-related unit groups				**Additional health-related unit groups**
		1342	Health service managers				
		1343	Aged care service managers				
		2634	Psychologists			2445	Psychologists
		2635	Social work and counselling professionals			2446	Social work professionals
		3344	Medical secretaries				

Notes: This table presents an overview of the treatment of health occupations in the 1988 and 2008 versions of ISCO and should not be used for correspondence. Occupations related to the veterinary field are excluded from the thematic view.

n.e.c. = not elsewhere classified.

Source: International Labour Organization (*10*).

Table 2.5 Economic sectors related to health activities on the basis of the International Standard Industrial Classification of All Economic Activities (ISIC) Revision 4

Code				Economic activity
Section	Division	Group	Class	
Core health industry groups and classes				
Q				**Human health and social work activities**
	86			**Human health activities**
		861	8610	Hospital activities
		862	8620	Medical and dental practice activities
		869	8690	Other human health activities
Selected associated classes				
C	21	210	2100	Manufacture of pharmaceuticals, medicinal chemical and botanical products
	32	325	3250	Manufacture of medical and dental instruments and supplies
E	36	360	3600	Water collection, treatment and supply
	37	370	3700	Sewerage
G	47	477	4772	Retail sale of pharmaceutical and medical goods, cosmetic and toilet articles in specialized stores
K	65	651	6512	Non-life insurance (including provision of health insurance)
M	71	712	7120	Technical testing and analysis (include testing in the field of food hygiene; testing and measuring air and water pollution)
O	84	841	8412	Regulation of the activities of providing health care, education, cultural services and other social services
			8430	Compulsory social security activities (including funding and administration of government-provided social security programmes for sickness, work-accident, temporary disablement, etc.)
Q	87	871	8710	Residential nursing care facilities
		872	8720	Residential care activities for mental retardation, mental health and substance abuse
	88	881	8810	Social work activities for the elderly and disabled (without accommodation)

Source: United Nations Statistics Division (*15*).

2.3.3 Classification of branches of economic activity

As mentioned earlier, in addition to health-care service providers, there are many non-health-trained workers acting to keep health institutions functioning. It is estimated that about one third of the global health workforce is composed of health management and support workers (*4*). Capturing them requires consideration of occupations across almost all ISCO groups, so further information on place of work may be required. The ISIC classification can form a basis for such analysis, as it allows pooling of information on workers in health services across different types of economic systems within a comparative framework (*15*). In ISIC, economic producing units are grouped into successively broader levels of classification in a four-level hierarchy: sections (one-letter code), divisions (two-digit code), groups (three-digit code) and classes (four-digit code). This grouping is done according to similarities in the character of the goods and services produced, the uses to which the goods and services are put, and the inputs, process and technology of production.

Relevant information for health workforce analysis essentially falls under ISIC division 86, "human health activities". Data available at the group (three-digit) or class (four-digit) level will allow disaggregating the different types of health systems activities, including service provision, supplies procurement and financing. Table 2.5 presents selected health-related categories from the latest ISIC revision.

2.3.4 Other classifications

It is also of significance to countries and stakeholders to be able to distinguish the different categories of human resources within health systems, such as those who are regular employees of the systems and those who are not, or those whose basic salaries are drawn from the government budget in comparison with health workers who are funded by other sources. A full list of international classifications for the collection and dissemination of economic and social statistics is available at the United Nations Statistics Division web site (*16*).

2.4 Summary and conclusions

Comparative health workforce analysis is meaningful only when the available information is based on common definition and classification of health workers. There is no single operational boundary of what constitutes the health workforce. Many assessments use country-specific or even tool-specific definitions and titles that are not always comparable across countries or over time. However, a growing number of countries are disseminating health labour data that can be mapped to international standard classifications – such as the International Standard Classification of Education, the International Standard Classification of Occupations, and the International Standard Industrial Classification of All Economic Activities. These classifications provide a coherent framework for categorizing key workforce variables (vocational training, occupation and industry of employment, respectively) according to shared characteristics. Using this trichotomy allows the identification of people with training in health, of people employed in health-related occupations, and of people employed in health services industries.

Health workforce analyses can draw on data from a number of sources, including standard statistical sources outside the (traditional) health sector. Selected tools for guiding the collection and coding of statistical information on economic activity from population censuses and surveys can be found online at the handbooks, guidelines and training manuals section of the United Nations Statistics Division web site (*17*) (see also *18, 19*). The United Nations Statistics Division (*20*) recommends the collection and processing of census data on education, occupation and industry categorized in accordance with, or in a manner convertible to, the latest revision available of the relevant international classification (i.e. ISCED, ISCO and ISIC, respectively). It is further recommended that countries code the collected responses at the lowest possible level of classification detail supported by the information given. In particular, in order to facilitate detailed and accurate coding for occupation data, the questionnaire should ask each active person for both the occupational title and a brief description of the main tasks and duties performed on the job. It is expected that possibilities for health workforce analyses will be strengthened in the current global series of censuses, known as the 2010 round (covering the period 2005 to 2014), which will largely be able to exploit the new ISCO-08 revision.

For some countries, human resources for health analyses based on population census and survey data can be facilitated through collaborative research projects aiming to harmonize microdata variables and structures for public use. Key microdata providers include the Integrated Public Use Microdata Series (*21*), the African Census Analysis Project (*22*) and the Luxembourg Income Study (*23*). Such projects process census and survey microdata series for multiple countries – with education, occupation and industry variables mapped where possible to ISCED, ISCO and ISIC, respectively – and help disseminate the relevant documentation for scholarly and policy research. Chapter 8 of this Handbook presents a multicountry analysis of health workforce statistics making use of the Integrated Public Use Microdata Series (*21*). The analysis draws on available occupational data from the 2000 round of censuses mapped to ISCO-88.

Even with ongoing improvement and revisions, given their nature, standardized classifications are inherently generalized and attempt to simplify a very complex system for statistical purposes. They may not always capture the full complexity and dynamics of the health labour market. The World Health Organization, International Labour Organization and other partners are continually engaged in initiatives to improve international classifications relevant for health workforce analysis and promote their use. This includes ongoing enumeration of the various sources of data and types of classifications used for monitoring health workers (*7*). This may facilitate definitional harmonization of the health workforce within and across countries, and be used to develop a road map on how to improve health workforce classifications at the national and international levels. Such exercises continue to benefit from exchanges and interactions among those that produce and use this information from diverse perspectives, including national governments (ministries of health, labour and education, and central statistical offices), health professional associations, WHO regional and country offices, other international bodies with health and statistical interests, nongovernmental and private organizations working in health and statistics, and academic and research institutions.

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Part II:
MONITORING THE STAGES OF THE WORKING LIFESPAN

3 Monitoring the active health workforce: indicators, data sources and illustrative analysis

FELIX RIGOLI, BOB POND, NEERU GUPTA, CHRISTOPHER H HERBST

3.1 Introduction

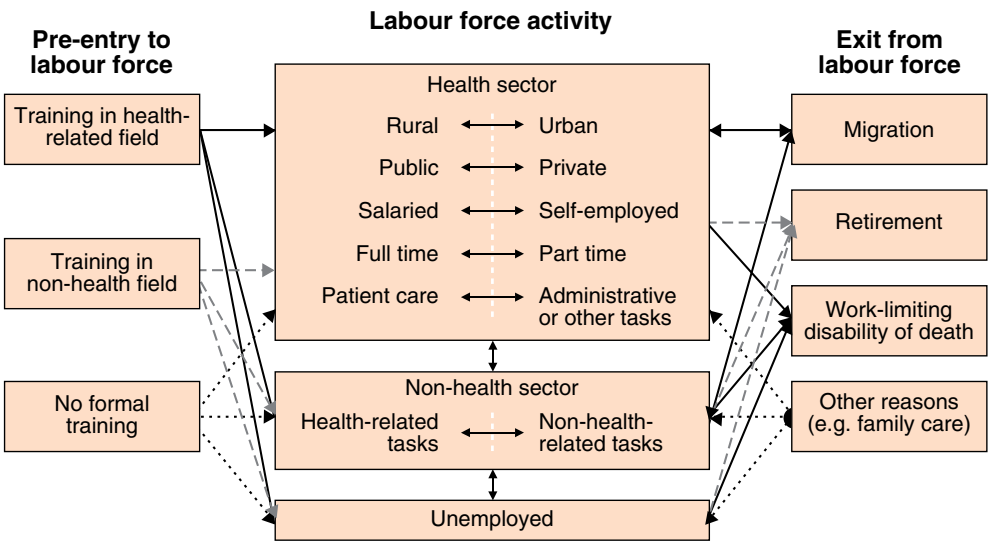
Human resources for health (HRH) have long been recognized as "the cornerstone of the [health] sector to produce, deliver, and manage services" (*1*). Assessments of HRH are required for various purposes, notably for planning, implementing, monitoring and evaluating health sector strategies, programmes and interventions. The importance of sound empirical evidence for informed policy decision-making and monitoring of progress in strengthening health workforce development and management is widely recognized. Precisely describing HRH can help to identify opportunities and constraints for scaling up health interventions.

The size and distribution of the health workforce is the result of the inflow into, outflow from and circulation of workers between, for example, different sectors (public or private), industries (health services or other), regions (rural or urban), countries and statuses (employed, unemployed or inactive) (Figure 3.1).

Various permutations and combinations of what constitutes the health workforce potentially exist, depending on each country's situation and the means of monitoring. A framework for harmonizing the boundaries and constituency of the health workforce across contexts is presented in Chapter 2 of this Handbook. To facilitate data collection and analysis processes, it is important to focus on a limited and essential number of indicators that are comparable and measurable regularly using standard data sources (*2*). Such data sources include population-based sources (censuses and surveys), health facility assessments and administrative records. For specialized or in-depth HRH assessments, information can further be drawn from, for example, professional registries, national health accounts, records of health education and training institutes, and qualitative studies.

The development of a comprehensive evidence base generally requires combining different types of information that may exist, frequently scattered across different sources. This chapter focuses on describing

Figure 3.1 Stocks and flows of the health workforce



the tools and means to monitor the active health workforce, that is, all people currently participating in the health labour market. Core indicators for characterizing HRH are first identified, with an emphasis on optimizing comparability across countries and over time. Key potential sources of data are then reviewed; both primary sources and standard statistical sources are examined, and the opportunities and challenges they offer for health workforce analysis are considered. Illustrative examples are presented, using case studies from various countries and sources. Lastly, some lessons learnt and recommendations for strengthening HRH information and monitoring systems within countries are discussed. The present chapter is primarily devoted to monitoring current health workforce activity; measurements of entry (notably, pre-service education and training) and exit (attrition due to various factors, including migration, retirement and death) are the focus of the next two chapters in this Handbook, respectively.

3.2 Core indicators for HRH analysis: what needs to be monitored?

Effective monitoring and evaluation of HRH in countries requires agreement upon a core set of indicators at the subnational, national and international levels to inform decision-making among national authorities and other stakeholders. Ideally, the indicators retained should be characterized by "SMART" properties: specific (measures exactly the result); measurable (so that the result can be tracked); attainable (so that the result can be compared against a realistic target); relevant (to the intended result); and timebound (indicates a specific time period). The ongoing and consistent measurement of these indicators allows monitoring of how HRH-related programmes and policies are being implemented. Once the baseline data have been generated, an evaluation framework can be established with periodic targets for analysis in terms of change and progress over time, that is, whether activities have been implemented in the right direction in accordance with the original plans and strategic objectives.

Table 3.1 presents a series of indicators that, when systematically measured, can be used to track the active health workforce (*2, 3*). At the most basic, there is a need to know how many people are working in the field of health, their characteristics and distribution. In considering the size of a country's health workforce at a given moment, or measuring the stock of health workers, it is crucial to distinguish whether the snapshot includes workers employed at health-care facilities (differentiating between those on facility duty rosters versus those physically headcounted on the day of the assessment), persons having been educated in a health-related field regardless of place of employment, or persons having been educated in a health-related field regardless of current labour force status.

Measuring the skills mix of the health workforce offers a means to assess the combination of categories of personnel at a specific time and identify possible imbalances related to a disparity in the numbers of various health occupations. Statistics on skills mix can help inform strategies to ensure the most appropriate and cost-effective combination of roles and staff. Because counts of workers in the private sector are likely to be less accurate when drawing on administrative data sources than counts of those in the public sector, and because private for-profit providers are often less accessible to low-income populations, it is also recommended that indicators be used to monitor workers' employment sector (public, private for-profit or private not-for-profit).

As detailed in the previous chapter, comprehensive assessments require accurate information on occupation, industry and training. Drawing upon a combination of these types of information will enable the identification of, for example, employment in non-health activities among those with a health-related education, and employment in health activities with jobs that do not require clinical skills (see Chapter 2). Additional indicators on labour productivity, unemployment and underemployment, and emigration, for instance, will allow monitoring of workforce wastage, or excess loss in utility due to attrition or poor productivity that could have been prevented or managed (*4*). Health workforce metrics, or measurements of particular characteristics of performance or efficiency of HRH development strategies, can further be assessed by means of indicators on HRH renewal and migration (*2*).

Comparability of HRH statistics across countries and over time can be enhanced through the setting and use of common definitions and classifications for monitoring the labour market. This includes the collection, processing and dissemination of data following internationally standardized classifications, including the International Standard Classification of Occupations (ISCO), the International Standard Industrial Classification of All Economic Activities (ISIC), the International Standard Classification of Education (ISCED) and the International Classification of Status in Employment (ICSE).

Depending on the data source used, indicators on HRH may be disaggregated by selected characteristics for further analysis. Disaggregation of relevant indicators allows for monitoring progress in health

worker training, recruitment and management policies among underserved communities or other nationally prioritized population groups. Disaggregating information on earned income among health workers by sex, for example, can be useful for monitoring gender gap in occupational earnings. Stratification of workforce statistics by district, province or region is particularly important for monitoring equity of geographical access to health services. HRH renewal can be indirectly assessed through the age distribution of the active health workforce, notably in terms of the ratio of younger workers (under 30 years) to those close to retirement age.Depending on the nature of the indicator and the data source, an evaluation of HRH programmes and policies can be carried out in the short, medium or longer terms. For example, certain aspects of HRH dynamics are only likely to change to a significant degree over the long term, such as the production of physicians over at least a decade or so, given the lengthy pre-service training requirements for this category of health workers.

3.3 Overview of potential data sources

Policies and programmes for the health sector should be informed by timely, reliable and valid data. Despite a prevailing view that statistics on the health workforce are scarce, diverse sources that can potentially produce relevant information exist even in low-income countries, including population censuses and surveys, facility assessments and routine administrative records. There are strengths and limitations to each source that need to be evaluated (Table 3.2) (*2, 5*). Drawing upon a combination of these complementary tools can result in useful and rich information for monitoring and evaluation of the health workforce and its impact in health systems.

All countries collect at least some data on their population, mainly through periodic demographic censuses and household sample surveys that produce statistical information about people, their homes, their socioeconomic conditions and other characteristics. Most censuses and labour force surveys ask for the occupation of the respondent (and other adult household members) along with other demographic characteristics, including age, sex and educational attainment. Labour force surveys generally delve into greater details on, for example, place of work, industrial sector, remuneration, time worked and secondary employment (*6*). Many meaningful results pertinent to HRH analysis can be produced through tabulation of population-based data on labour activity. Other kinds of national household surveys can also provide relevant information; for example, surveys with questions on care-seeking behaviour have been used to help understand how factors such as demographics, health insurance coverage and distance to a health facility influence not only clients' choice of whether or not to seek the services of a health-care provider, but also from whom services have been obtained (for example public or private sector, formal or informal provider).

Health facility assessments can be conducted using different sampling approaches (establishment census or sample survey) and methodologies (self-administered postal, fax or Internet-based questionnaire; telephone or face-to-face interview). Depending on the nature of the data collection procedures and instruments, in-depth information can be obtained on health workforce metrics, for instance, in-service training and provider productivity. In addition, the nature of facility-based assessments facilitates the collection of data for numerous other indicators pertinent to health system performance assessment, such as infrastructure, availability of supplies and costs (*7*).

In many countries, the computerization of administrative records – including public expenditure, staffing and payroll, work permits, trade union memberships and social security records – is greatly facilitating the possibilities for HRH analysis. Many skilled health-care providers require formal training, registration and licensure to practise their occupation; as such, the administrative records of health training institutions and professional licensing bodies are potentially valuable sources for tracking the health workforce. These sources offer the advantage of producing continuously updated statistics. In addition, depending on the characteristics of the registries, notably whether individuals are assigned a unique identifier, it may be possible to track workers' labour force entry, career progression and exit.

The fundamental challenges for data compilation, analysis and use include identification of appropriate sources and gaining timely access to the data (*2*). Other issues include the decision whether to complement existing sources with new data collection activities, such as a specialized (quantitative or qualitative) study of health human resources. In particular, periodic health sector-specific labour surveys can provide more detailed information, which can typically be disaggregated to a finer detail for distinct categories of health workers compared to general labour force surveys. Mobilizing the required resources (human, technical and financial) for specialized HRH data collection activities can often be difficult, especially in low-income countries, but the instruments can be customized to gather in-depth information on almost any

Table 3.1 Selected key indicators for monitoring and evaluation of human resources for health

Indicator	Description	Numerator	Denominator	Measurement/comparability issues
Basic indicators of HRH stock and distribution				
Stock (and density) of HRH	Total number of health human resources (relative to the population)	Total number of health workers in a given country	(Total population of the same country)	Definition and boundaries of HRH, such as by occupation (e.g. physicians, nurses, etc.), industry or training – with distinction between headcounts versus job positions
Skills mix	Distribution of HRH by occupation, specialization or other skill-related characteristic	Number of physicians, nurses and midwives (or other categories of health service providers)	Total number of health workers	Occupational classification – with distinction between headcounts versus job positions (with positions weighted for full-time equivalency on the basis of working hours)
Geographical distribution	Distribution of HRH by geographical location	Number of health workers in rural areas (or other epidemiological, administrative or economic region)	Total number of health workers	Definition of rural (or other geographical delimitation)
Age distribution	Distribution of HRH by age group	Number of health workers of a given age group	Total number of health workers	
Gender distribution	Distribution of HRH by sex	Number of female (or male) health workers	Total number of health workers	
Indicators of HRH labour activity				
Labour force activity rate	Proportion of HRH currently active in the labour force	Number of persons with health-related skills active in the labour force	Total number of persons of working age with health-related skills	Occupational/educational classifications as well as age range for labour force eligibility
Employment/ unemployment rate	Proportion of HRH currently employed (or unemployed)	Number of persons with health-related skills currently employed (or unemployed)	Total number of persons with health-related skills active in the labour force	Definitions of labour force participation and employment status
Industrial sector	Distribution of workers by industry of activity	Number of persons employed in health services industry	Total number of persons currently employed	Industrial classification
Institutional sector	Distribution of health workers by sector of activity	Number of health workers employed in the public (versus private or nongovernmental) sector	Total number of health workers	Definition of operating authority of the place of work
Dual employment	Proportion of HRH currently employed at more than one location	Number of health workers currently employed at more than one location	Total number of health workers	

Continues…

Indicator	Description	Numerator	Denominator	Measurement/comparability issues
Occupational earnings and income	Average occupational earnings and income among health workers	Total income from labour over a given period (from wages, practice or business) among health workers	Total number of health workers	Distinction between net/gross income, sources of income, non-monetary benefits, as well as definition of reference period for income reporting
Indicators of HRH productivity				
Absenteeism	Days of absenteeism among health workers	Number of days of employee absences over a given period in the health workplace	Total number of scheduled working days among employees over the same period in the same place	Delimitation and reporting of causes of absenteeism (e.g. duty absence, sickness or other emergency leave, maternity or parental leave, unauthorized absence)
Provider productivity	Relative number of specific tasks performed among health workers	Specific tasks performed over a given period (e.g. ambulatory visits, immunizations, surgeries) by a given health service provider	Total number of specific tasks performed over the same period among all health service providers	Delimitation of tasks in terms of quantity/quality
Indicators of HRH renewal and loss				
Workforce generation ratio	Ratio of entry to the health workforce	Number of graduates of health professions education institutions in the last year	Total number of health workers	Educational classification as well as processes of professional credentialing/ deployment for new graduates
National HRH self-sufficiency	Proportion of nationally trained health workers	Number of health workers who received their professional training in the reference country	Total number of trained health workers in the same country	Occupational/educational classifications across the country of origin and receiving country for foreign-educated workers
Workforce loss ratio	Ratio of exits from the health workforce	Number of health workers who left the active labour force in the last year	Total number of health workers	Delimitation and reporting of reasons for exit (e.g. retirement, mortality, out-migration, career break or change)

Sources: Adapted from Diallo et al. (*2*) and WHO and University of Technology Sydney (*3*).

Table 3.2 Potential data sources for monitoring the health workforce

Source	Strengths	Limitations
Population census	• Provides nationally representative data on stock of HRH: headcount of all occupations (including private sector, management and support staff, health occupations in non-health sectors) • Data can be disaggregated for specific subgroups (e.g. by age, sex) and at lowest geographical level • Rigorous collection and processing procedures help ensure data quality	• Periodicity: usually only once every 10 years • Database management can be computationally cumbersome • Dissemination of findings often insufficiently precise for HRH analysis, but microdata that would allow for in-depth analysis often not released • Cross-sectional: does not allow tracking of workforce entry and exit • Usually no information on labour productivity or earnings
Labour force survey	• Provides nationally representative data on all occupations • Provides detailed information on labour force activity (including place of work, unemployment and underemployment, earnings) • Rigorous collection and processing procedures help ensure data quality • Requires fewer resources than census	• Variable periodicity across countries: from monthly to once every 5 years or more • Dissemination of findings often insufficiently precise for HRH analysis • Sample size usually too small to permit disaggregation • Cross-sectional: does not allow tracking of workforce entry and exit
Health facility assessment	• Provides information on health facility staff, including management and support staff (headcounts and full-time equivalents) • Data can be disaggregated by type of facility, staff demographics (age, sex) and geographical area • Can be used to track wages and compensation, in-service training, provider productivity, absenteeism, supervision, available skills for specific interventions • Usually requires fewer resources than household-based assessments • Can be complemented with routine reporting (e.g. monthly) of staff returns from each facility (such statistics are frequently cited in official publications)	• Usually conducted infrequently and ad hoc • Private facilities and practices often omitted from sampling • Community-based workers may be omitted • May double-count staff working at more than one facility • Cross-sectional: does not allow tracking of workforce entry and exit • No information on unemployment or health occupations in non-health services sector (e.g. teaching, research) • Variable quality of data across countries and over time
Civil service payroll registries	• Provides information on public sector employees (headcounts and full-time equivalents) • Data are usually accurately and routinely updated (given strong government financial incentive for quality information, which can also be validated through periodic personnel audits) • Data can sometimes be disaggregated by age, sex, place of work, job title and pay grade	• Excludes those who work exclusively in the private sector (unless they receive government compensation) • Depending on the nature of the registry, may double-count staff with dual employment or exclude locally hired staff not on the central payroll • Many countries have persistent problems eliminating ghost workers[a] and payments to staff who are no longer active
Registries of professional regulatory bodies	• Provides headcounts of all registered health professionals • Data are routinely updated for entries to the national health labour market • Data can typically be disaggregated by age, sex and sometimes place of work • Depending on the characteristics of the registry, it may be possible to track career progression and exit of health workers	• Variable coverage and quality of data across countries and over time, depending on the characteristics and capacities of the regulatory authorities • Usually limited to highly skilled health professionals

a. Ghost workers are personnel formally on payroll but providing no service (notably as a strategy among health personnel to overcome unsatisfactory remuneration or working conditions).

Sources: Adapted from Diallo et al. (*2*) and Pond and Kinfu (*5*).

variable of interest. An overall strategy of cross-examination or triangulation across different data sources and using different methodologies can be used to monitor consistency and validity of results, optimize the information and evidence retrieved, and ultimately provide better-quality measurements of health workforce characteristics (see also Chapter 11). Given the diversity of information sources, it is especially important that data dissemination includes the metadata – or details on the definition, construction and coverage of each data point (literally: data about data) – in order to help understand the background of the information and judge its appropriateness for the decision at hand (*8*).

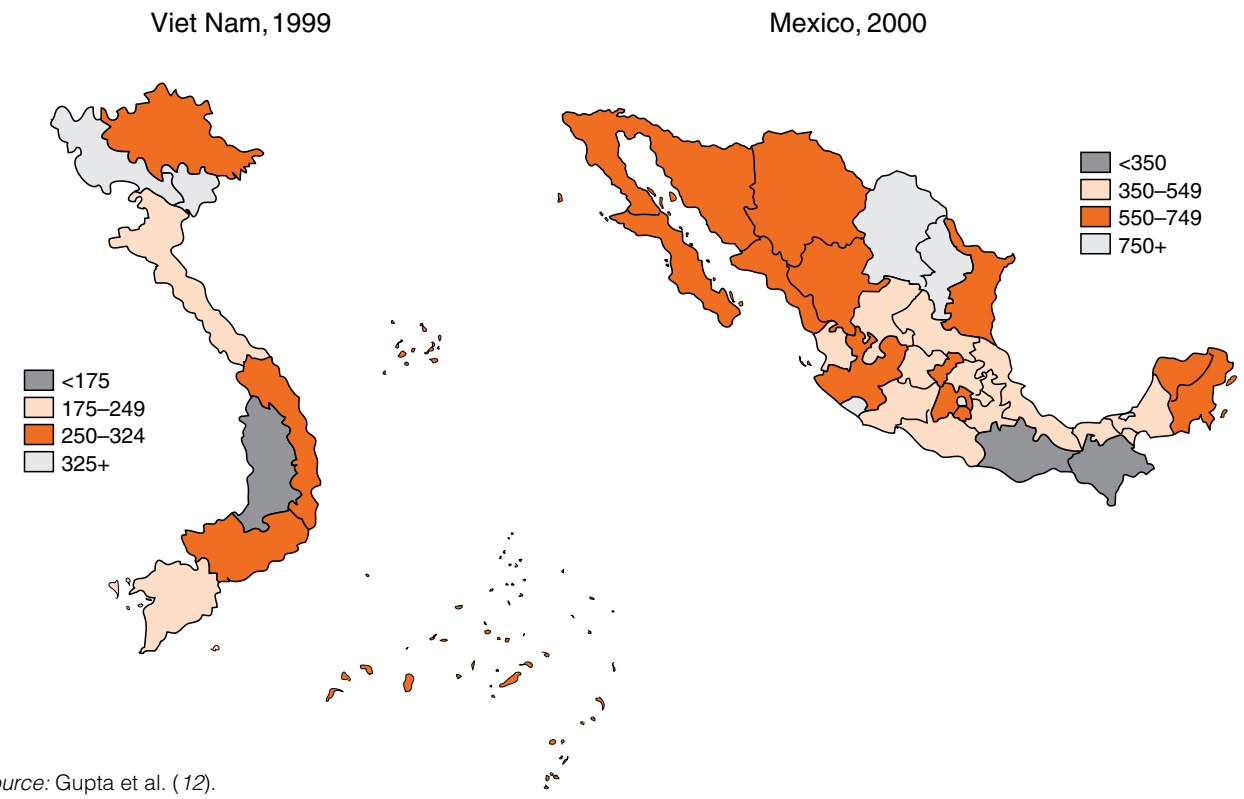
3.4 Illustrative analysis

How a health or health system challenge is perceived affects how related data are organized and presented to support decision-making. Even the most robust research findings may fail to reach policy- and decision-makers unless they are presented in a way that they can understand and use. A critical aspect of HRH assessment is the identification and critical review of data from the most appropriate source(s), and synthesis and presentation based on the construction of a few relevant indicators. The final presentation of data will vary depending on the users' needs in terms of the level of detail and technical specificity required. It has been suggested that graphs and maps can display information in a form more easily understood among non-specialist audiences (*9, 10*).

For instance, if imbalance in the geographical distribution of health personnel is considered a constraint to health systems strengthening – as it is in almost all countries (*11*) – the information should show the nuances of that distribution, for example by highlighting regions of the country with higher versus lower densities of health workers. In addition to being a nationally representative data source, population censuses offer an advantage in terms of sample sizes that allow for disaggregation at the subnational level. Census-based data on occupation can be used to map maldistribution in the health workforce, as exemplified in Figure 3.2 for two countries. Such data can also be used to calculate a range of summary measures of workforce imbalance, such as the Gini coefficient or other indices of relative inequality (*12, 13*).

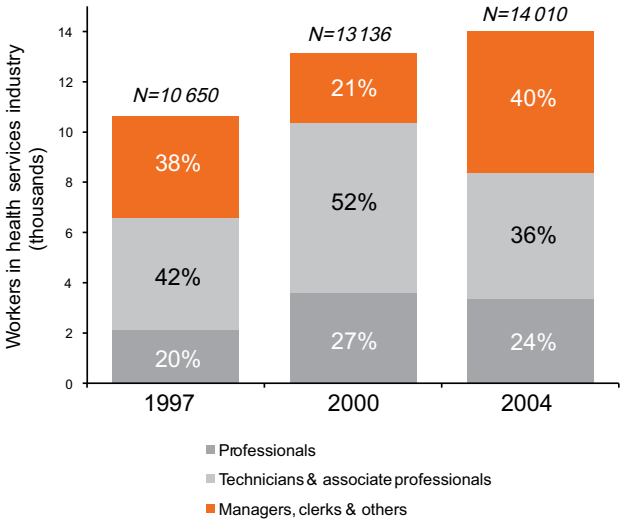
Given the relatively long periodicity of censuses (usually once every 10 years), an examination of labour force dynamics for shorter term HRH planning and policy monitoring might be better addressed by drawing

Figure 3.2 Geographical distribution of the stock of health workers (per 100 000 inhabitants), Viet Nam and Mexico censuses



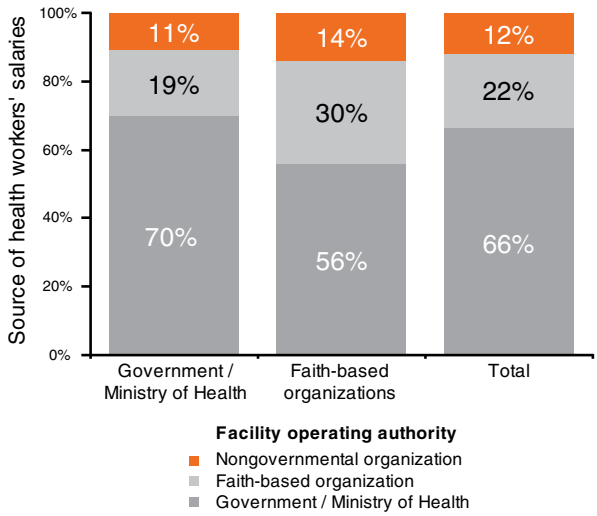
Source: Gupta et al. (*12*).

Figure 3.3 Trends in the distribution of workers in health services by main occupational group, Namibia labour force surveys, 1997–2004



Source: Institute for Public Policy Research (*14*).

Figure 3.4 Distribution of health workers' salaries by source, according to facility ownership, Rwanda health facility assessment, 2006



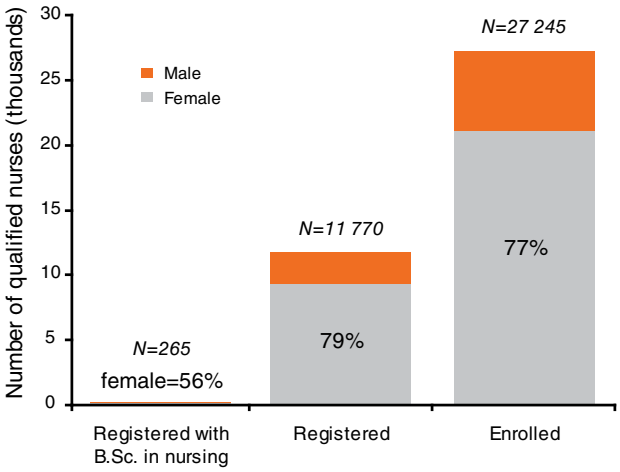
Source: Herbst and Gijsbrechts (*16*).

on survey data. Figure 3.3 presents time trends in the mix of workers in health services by broad occupational group in Namibia, drawing on results from repeated labour force surveys (*14*). Labour force and employment surveys offer the advantage of being able to grid health management and support workers, a group often overlooked in HRH analyses but critical to the functioning of health systems. On the other hand, disaggregation for specific subgroups might be constrained due to sample size limitations, especially in many low-income countries facing the most serious health worker shortages. Based on statistics from the *Global atlas of the health workforce* (*15*), even a larger-scale survey (for example sample size in the vicinity of 0.6% of the total population) would identify only a small number of health professionals in most of the 50 countries with the lowest density of medical personnel: fewer than 20 physicians in three quarters of these countries, and fewer than 20 nurses in half of them.

Where the existing data remain inadequate (notably from sources outside the health sector), a well-designed and carried-out health facility assessment may obtain more detailed data for an HRH situation analysis. Assessments that collect information at both the level of the facility and of the worker offer a unique opportunity for measuring certain labour market indicators. In the example given (Figure 3.4), a health facility assessment in Rwanda collected data on facility ownership and employee salary source, allowing cross-reference of the proportion of staff working in facilities classified in a given sector but on the payroll of another. Such a distinction is often not made but is crucial for accurate statements on health labour metrics, for example, workers in public sector facilities are often (imprecisely) all counted as public sector employees (*16*).

Lastly, Figure 3.5 presents a synthesis of findings on nurse demographics and workforce capacity capitalizing on the development of an electronic nursing workforce database in Kenya. The database contains some 40 000 administrative records covering a 45-year span from the national nursing regulatory body (*17*). The analyses gleaned from the data indicate the dominance of enrolled nurses compared to their registered counterparts with more specialized training, as well as the feminization of the profession – except at the most highly skilled level, that is, among those with a Bachelor of Science degree in nursing. At the same time, the quality of information derived from this source must be called into question; while nursing licensure and renewal are mandatory in Kenya for both the public and private sectors, the database does not track exits by death, out-migration or retirement. The need to improve completeness and timeliness of available data, notably for monitoring stock and flows of health workers, is present in virtually all HRH information systems, and may be even more urgent in most low- and middle-income countries, given the status of their workforce situation.

Figure 3.5 Gender and skills mix of the nursing workforce in Kenya, Nursing Council of Kenya database, 1960–2005



Source: Riley et al. (*17*).

3.5 Putting it all together: governance and use of HRH information sources

Increasing attention is being paid at the national and international levels to the need for new and improved information for planning and monitoring HRH development as a core parameter of health systems strengthening. However, in many countries, information on the health workforce is fragmented, inadequate and not timely. Statistics generated by various sources receive limited public dissemination and are generally underused. Moreover, even in countries where good and reliable data are available, the information is not always used for decision-making.

Often, limited human, technical and financial resources contribute to the current poor status of information and evidence on the health workforce situation. In most low- and middle-income countries, information and communications technologies (for example computer hardware and software applications for the manipulation and communication of information) needed for implementing a comprehensive HRH information system are sorely lacking. At the same time, strengthening HRH information systems means attention to each of its components – not just the infrastructure and technology, but also the persons needed to capture and use the data. Dedicated health information staff are needed at the national and subnational levels (and even at larger facilities) for data collection, processing, reporting and analysis. Training may be required among those providing information to decision-makers to strengthen analytical and presentation skills. Training among policy-makers and their aides could also help them to better identify and use high-quality research.

Support for a centralized national HRH database (for example at the ministry of health) is among the potentially effective means to enhance national monitoring and evaluation performance (*18*). The coordinating mechanism for this unit will ideally function in the following capacities: ongoing assessment of data availability and quality; data management, analysis and synthesis; generation of national indicators estimates; information and research dissemination; advocacy and communication of HRH monitoring and evaluation efforts; coordination, supportive supervision and capacity building among state or provincial and district monitoring and evaluation offices; and coordination with international partners and other stakeholders. The unit may be involved in developing and costing the national HRH monitoring and evaluation strategy, and drafting terms of reference for technical consultancy input. At the decentralized level, activities of regional and district monitoring and evaluation officers may include maintaining an updated registry of all health facilities and health service providers; collecting routine data on health workers from various health and non-health sources; conducting basic data analysis; and reporting data and facilitating its use for decision-making.

While there is no single best model of what a health workforce information and monitoring system should look like, much depends on the main reasons for building such a system. An important consideration is planning and monitoring of the monitoring system itself (*19*). This includes delineating, as part of the process of setting up and using the system, not only its contents but also its ownership and accessibility, as well as the mechanisms for maintaining data security and regular updating. A key challenge is ensuring the information needs of all stakeholders are being met, from the international to district level, while also being realistic about ability to operationalize the system. The set of indicators proposed earlier in Table 3.1 is neither exhaustive nor absolute. Rather, it is an attempt to build a framework for HRH monitoring and evaluation focusing on globally identified areas of concern for workforce development. Collection and sharing of data on such standardized indicators can be helpful for cross-national analyses, allowing ministries of health to benchmark against regional and global performance and compare, for example, what service levels and health outcomes other countries are able to achieve with similar human

resources. It will be imperative to review this selection at the national and subnational levels, particularly with regard to feasibility and cost of measurement, and in the process of establishing appropriate country-specific baselines and targets.

A number of critical requirements are identified for developing and sustaining a comprehensive health workforce information system, including:

- the political decision to place monitoring of the HRH situation high on the national agenda;
- the establishment of a set of explicit benchmarks and targets within the national HRH strategic plan, each linked with appropriate indicators and an identified minimum dataset for their measurement;
- preparing an enabling work environment for health workforce information system strengthening;
- recruitment and training of a sufficient number of staff for developing, implementing and managing the information system;
- involving all key stakeholders in the process from the initial planning stages.

Some possible indicators for monitoring implementation of the HRH information and monitoring system, along with potential means of verification, are presented in Table 3.3 (*10, 20–22*). These indicators may not require a specific numeric answer, but they are at the centre of monitoring usefulness of the information system for supporting evidence-based HRH policy-making, budget decisions, management and accountability, and doing so in ways that are open and transparent and optimize stakeholder participation. Systematic use of the information system for decision-making, with most national and international stakeholders accepting its contents as reliable and valid, would be the ultimate measure to evaluate its performance.

3.6 Summary and conclusions

There is growing concern around the world about the current and future availability of health workers for maintaining effective health systems (*23*). The lack of reliable, up-to-date information on numerous aspects of the HRH situation – including skills mix, sources and levels of remuneration, workforce feminization, and even basic stock – greatly restricts the ability to develop evidence-based strategies at the national and international levels to address the health workforce crisis.

Data and evidence are necessary to inform discussion, prioritization and decision-making among countries and other stakeholders. Even in many low-income countries, a variety of potential information sources exist but remain underutilized in health research. The starting point for any investigative exercise of the HRH situation should be a rigorous review of existing standard statistical sources, including those from outside the health sector: population statistics generated by census bureaus and central statistical offices; work permits from labour departments; income files from tax departments; and others seldom used by health system planners and managers. Decision-making should draw on a meta-analysis, or investigation of the results across several information sources. Ideally, all HRH data sources should be integrated into one comprehensive information system, whereby routine administrative records are complemented with regularly conducted population-based and facility-based surveys and censuses.

The optimization of use of such sources, however, can be hindered by the dichotomy that often exists between the providers of the data and potential users. In particular, while variables on occupation and place of work are typically integral to population census and labour force survey questionnaires, often the final results are not disseminated using a categorization permitting the identification of those with a health-related occupation or working in the health services industry. Even when they are, the results are often not comparable across countries or over time, due to differences in the occupation, education and industrial classifications used.

As such, monitoring and evaluation of HRH requires good collaboration between the ministry of health and other sectors that can be reliable sources of information, notably the central statistical office, ministry of education, ministry of labour, professional licensing or certification bodies, and individual health-care facilities and health training institutions. Ideally a commitment should be established in advance to investigate purposeful ways to put the data to use. Discussions between representatives of the ministry of health, central statistical office and other stakeholders, such as professional associations and development partners, are recommended from the beginning to set an agenda for data harmonization, publication and use, taking into account the timeline for data collection and processing and the information needs for HRH policy and planning.

Table 3.3 Selected indicators and means of verification for monitoring implementation and use of the national HRH information and monitoring system to support decision-making

Indicator	Description	Timeline	Potential means of verification
Indicators of sound governance of the HRH information system			
Existence of an operational national strategy with explicit objectives, indicators and targets to address HRH planning and management	National HRH strategy developed, including a set of SMART[a] indicators and targets, and with costed (budgeted) prioritized workplan for implementation and monitoring at the national and subnational levels	From the initial planning stages of the national HRH strategy	National HRH strategy, key informants (e.g. ministry of health, ministry of planning)
Existence of an advisory body to monitor implementation of the HRH information and monitoring system in accordance with the national strategy	Regular meetings and consultations among national and international stakeholders in health, development and information management to steer and monitor implementation of the HRH information and monitoring system	From the initial planning stages of the national HRH strategy	National HRH strategy progress reports, reports/ minutes of advisory body meetings, key informants (e.g. ministries, agencies, institutions, associations, NGOs, private initiatives)
Existence of a functional national coordinating mechanism for the HRH information and monitoring system	Existence of a national coordinating mechanism with a dedicated unit with sufficient resources (human, financial and technical) to develop, implement and monitor the information system	From the initial planning stages of the HRH information and monitoring system	National HRH strategy progress reports, minutes of the coordinating mechanism meetings, key informants
HRH information system in place and used for HRH decision-making at all levels	Contents of the HRH information system used to inform decision-making among health authorities at the national and subnational levels on a regular basis (e.g. annual planning and management review)	Throughout implementation of the HRH information and monitoring system	National HRH strategy progress reports, key informants
Indicators of a strengthened HRH information system			
Timeliness of the HRH information and monitoring system	National HRH information and monitoring system populated with data at the subnational and national levels on a regular basis (e.g. quarterly/annually)	Throughout implementation of the HRH information and monitoring system	Dissemination reports, key informants (e.g. ministry of health, district health managers, professional bodies/associations, private providers)
Validation of the HRH information and monitoring system	Comprehensive review of all available HRH data sources conducted and used to update and calibrate the national HRH information and monitoring system on a regular basis (e.g. biennially/ quinquennially)	Throughout implementation	Dissemination reports, key informants (e.g. ministry of health, ministry of labour, ministry of education, central statistical office)
Consistency of the HRH information and monitoring system	All indicators and data within the HRH information and monitoring system use a common set of definitions and classifications allowing for consistent comparisons over time, across sources and at the international level	Throughout implementation	Dissemination reports, international standard classifications (ISCO, ISCED, etc.)
Disaggregation of data in the HRH information and monitoring system	All relevant indicators and data within the HRH information and monitoring system can be disaggregated by cadre, gender, geographical area, sector or other characteristics	Throughout implementation	Dissemination reports

a. SMART = specific, measurable, attainable, relevant, timebound.

Sources: Adapted from Health Metrics Network (*10*), World Health Organization (*20*), Capacity Project (*21*) and Islam (*22*).

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4 Framework and measurement issues for monitoring entry into the health workforce

KATE TULENKO, GILLES DUSSAULT, HUGO MERCER

4.1 Introduction

One of the main causes of shortages and maldistribution of health workers in a country is the lack of entry into the labour market of adequate numbers of persons with appropriate education and training. Yet in most countries few data on health worker entry are available for use by the education system or the ministry of health, impeding the ability of the health system to respond to labour market forces or develop effective health workforce strategies. Measuring entry and tracking subsequent service are essential to the planning, management and quality control of the health workforce in a country (*1*). Gathering timely, accurate and comprehensive data on health worker entry is crucial to planning the delivery of health services and effecting health policy reform. Beyond the simple but commonly reported indicator of numbers of health education graduates (see also Chapter 3 in this Handbook), it is important that the factors surrounding entry in a country are well understood. The availability of baseline and ongoing data enables decision-makers to monitor the progress of interventions and to make periodical corrections. This is critical as adjustments can often take years to implement, with effects potentially lasting even decades, and can involve the reallocation or addition of significant amounts of funding. Also, since human resources for health (HRH) planning involves sectors beyond the ministry of health – including the ministries of education, labour and finance, civil service and professional regulatory bodies, and the private sector – strengthened information and monitoring systems are necessary for following trends in the education, employment and regulation of health labour; assisting the decisions of managers and policy-makers; and creating a sound evidence base for the policy dialogue with professional associations and development partners.

This chapter explores ways in which entry into the health workforce can be monitored and assessed, and how the appropriate data can lead to formulation and evaluation of policies and programmes to correct shortages and maldistribution of health workers. A set of core indicators are identified, and existing and new sources of data for their measurement are examined. The objective is to assist researchers, managers, policy-makers and others to identify, obtain and use data critical to sound health workforce analysis and planning, through a consideration of the questions: What needs to be measured, and how?

For the purpose of the chapter, "entry" means inclusion into the pool of workers available for employment in the health sector in a country. Entry does not necessarily imply employment, only eligibility and desire for employment. Consideration is given to all health service providers who require vocational education and training in a health-related field for recruitment in a job, including clinical cadres, public health workers, community health workers and laboratory health workers. Those not considered include self-declared traditional healers, drug sellers and others without formal training, working in the informal health sector or working illegally; those working in a non-health sector; and qualified health service providers who had previously not been working but who are now re-entering the health labour market. Some of these issues will be covered in Chapter 5.

It is important to keep in mind that decisions made regarding health worker entry affect more than just the aggregate number of workers. The geographical maldistribution of health workers (usually favouring urban areas over rural areas and wealthy communities over poor communities) can be attributed in part to pre-service education and training factors. These include insufficient recruitment of students with attributes that would lend them to serve underserved communities; the training of cadres whose skills are not matched to the needs of underserved communities; lack of student exposure, during training, to underserved clinical settings or populations; and failure to instil students with a sense of professional obligation to underserved populations and to counterbalance students' perceptions that there is less prestige and lower income prospects associated with working with such populations (*2–5*).

The location of training institutions also appears to be related to the choice of a location of practice by graduates (*6–8*). In addition, entry decisions can affect the overall health wage bill: for example, training more primary and community-based health workers than specialist practitioners can result in a lower wage cost per unit of health service provided.

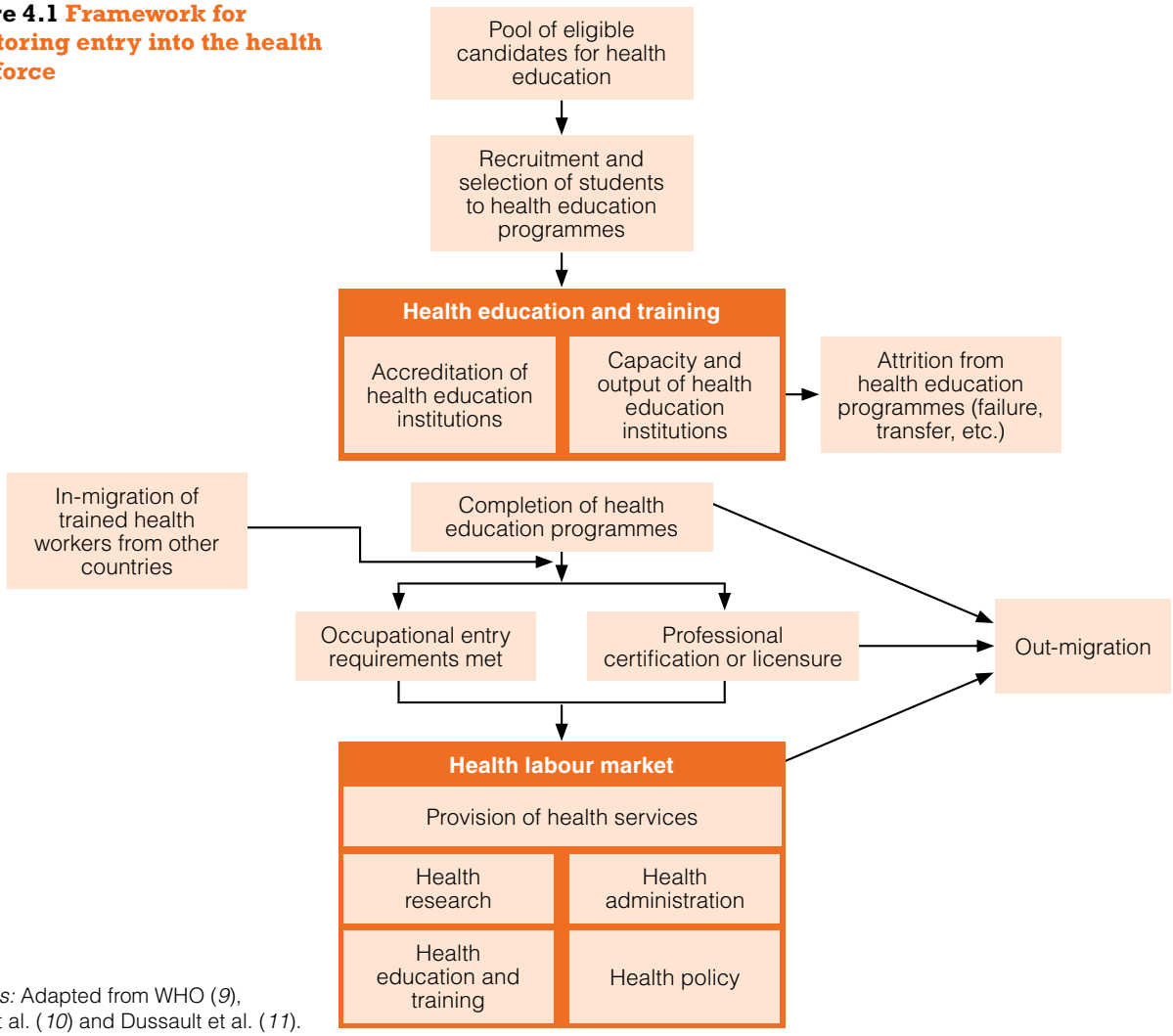
Following this introduction, the chapter is organized into three parts: framework for monitoring entry into the workforce; measurement issues; and summary and conclusions.

4.2 Framework for monitoring entry

This section proposes a conceptual framework that divides the entry process into seven distinct but interrelated components. Each component is explored and the policy implications discussed. The framework is an expansion of the HRH education and in-migration paths within the working lifespan framework developed by the World Health Organization (*9*) and introduced in Chapter 1 of this Handbook (see section 1.4). The production and availability of health workers can be viewed as a pipeline tracking the processes related to health worker training and the development of the institutions that train them, with the outputs of each component feeding into the next (Figure 4.1) (*9–11*). How each of the components in the pipeline can be measured, monitored and evaluated will be examined.

The seven components are: (i) pool of eligible candidates for health education; (ii) recruitment and selection of students to health education programmes; (iii) accreditation of health education institutions; (iv) capacity and output of health education institutions; (v) in-migration of trained health workers from other countries; (vi) certification and licensing of health service providers (nationally or internationally trained); and (vii) recruitment into the health labour market. In the context of this chapter, health worker education refers to pre-service vocational education and training in the field of health, as opposed to in-service training for upgrading skills among workers already employed in the health-care industry. An illustrative example of monitoring in-service training will be presented in Chapter 7.

Figure 4.1 Framework for monitoring entry into the health workforce



Sources: Adapted from WHO (*9*), Allen et al. (*10*) and Dussault et al. (*11*).

4.2.1 Pool of eligible candidates for health education

Within each country, the size of the pool of eligible people from which health training institutions recruit their students depends primarily on the admission criteria for each training programme and the strength of the primary and secondary school system. For tertiary-level programmes producing the most highly skilled health service providers, this pool traditionally consisted of students having graduated at the upper secondary level – equivalent to level 3 of the International Standard Classification of Education (*12*) – and with strong science backgrounds.

With the increasing emphasis on the need for locally recruited cadres for providing basic preventive and curative care and referral services, especially among underserved communities, some countries have recognized that their requirements for eligibility for admittance into certain types of health training programmes were unnecessarily stringent, and have made the criteria more suitable to the responsibilities of the cadres. The pool of eligibles has been widened to include those without upper secondary diplomas or strong science backgrounds. For example, to increase retention of nurses in rural areas of Pakistan, the Aga Khan School of Nursing developed a programme that recruited young women who had graduated from rural secondary schools but essentially, due to the weakness of their underresourced schools, at only the lower secondary level. The remedial programme quickly brought their knowledge level up to meet the qualifications to enter nursing school, and they then joined the regular nursing programme along with their counterparts who graduated from urban secondary schools (*13*).

The pool of eligibles is one of the most underappreciated policy issues within HRH and, as a result, few ministries of health have accurate data or effective policy on eligibles. With appropriate data and analysis, policies on the entry requirements for students can be made or changed so that they are more aligned to the country context; outreach programmes can be started to interest high-school students or others to become health workers; and training programmes can be set up within high schools. Or the analysis may reveal that more sweeping changes are needed in the primary and secondary curriculum to properly prepare students for health careers.

4.2.2 Recruitment and selection of students to health education programmes

In most low- and middle-income countries, especially those that rely exclusively on public training institutions, recruitment of students remains a passive process. Educational institutions may post the opening of the acceptance of applications on their public notice board, but there is generally little outreach to the pool of eligibles. From a policy point of view, the need for active recruitment to correct gender, economic, ethnic, urban/rural and regional imbalances should be examined. Also to be considered is the provision of assistance to potential students in their choice of institution and in filling out the application forms, which may be especially daunting to those from disadvantaged socioeconomic groups or underserved communities who may be the first in their family to apply for higher education.

Recruiting students based on their motivations for pursuing a health career can help improve worker retention. Evidence from an observational study of Ethiopian nurses and physicians revealed that students with higher reported rates of altruism (measured as willingness to help the poor) were willing to work in rural areas for a lower rural bonus, and were more likely to still be practising in a rural area when followed up two years later (*4*). A study on the migration of health workers from Ghana to the United Kingdom and the United States of America found that many nurses and physicians had entered the health field with the intention to migrate, and that a health career was often seen as a "ticket" out of Ghana (*14*).

4.2.3 Accreditation of health education institutions

All health professions education institutions, public or private, should be accredited to assure the match of health workers and their skills with the country's health-care needs, and to ensure the quality of education provided. The accreditation process should be driven by the national health policy and be conducted in a manner that makes it socially responsible, while maintaining the independence of the accreditation agency (*15, 16*). The mechanism consists of an initial formal recognition of training institutions by a representative body (usually at the national or sometimes subregional level) that certain predetermined educational requirements have been met – covering such aspects as instructors' qualifications, curriculum and clinical rotations – followed by periodic assessments to ensure maintenance of standards. Elements of proper accreditation and quality assurance processes of health education institutions include authoritative mandate and decision of the accreditation agency; social accountability; independence from government and providers; transparency; predefined general and specific criteria for education standards; procedures using a combination of institutional self-evaluation and site visits by external reviewers; and publication of reports and decisions (*17*).

Potential uses of accreditation data to support decision-making include identifying practices from high-performing training institutions that can be replicated at other institutions, and identifying poorly performing institutions in need of increased attention. A large number of institutions failing to meet accreditation or reaccreditation standards could indicate that institutional management may need to be improved, that the standards are unrealistically high or that education institutions are underresourced.

Several barriers exist to the effective use of accreditation data. In Ghana it has been found that health science training institutions did not receive copies of their accreditation report, nor were the reports publicly available (*18*). Another barrier to data use is that many countries do not have an accreditation body, or the one that exists is underresourced. There is a need to promote national and regional policies to enhance the accreditation of health professions education institutions as a way to ensure the quality of health services delivery.

4.2.4 Capacity and output of health education institutions

Capacity in pre-service training includes physical infrastructure (for example classrooms, laboratories, libraries, clinics for internships, campus residencies), human resources (quantity and quality of instructors and auxiliary staff), financial resources, organizational and operational capacity (managerial structure and processes) and other non-infrastructure physical inputs (pedagogical tools, reference books and journals, computer equipment) (*11*). Health worker training institutions, accredited or not, can vary greatly by capacity, and in many cases the training institution may not be aware of its own capacity or potential capacity.

The various components of capacity determine the overall output capacity: the number, type and quality of cadres that graduate from the institution. Combining data on output with that on financing can be used to calculate how much it costs to train each type of health worker, and to estimate how much it would cost to train additional workers based on current capacity.

For policy purposes, it is critical to monitor each of the components of capacity and output. By drawing on assessments of oversupply or undersupply of various cadres of the active health workforce, institutional capacity for producing new health workers can be decreased or increased, or training programmes for new cadres can be developed. This information can be used to identify the specific bottlenecks in capacity so that if rapid increases in production are required, capacity can be increased as rapidly as possible.

4.2.5 In-migration of trained health workers from other countries

Countries with better wages, working conditions and quality of life tend to attract health workers from other countries. In order to legally exercise their occupation in the destination country, in-migrants must receive working visas and, for certain skilled health service providers, be licensed or certified by the appropriate regulatory body.

Policy options on migration for destination or receiving countries include adjusting the number of visas earmarked for health workers, the degree to which their visa applications are facilitated and expedited, and how actively the government allows the public or private sector to recruit internationally (*19*). Policies and practices can be active, for example when the government posts advertisements in other countries, sends recruiters or negotiates bilateral arrangements with other countries; or passive, that is, simply considering health workers like all others who apply for visas on their own accord.

For sending countries, options can include increased funding for the production of health workers to meet demand abroad, and policies of return (*20*). Of note is the Philippines' policy on assistance to international migration for its nurses to many receiving countries. As part of its managed migration strategy, the Philippines negotiates the number of workers the destination countries will receive and the terms of their service (the agreements signed with the United Kingdom in 2003 and with Japan in 2006 are examples). This may be considered a mutually advantageous process for both countries, as it allows both the Philippines and the receiving country to conduct long-range nurse workforce planning and minimize sudden shocks (*21*). On the other hand, unexpected (and undesirable) side-effects of this strategy may include encouraging nursing teachers and trainers to leave, encouraging physicians and other health professionals to retrain as nurses to improve their chances to emigrate (*22*) and weakening of the health system, particularly in rural areas.

Increasing attention is being focused on the incorporation of ethical codes of practice into national practice (*20*). Policy options being explored by a country should recognize the right of individual workers to migrate, and denounce unethical recruitment practices that exploit health workers or mislead them into accepting job responsibilities and working conditions that are incompatible with their qualifications, skills and experience (*23, 24*). Among receiving countries, they should also acknowledge that the flow of international migration of skilled health professionals is generally from poorer to wealthier countries, who gain a valuable resource without paying the education and training expenses.

4.2.6 Certification and licensing of health service providers

Certification and licensing are used by countries to control the quality of health-care workers practising in their country and to control the size of the health labour market. Certification and licensing purposefully weed out unqualified workers because those whose knowledge and skills do not match the minimal requirements for their cadre can do more harm than good to the health of their patients and can erode the confidence that the public has in the health system, especially of government-provided services. The location of certification and licensing can vary for different cadres and countries and this affects how the data can be gathered. For certain cadres, quality at the level of the individual worker is controlled by graduating from an accredited training institution, while for other cadres, the requirement is passing a national professional qualification exam. Also affecting potential monitoring and evaluation efforts is the fact that certification to practise a profession usually does not need to be renewed, while a licence usually needs to be periodically renewed based on certain criteria such as passing a renewal exam, demonstrating continuing learning, being employed in the field or simply paying a fee (*25*).

Monitoring trends in professional certification and licensing numbers and success rates can help identify a variety of problems in the entry process. For example, an increase in the licensing exam failure rate may indicate insufficiencies in training curricula or exams that are outdated in relation to changes and innovations in clinical practice. Another policy issue that may need to be addressed is whether conflicting quality control criteria exist between the government, individual training institutions and professional regulatory bodies. There are cases where graduates succeed in the institutional proficiency tests, but fail the professional association certification exam, indicating a mismatch in the level of proficiency expected at the institutional versus the association level. This points to the need to set and use common standards within a country, and align training curricula with professional knowledge and skill requirements.

With the expected global increase in the production of front-line cadres that are usually certified rather than licensed, such as community health workers and auxiliary nurses, it is crucial that the certification process is better monitored. This increase will occur because many countries with extreme shortages or maldistribution of highly skilled health service providers, especially medical and nursing professionals, are considering or opting for rapid production of large cadres of lower-skilled workers to meet the immediate needs for basic health services among underserved, mainly rural communities. Since these workers will often be the first point of contact with the formal health-care system, and therefore will represent the system at the community level, guaranteeing the quality of the workers through proper certification is of extreme importance.

For in-migrants, typical requirements for professional certification or licensing in the receiving country vary greatly. Most countries require graduation from a training institution recognized by the receiving country (for example, based on recognition of meeting the quality assurance standards of the World Federation of Medical Education) and professional certification or licensing in the country of education. Most countries have credentialing staff in medical boards or the ministry of health who document the certification or licensing of the workers and their work history. Some countries have streamlined this process and designed reciprocal recognition procedures with other countries.

A special issue with regard to immigrant health workers is that of language and cultural competency. Some countries may require passing a proficiency exam for the language most used in professional communication at the national level. However, there tend to be few or no requirements for knowledge of local languages and culture, which may not favour retention of immigrant health workers in rural areas. A provider's lack of common language with patients may also affect cultural acceptability of the health system, and negatively impact care-seeking behaviours and treatment compliance (*26*).

In any case, professional certification and licensure can document the quality of health workers at entry, but does not necessarily reflect the quality of care they provide. Quality of service provision is affected by many factors, such as workload, motivation, supervision, available resources (for example equipment, supplies, support staff) and lifelong learning.

4.2.7 Recruitment into the health labour market

Monitoring the recruitment of newly trained health workers into the national health labour market is critical in order to reduce inefficiencies in the hiring system, identify potential gaps between supply and demand for health workers, and monitor achievements in health workforce planning. Policies and strategies for deployment of health workers vary according to the context and dynamics of countries' health, education and labour markets. Countries with only government-operated education institutions and few health-related private sector jobs have simple health labour markets; active recruitment of workers to health-care service is not needed since all graduates are directly employed

by the government, or do not work if posts are not available. But countries with private training institutions or a significant formal private health sector have more complex health labour markets, requiring active recruitment to fill job vacancies.

Policy issues include making sure the application and posting process is as transparent and timely as possible. Health workers should be able to apply to specific posts and the criteria for selection should be clear. Governments can improve the efficiency of the health labour market by establishing free, easily accessed job boards on which all job seekers and employers can post. In some contexts, offering incentives (monetary and non-monetary) may be needed to encourage workers to apply for posts in underserved areas. Establishing early links between potential employers and educational institutions is also an option that enlarges the students' knowledge on their future labour trajectory.

If a country imports or exports health workers, relevant questions include: What are the recruitment rules that need to be followed? How many health workers in-migrate or out-migrate each year? Is reimbursement needed from the receiving to the sending country to compensate the latter for health workers trained with public funds? How should this recruitment be conducted? For example, in some African countries, recruiters for foreign health systems have been allowed to set up tables at nursing graduation ceremonies and directly recruit the new nurses (*27*).

4.3 Measurement issues

Each section of the health workforce entry framework can be monitoring by means of its own set of indicators for measurement. Table 4.1 (page 44) presents a series of indicators on entry and their potential means of verification. This list is by no means exhaustive, and additional indicators may be required. The issue of a minimal set of essential indicators is a complex one, and there may be conflicting priorities between what data are needed at the national level and the international level. Every country and region has a unique HRH situation, and will need to collect and analyse the necessary information most suited to its health system needs, objectives and targets (Box 4.1) (*28*). Throughout this discussion, it is important to keep in mind the need, where possible, to routinely compile, analyse and act on data collected through existing national administrative processes (Box 4.2) (*12, 29*). This routine data collection can then be supplemented and validated through periodic or ad hoc surveys and other standard statistical sources (for example population census or labour force survey).

Within the framework, capacity and output of training institutions is the field with the largest number of proposed indicators. This is also probably where lies the greatest potential for changes in the shorter term in response to policy or programmatic interventions. One entry indicator that each country should routinely measure, analyse and disseminate is the annual output (or number of graduates) of health vocational training institutions (see Box 4.3 for an illustrative example) (*11*). This is the aggregate of multiple pieces of information

Box 4.1 Illustrative example of the establishment of health worker education and training goals and targets: region of the Americas, 2007–2015

An HRH strategic plan for the Americas proposed a set of goals, targets and indicators for the countries in the region in several areas of education and training. Under the goal "adapt the education of the health workers to a universal and equitable model of providing quality care to meet the health needs of the entire population", specific benchmarks for 2015 included:

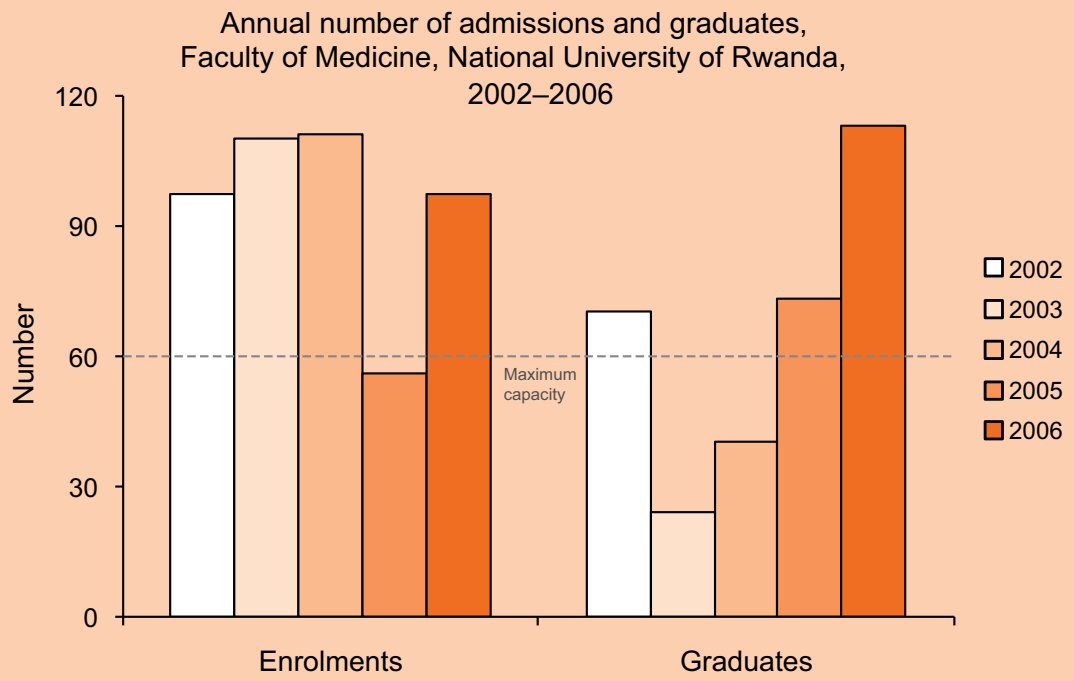
- 80% of schools of clinical health sciences will have reoriented their education towards primary health care and community health needs and adopted interprofessional training strategies;
- 80% of schools of clinical health sciences will have adopted specific programmes to recruit and train students from underserved populations with, when appropriate, a special emphasis on indigenous, or First Nations, communities;
- attrition rates in schools of nursing and medicine will not exceed 20%;
- 70% of schools of clinical health sciences and public health will be accredited by a recognized accreditation body.

Source: Pan American Health Organization (*28*).

Box 4.2 Some notes on data collection, processing and use

- Among the recommended requirements for strengthening the collection, processing, analysis and use of data on HRH production is the replacement of paper-based administrative records and registers with electronic data processing systems. This includes securing the necessary human, financial and technical resources for developing and strengthening the information system, which would capture data at different levels (including basic education, institution-based training and community-based training) for ongoing monitoring of progress. However, in certain local conditions, such as unreliable electricity supply, dust problems or poor access to computer repair services, a robust paper system may be preferable to an unreliable computerized system.
- Comparability of HRH education statistics within and across countries and over time can be enhanced through the setting and use of common definitions and classifications. This includes the collection, processing and dissemination of data following or mapped to the International Standard Classification of Education (*12*) (or national equivalent).
- Special permission may be needed to access certain types of data for research and policy purposes, such as student professional qualification exam or institution accreditation scores. Individual-level records should be accessible only to those who need to work directly with them, and all identifiers (such as name and unique identification number) must be removed from the dataset prior to distribution and use for analysis. In some cases, the level of precision of certain variables that may not be common to several individuals (for example age, district of residence or clinical specialization) may need to be changed to reduce the risk of indirect personal identification. Various techniques can be used for anonymizing microdata from administrative and survey sources, such as those developed by the International Household Survey Network (*29*).

Box 4.3 Illustrative example of data on trends in medical education institutional capacity, recruitment and output: Rwanda, 2002–2006



Source: Dussault et al. (*11*).

Table 4.1 Key indicators and means of verification for measuring entry into the health workforce

Indicators	Potential data sources	Complementary dimensions
Pool of eligible candidates for health education		
• Number of students graduating from primary school, e.g. expressed as % of all children of primary schooling age • Number of students graduating from secondary school, e.g. expressed as % of all children of secondary schooling age • Number and % of students graduating from secondary schools with science concentrations (or other entry requirements for health vocational training)	Ideally assessed through routine administrative records submitted by individual primary and secondary schools (ministry of education). Can also be assessed by interviews with key informants (e.g. district school managers). Information on the total number of children belonging to the age group that officially corresponds to primary and secondary schooling should be periodically validated against data from a population census or other nationally representative source (central statistical office).	Data on eligible students ideally disaggregated by age, sex, urban/rural or other characteristic that would lend them to serve underserved communities. Additional qualitative information may be required on the quality/relevance of the secondary science curriculum. Further information may also be needed on requirements to enter training for lower-skilled occupations (such as community health workers).
Recruitment and selection of students to health education programmes		
• Number of applicants per training place, per cadre • Number and % of applicants meeting entry requirements per place, per cadre • Number and % of applicants accepted for training programmes, per cadre • Number and % of accepted applicants who register for training, per cadre	Ideally assessed through routine administrative records submitted by individual health training institutions (ministry of health, ministry of education). Can also be assessed through a quantitative survey of training institutions or interviews with key informants (e.g. managers of training programmes).	Data on applicants ideally disaggregated by age, sex, urban/rural or other characteristic that would lend them to serve underserved communities. Additional qualitative information may be useful on recruitment strategies (especially targeting certain population groups), reasons applicants did not qualify for training and reasons accepted applicants did not eventually register for the programme.
Accreditation of health education institutions		
• Existence of an accreditation agency of health education and training institutions • Number and % of health training institutions meeting accreditation and reaccreditation standards	Can be assessed through document reviews (e.g. evaluation reports) or interviews with key informants (ministry of health, ministry of education, national or subregional experts of accreditation processes and education standards).	Data on accreditation results ideally disaggregated by type of institution (public/private) and region. Additional qualitative information may be required on the authority of and resources available to the accreditation agency, and on the main barriers to institutional accreditation (e.g. reasons for failure to obtain accreditation, most commonly missed criteria).

Continues…

Indicators	Potential data sources	Complementary dimensions
Capacity and output of health education institutions		
• Number of education and training places per cadre • Number of places in laboratories or clinical internships, per cadre • Number of students per qualified instructor, per cadre • Number of students per personal computer, per cadre • Number of library books and journals per student, per cadre • Attrition (drop-out) rate per student cohort, per cadre • Attrition (turnover) rate among instructors, per cadre • Number of students graduating each year, per cadre • Government expenditure on health vocational training, per cadre • Private expenditure on health vocational training, per cadre • Total cost per graduate for health vocational training, per cadre	Indicators on training capacity and output ideally assessed through routine administrative records submitted by individual health training institutions (ministry of health, ministry of education). Can also be assessed through a quantitative survey of training institutions. Data on government expenditure ideally available from ministry of finance. Additional data on training costs required to take account of private expenditure (e.g. tuition fees, budget of private institutions, household expenditure survey).	Data on training capacity, attrition rates, output, expenditures and costs disaggregated by type of institution (public/private) and region. Data on graduates should be disaggregated by age, sex, urban/rural or other sociodemographic characteristics. Additional qualitative information may be required on main bottlenecks in training capacity (e.g. recruitment, qualifications and retention of instructors), opinions on accessibility to clinical environments and other resources, career expectations (for both instructors and students), career counselling/mentoring programmes for students, and reasons for student attrition (e.g. failure, transfer to a non-health programme, migration).
In-migration of trained health workers from other countries		
• Number of non-national health workers applying for entry visas, per cadre • Number of entry visas issued to non-national health workers, per cadre	Ideally assessed through routine administrative records (ministry of foreign affairs).	Data on in-migrants ideally disaggregated by age, sex and country of origin. Additional follow-up data could be useful, including eventual posting (urban/rural) and length of stay in the destination country. Qualitative information on special visa programmes for trained health workers and bilateral agreements for managed migration may also be required.
Certification and licensing of health service providers		
• Number and % of new nationally trained health workers granted professional certification/licensure, per cadre • Number and % of new internationally trained health workers granted professional certification/licensure, per cadre	Ideally assessed through routine administrative records (professional regulatory bodies).	Additional qualitative information may be required on main reasons for unsuccessful certification/licensing.
Recruitment into the health labour market		
• Existence of job boards to facilitate recruitment of newly trained health workers • Number of newly graduated health workers who are employed in the health labour market within 3 months of graduation (or other nationally defined time period), per cadre • Number of newly graduated or licensed health workers who are diverted from the national health labour market (e.g. unemployed, migrate, choose not to work, or work in a non-health job), per cadre	Ideally assessed through routine administrative records (ministry of health, ministry of labour, ministry of foreign affairs, professional regulatory bodies, associations of private providers). Information on labour market participation should be periodically validated against data from a national labour force survey.	Data on new entrants to the health labour market ideally disaggregated by age, sex, urban/rural, and place of work (public/private). Additional qualitative information may be required on regulations and practices for internal and external recruitment, such as transparency of government practice, offering incentives to serve in rural areas, and ethical recruitment of foreign workers.

depending on the number of cadres in the health system. The number and type of newly trained health workers is relevant everywhere: in countries that need increased production among all cadres, countries that need increased training for workers tailored to rural and underserved areas, and receiving countries that are aiming towards national self-sufficiency of health worker entry.

At the international and regional levels, it is important to have standardized definitions, indicators and measures that can be compared and aggregated across countries for global health workforce monitoring. The most commonly reported measures related to entry are production of physicians, nurses and midwives (*9*). However, additional information on other categories of health workers should be considered to reflect the vital importance of all human resources in health systems, such as pharmacists, public health workers and community health workers. As discussed in Chapter 2, given the differences across countries in occupational titles, training requirements and responsibilities, data should be processed and disseminated such as to enhance comparability across countries and over time, notably by means of mapping to the International Standard Classification of Education.

Also of particular importance is information on government expenditure and financing for health vocational education and training. These data can be used to estimate the current costs of producing health workers, and are needed for planning purposes to project future costs. Combining information on expenditure with data on student attrition or professional licensing exam pass rates will enable more efficient training systems to be identified, and wasteful programmes to be improved or even eliminated.

Many data already exist within countries on heath worker production but they are often difficult to access and analyse. They tend to be fragmented, not shared and stored in a form that make them difficult to compare with data from other sources. Administrative records may not be computerized and archived, and statistics on the different components of HRH production and entry are not routinely compiled, updated or analysed. Further challenges include the fact that many information systems only contain data for the public sector. As such, the usefulness of the data for policy-makers and researchers will depend on the completeness, reliability and timeliness of the information and monitoring system, which itself is dependent on the level of collaboration between key stakeholders, including the ministry of health, ministry of education, ministry of finance, individual training institutions, professional regulatory bodies and the private sector (for example associations of private providers and non-governmental or faith-based organizations that provide health services). Ideally, the information system would be characterized with the use of unique personal identification numbers, which would allow tracking of individual workers from the time they enter pre-service training and throughout their career; this will be discussed further in Chapter 9.

Entry can be politically sensitive: through admission criteria to health education programmes and processes for credentialing and regulation, political actors negotiate their respective interests. In many low- and middle-income countries, health-care careers, especially among physicians and nurses, are among the most highly respected, remunerated and sought-after. Many stakeholders watch closely entry into the health professions. Failure to understand and address these stakeholders' interests can result in opposition to health workforce reform. In addition, in many countries the pool of eligible candidates for advanced training in health restricts recruitment, and the search for alternative solutions has led to populist (but not necessarily sustainable) pathways for expanding the health workforce, such as engaging volunteers or importing health workers from other countries. Another sensitive issue is the division of tasks among various cadres in the health-care team – for example, those who can prescribe medicines or perform a Caesarean section – or the creation of new cadres, such as paramedical practitioners (sometimes called physician assistants or clinical officers) or community health workers, which typically provokes resistance from established cadres. In some contexts, entry into the health workforce can be also a lever for cultural and social changes, such as an increase in the proportion of women or students from rural or other underserved communities trained for a professional career in this sector.

4.4 Summary and conclusions

As has been discussed in this chapter, timely and accurate data on entry into the health labour market are essential for evidence-informed planning and management of health systems. During implementation of national HRH plans and strategies, policies and interventions must be monitored, managed and adjusted if necessary. The labour or educational market may change quickly as the economy changes, positively or negatively affecting the quality of candidates for health occupations. The population size and structure, immigration patterns and burden of disease may also change, necessitating a change in training curricula or workforce size or skill mix. All these changes have to be taken into account in the policy-making process. Health sector actors must actively monitor the whole situation to be able to respond appropriately, and to be able to gauge the success of interventions.

Seven components of the health worker production pipeline were identified for which data are needed. They were: (i) the pool of eligible candidates for health education; (ii) recruitment and selection of students to health education programmes; (iii) accreditation of health education institutions; (iv) capacity and output of health education institutions; (v) in-migration of trained health workers from other countries; (vi) certification and licensing of health service providers (nationally or internationally trained); and (vii) recruitment into the health labour market. As such, measuring and monitoring the entry function requires comprehensive information on education and training at different levels, including basic education.

Policy-makers have a responsibility to analyse the relevant data and formulate policy on all of the seven entry issues. The process of collecting, analysing and acting on these entry data is not just a one-time exercise, but would be an ongoing activity of the ministry of health (or other agency mandated by the government for that purpose). At certain critical points of HRH planning and monitoring, special surveys or studies may be needed to validate or gather additional entry data that are not feasible to gather on a routine basis. It is important for the ministry of health to partner with other responsible ministries, education and training institutions, and stakeholders to work together to provide the country with the proper numbers of appropriately trained health-care workers.

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5 Monitoring health workforce transitions and exits

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5.1 Introduction

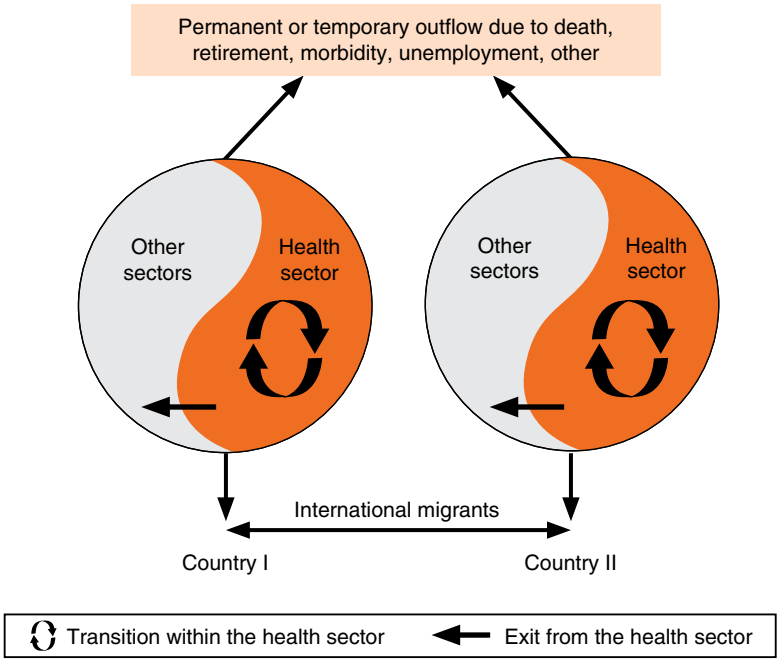
The world health report 2006, published by the World Health Organization (WHO), drew global attention to the human resources for health (HRH) crisis, manifested by shortages and imbalances in the health workforce undermining the performance of health systems and exercising adverse impacts on the ability of many countries to promote and enhance the health of their population (*1*). The HRH crisis has several causes and consequences. In many low- and middle-income countries, in addition to past and current investment shortfalls in pre-service education and training, international migration of skilled health workers and premature exit from the health labour pool due to career change, early retirement, work-limiting morbidity and premature mortality are among the main responsible factors. Yet, in many countries, the dynamics of movements within and exits from the health workforce are poorly understood, limiting the capacity of governments and stakeholders to design and implement effective, equitable and cost-efficient intervention programmes for enhancing workforce retention. This challenge emanates in part from the absence of timely and relevant data and information on inflows and outflows of health workers, but also from the lack of widely accepted standardized indicators associated with the measurement of workforce flows.

The most commonly monitored dimensions of health workforce metrics have traditionally been limited to two indicators: current health workforce stock (the number of workers participating in the health labour market at a given time) and the number of newly trained health service providers (number of graduates of health professions education programmes over a given reference period) (as detailed in Chapters 3 and 4 of this Handbook, respectively). However, adequate understanding of health workforce dynamics requires an analysis not only of new entries and current stock, but also of the flows within and out of the health workforce. In this chapter, a framework is provided for identifying and analysing major health workforce transitions and factors associated with exit from the active workforce; a comprehensive set of indicators that could potentially be measurable from standard statistical sources is proposed; and the underlying data requirements are specified. Illustrative analyses from several contexts are also provided, and the implications of observed patterns for policy and planning are discussed.

5.2 Transitions within and exits from the health workforce: a framework for analysis

Building an adequate workforce supply, capable of addressing the health needs of the population, begins with the education and deployment of skilled health workers. Once having entered the health system, they then experience different forms of transition along the working lifespan. There is a growing body of literature showing that health workforce turnover is directly influenced by inadequate compensation, poor working conditions (such as lack of medical equipment and poor workplace safety) and job dissatisfaction (due to various reasons, including low work autonomy, limited opportunities for professional development and inflexible working hours), combined with better career options elsewhere and other factors exogenous to the health system (for example living conditions and educational opportunities for children) (*2–4*). This includes geographical movements of health workers within and across countries, professional movements within and outside the health sector and other types of movements. For the purpose of the present chapter, all labour movements that occur within the national health sector are considered as "transitions" (or intrasectoral mobility); and those that involve a movement away from the health sector (intersectoral mobility) or to another country (international out-migration) are considered as "exits" from the health workforce. These dynamics are summarized in Figure 5.1.

Figure 5.1 **Transitions within and exits from the health workforce: a framework for analysis**



Transitions within the national health labour market may involve changes in work patterns, places and positions. The flow of health workers from rural and remote areas to urban and more affluent regions, known as geographical transition, is probably the most common type of transition. Also of importance is movement of workers across sectors (for example from the public to the private sector) or from one type of service delivery point to another (for example from a primary-level health-care centre to a tertiary-level hospital). Given the social and political importance of ensuring universal access to essential and affordable health services, notably through primary health-care strengthening, monitoring the movement of workers away from public health-care facilities is a concern for decision-makers and stakeholders in many low- and middle-income countries.

Another type of transition that needs to be considered is occupational transition: health workers may move from one health occupation to another, or to a non-health occupation within the health sector. Often this is a reflection of career progression, for instance a nursing care provider being promoted to nursing services manager. An example that has attracted considerable interest in recent years, as mentioned in Chapter 4, is the phenomenon observed in the Philippines of doctors retraining as nurses in order to facilitate their chances of international migration. In some contexts, there is concern over the exodus of health professionals previously providing direct patient care (usually in lower-paying jobs in public sector facilities) to project management jobs in the expanding donor-supported nongovernmental sector (*5, 6*). Other types of work pattern transitions – such as from full-time to part-time positions – may be prompted by changes in individual circumstances or overall economic conditions in the country. Monitoring such trends is critical to understanding HRH dynamics within and across occupations and the possible implications for overall workforce skills mix and capacity for provision of quality services.

At the same time, it is important to keep in mind that such transitions are not necessarily mutually exclusive; a single move could actually combine different types of transitions. For example, the move of a nurse practitioner working in a public sector health centre in a rural area to a job as manager of nursing care services in a private hospital in the capital city simultaneously involves occupational, sectoral, institutional and geographical transition.

With regard to exits from the national health system, these include movements that are either voluntary or involuntary, permanent or temporary in nature. Temporary exits are categorized as those where the health worker is assumed to have a chance to re-enter the system at some future point, usually in the shorter term. Maternity or family care leave, sickness or other emergency leave, unemployment and return to studies are among the most frequent causes of temporary exit from the economically productive workforce. Retirement, death, work-limiting chronic disability and international out-migration are examples of "permanent" exits (although the possibility remains that a worker who has retired early or migrated abroad may still opt to eventually return to the national health labour market).

5.3 Indicators and measurement strategies

Measuring and monitoring health workforce transitions and exits remains challenging for a number of reasons, including scarcity of the required data (almost no country has reliable data on international out-migration, for one); underuse of available data; lack of disaggregation (information sources often combine transition and exit factors, limiting the ability to estimate separate indices for each indicator); and lack of standardization of measurement techniques (different methods can be used to produce different indicator estimates, rendering comparisons across information sources difficult or impossible).

One inherent complexity in analysing workforce transitions and exits is that most relevant indicators can be measured in two different ways: following all moves that have taken place among a given group of individuals over the course of a specified time period (longitudinal analysis); or observation of the current state of all individuals in the target population at a single point in time (cross-sectional analysis). For instance, with regard to sectoral movements, this can be assessed either by counting all moves of clinical personnel from the public to private sector within the last five years (or, from a perspective of monitoring retention, the number who have stayed in their public sector job over the same period); or by taking snapshots of the public–private distribution of clinical staff at two points five years apart. In other words, when measuring transitions and exits, either flow-based or stock-based indicators can be used. The former are usually expressed as rates, while the latter are expressed as proportions or ratios.[1]

The choice of whether to examine flow-based or stock-based estimates generally depends on the nature of the underlying information source. As such, understanding the full complexity of exit and transition patterns requires analysis of data across multiple sources. Table 5.1 presents an overview of potential data sources that can be used for measuring various indicators of workforce transitions and exits. As can be seen, no single source will be able to provide all the information needed; if used in a complementary manner, a wide range of data collection techniques – including population censuses, labour force and other

1 The general rate of workforce transition and exit can be represented by the following algebraic formula: $M_{ij}(t\ n)\ \frac{T_{ij(t\ n)}}{W_i}$, where $M_{ij}(t\ n)$ represents the observed rate of transfer from origin state i to destination state j between time period t and $t+n$; $T_{ij(t\ n)}$ is the observed number of moves (exits or transitions) from state i to state j between period t and $t+n$; and W_i is the stock of health workers in state i at midpoint.

Table 5.1 Potential sources of data on health workforce transitions and exits

Indicators	Potential data sources	
	Flow-based measures	Stock-based measures
Transition indicators		
• Between sectors (public/private) • Between occupations • Between areas/regions • Between institutions • Full time to part time (or vice versa)	• Routine administrative records, including payroll records and health professional registries • Special HRH assessments (longitudinal design or retrospective questions)	• Population census or labour force survey (with questions on occupation, place of work, working hours) • Health facility assessment (module on staffing)
Exit indicators		
• Unemployment/loss of job • Leave for further education and training • Maternity or family care leave • Sickness or other emergency leave • International out-migration • Retirement • Work-limiting chronic disability • Death	• Routine administrative records, including payroll records, health professional registries, social security records • Special HRH assessments (longitudinal design or retrospective questions) • Vital registration	• Population census or labour force survey (with questions on education, labour force activity, occupation, reasons for inactivity) • Health facility assessment (module on staffing)

household surveys, health facility assessments, routine administrative records and specialized quantitative or qualitative HRH studies – can provide a more complete picture of the dynamics. A general review of standard statistical sources and their strengths and limitations for HRH analysis is presented in Chapter 3.

To give an example, one way of measuring occupational transition using a stock-based approach is through using labour force survey data to calculate the proportion of individuals in the country with education and training in a given health field who are currently working in a different occupation (irrespective of when they moved from qualification for one occupation to practice in another). Measuring the same dynamic using a flow-based approach – for example to calculate an annual rate of movement from one health occupation to another – can be accomplished using health professional registries, provided they are continuously updated to reflect current work activities. Specially designed HRH assessments for collecting job histories and trajectories among health workers, either by reinterviewing the same cohort at periodic intervals over an extended time or by singular in-depth interviews with questions on labour activities at some point in the past, also allow for estimates of occupational flows.

Similarly, unemployment among skilled health workers can be expressed in different ways depending on the data source. Population survey or census data on education, labour force participation and reasons for inactivity can be used for stock estimates (for example the number of currently unemployed individuals with education and training leading to a health occupation, relative to the total number of employed health workers of the same occupation). Routine data from health professional registries can potentially offer information on numbers of qualified health workers who were ever unemployed over the past year. Health facility assessments with modules on staffing levels and patterns can help shed light on the magnitude of the problem by tallying the numbers of health service providers who lost their jobs in the previous year. Such results can then be analysed within the context a monitoring and evaluation framework, for example to gauge trends over time, across regions or by occupational group.

Geographical transitions within a country can also be assessed with a number of measures. A stock-based assessment drawing on periodic census data could compare, for instance, the density of health workers in a given region at the time of enumeration against the same density enumerated in the previous census. A related flow-based measure could be obtained through administrative records designed to allow tracking of individuals, enabling measurement of the number of health workers moving from a given region to another over the specific time period. Flow estimates can also be obtained indirectly from a census or survey if respondents are asked about their place of residence five or ten years earlier (assuming they held the same occupation at that previous time).

Ideally, international migration should be measured adopting the same approach. In reality, few countries have accurate and timely data on the numbers of nationals living abroad or leaving the country. Concerns about the adverse impact of the migration of health professionals, especially from poorer to richer countries, have thrust the issue to the forefront of the global health and development policy agenda in recent years (*1*). However, the evidence needed to monitor and evaluate the phenomenon remains weak or non-existent (*7, 8*). Most available analyses are excessively reliant on indirect quotations, largely based on extrapolation of measures compiled and disseminated in destination countries: (i) census-based estimates of lifetime migration (by country of birth of individuals practising a health occupation in the destination country at the time of enumeration, regardless of place of education); (ii) registry-based estimates of foreign-trained workers newly obtaining professional licensure (which do not count skilled workers who fail to satisfy national practice regulations); and (iii) numbers of residency or work permits issued to foreigners according to the self-reported occupation held in their country of origin (regardless of eventual work activity in the destination country). In this context, ensuring comparability of such measures – including occupational definitions, education equivalencies and professional practice regulations across the source and destination countries – is particularly imperative.

Another challenging area is measuring mortality among health workers: even in countries where vital registration coverage is very high or complete, occupation-specific mortality data are rarely tabulated and disseminated. Again, most available measures use indirect estimation techniques. This includes examination of facility staffing records for deaths while in employment, or the use of model life tables applying age- and sex-specific survival ratios against the demographic distribution of the active health workforce to estimate numbers of premature deaths.

By contrast, measuring workforce exits due to retirement is relatively straightforward. Estimates can often be obtained from payroll or social security records. In the absence of reliable data from administrative sources, population-based census and survey tools are another option if they include data on educational attainment by field (or on previous occupation) and

reasons for labour force inactivity. In many cases it is possible to use the legal age of retirement as a proxy measure, and assume that all health workers remaining alive and in the country will retire at that age.

5.4 Illustrative analyses

In this section, illustrative analyses of different types of workforce transitions and exits are presented from various contexts, and using different methodologies and data sources as described in the previous section.

5.4.1 Transitions within the national health labour market

As mentioned earlier, different approaches can be used to collate information on transitions within the health workforce, largely depending on data availability, relevance and quality. An example of sectoral transitions can be gleaned from a special HRH survey in Sri Lanka, which included interviews among a sample of facility-based health workers across the country (*9*). According to retrospective questions on place of work prior to the current location, the large majority (96%) of hospital-based health workers in the public sector also listed a government hospital as their previous workplace. Among staff in private hospitals, 62% of those who had previously worked elsewhere reported having moved from a government hospital. Altogether, fewer than 0.5% of facility-based workers reported their previous place of work as outside the health sector.

In another example based on a special HRH survey, higher levels of occupational transition – that is, movement from one occupation to another while remaining employed in the health sector – were observed among medical practitioners compared to nursing personnel in Lesotho. The turnover rate was highest among medical specialists (16.7%) and considerably lower among nursing officers (4.4%) (*10*).

Another potential means to measure and monitor occupational transitions is by using professional and academic registries. In the Philippines (probably the largest exporter of nurses worldwide), it was estimated that of students who took the national exams for nursing licensure, more than 4000 were previously doctors, a figure that represents about 10% of the total number of doctors in the country (*11*).

5.4.2 International migration

International outflows of health workers are rarely measured directly at the country level. Some inferences can be made, for example through qualitative studies on migration intentions. Findings from special HRH surveys in six African countries revealed substantially high proportions of health professionals – from 26% in Uganda to 68% in Zimbabwe – declaring an intention to emigrate, mostly to high-income countries of Europe and North America but also to some other African countries (*12*). Another indirect measure is through numbers of verifications of professional licensure with national regulatory bodies. For instance, prospective foreign employers of nurses seeking employment abroad may request verification of licensure with the nursing council in the country of origin. In Kenya, such data from the national Nursing Council pointed to the United States of America as one of the main intended host countries for Kenyan nurses looking to practise abroad (*13*). In both of these cases, while useful for weighing general trends, the data refer only to migration intentions, and do not confirm that a health worker has actually (or will ever have) out-migrated.

The main means of assessing levels of international migration is through examining data in the destination country according to the migrant worker's country of origin (in terms of birth, citizenship or professional education). As illustration, data from the United Kingdom Nursing and Midwifery Council (*14*) allow estimation of trends in nursing exits from source countries (Table 5.2). The data reveal major changes between 1998 and 2007 in the distribution of foreign-trained nurses in the United Kingdom: from mostly high-income countries at the beginning of the period of observation (Australia and New Zealand), to more and more nurses from low- and middle-income countries (notably India and the Philippines). Some countries, such as Nepal and Pakistan, which previously had no or very little out-migration towards the United Kingdom, are now among the main source countries. Migration levels from selected African countries appear to have peaked in around 2002/03, especially for South Africa. It may further be noted that South Africa itself is home to many foreign-qualified health professionals: data from the Health Professions Council of South Africa indicate that one quarter (24%) of registered doctors had been trained in a different country (*15*).

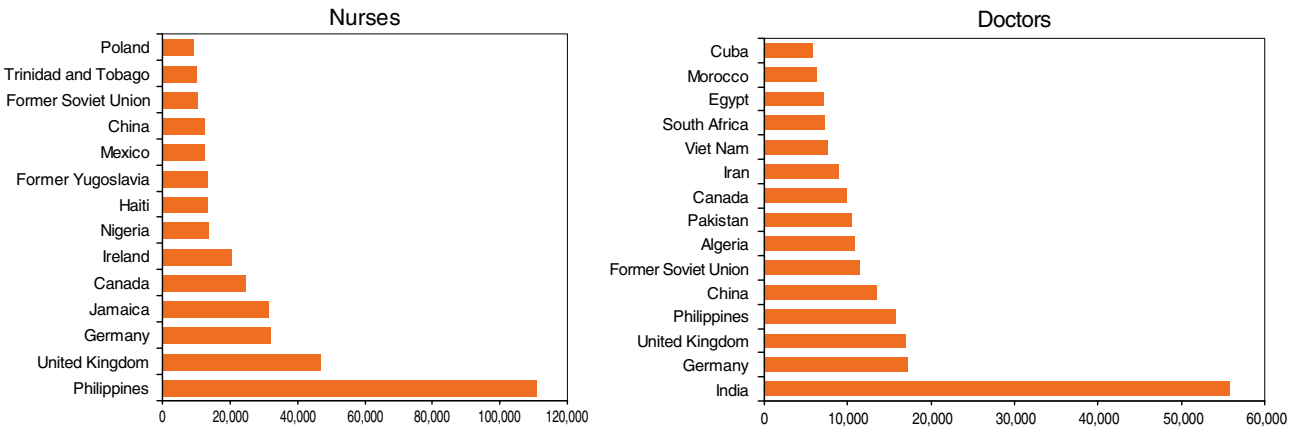
Combining migration data across multiple destination countries can help present a broader picture. In this context, population census data are often valuable, as census measurement tools tend to be more standardized, allowing for international comparisons. Figure 5.2 presents selected findings using merged census data on foreign-born health professionals living in 24 high-income countries of the Organisation for Economic Co-operation and Development (OECD), including Australia, the United Kingdom and the United States of America. While migration patterns may vary significantly from one country to another, one key

Table 5.2 **Annual numbers of overseas-trained nurses obtaining national licensure to practise in the United Kingdom, 1998–2007 (main countries of origin outside the European Economic Area)**

Country of nursing education	Year professional licensure obtained in the United Kingdom								
	1998/99	1999/00	2000/01	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07
India	30	96	289	994	1830	3073	3690	3551	2436
Philippines	52	1052	3396	7235	5593	4338	2521	1541	673
Australia	1335	1209	1046	1342	920	1326	981	751	299
Nigeria	179	208	347	432	509	511	466	381	258
Pakistan	3	13	44	207	172	140	205	200	154
Nepal	0	0	0	0	71	43	73	75	148
Zimbabwe	52	221	382	473	485	391	311	161	90
China	0	0	0	0	0	0	60	66	80
New Zealand	527	461	393	443	282	348	289	215	74
Ghana	40	74	140	195	254	354	272	154	66
Zambia	15	40	88	183	133	169	162	110	53
South Africa	599	1460	1086	2114	1368	1639	933	378	39
Kenya	19	29	50	155	152	146	99	41	37
Canada	196	130	89	79	52	89	88	75	31

Source: United Kingdom Nursing and Midwifery Council (*14*).

Figure 5.2 **Foreign-born nurses and doctors enumerated in 24 OECD countries by main countries of origin (population census data, around 2000)**

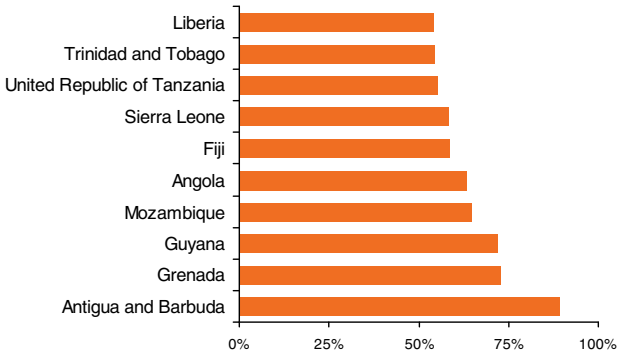


Source: Dumont and Zurn (*8*).

finding stands out: nurses born in the Philippines (some 110 000 in number) and doctors born in India (56 000) represent a major part of the immigrant health workforce in OECD countries (about 15% of the total stock each) (*8*).

Extending such analysis by combining data on in-migrants in destination countries with information on the active health workforce in countries of origin can help gain some further sense of the magnitude of international emigration. Such an analysis is depicted in Figure 5.3, where census data on foreign-born doctors residing in OECD countries at the time of enumeration are compared to official statistics on the domestic workforce for those same origin countries. Some countries – in particular, small island developing nations of the Caribbean and South Pacific and certain sub-Saharan African countries with severe shortages of

Figure 5.3 Estimated lifetime emigration rate of physicians born in selected non-OECD countries and working in OECD countries at the time of the census



Source: Dumont and Zurn (*8*).

medical personnel – appear to be disproportionably affected by out-migration. These are countries with estimated lifetime emigration rates above 50% (which means that there are as many doctors born in these countries working in the OECD region as there are doctors working in the home country) (*8*).

5.4.3 Workforce exits due to mortality

In several southern African countries, especially where HIV prevalence is high, death is emerging as one of the most important causes of exits from the health workforce (*16*). Effects include both the permanent loss of individual workers and temporary increases in staff absenteeism to attend funerals. However, systematic data collection on this issue is lacking: few countries routinely compile and disseminate occupation-specific mortality data via their vital registration system (usually the main source of information on deaths and births in a country).

Measuring and monitoring the extent and effects of premature health worker mortality often calls for special tools and approaches. In one pilot study conducted in Zambia, time trends were estimated at two hospitals based on the numbers of archived death certificates for female nurses compared to the numbers of person-years of service (*17*). Results suggested that mortality among the female nursing workforce increased more than tenfold between 1980 and 1991, from 2.0 to 26.7 per 1000. The observed increase was largely attributed to HIV.

Often, workforce mortality must be estimated indirectly using model life tables and other demographic and epidemiological projection techniques. An illustrative example of the application of such techniques for 12 African countries is presented in Table 5.3. The results were obtained by dividing the projected annual number of premature deaths among active health workers (based on age- and sex-specific mortality quotients extracted from national life tables) by the baseline total number of health workers (according to official workforce statistics compiled by WHO). Premature deaths were defined as those occurring under age 60. Overall, each year these countries are expected to lose about 2% of their medical, nursing and midwifery workforce to premature mortality. As could be expected (given the underlying assumption that mortality patterns among health workers follow those of the total population), somewhat lower estimated death rates among nursing and midwifery personnel compared to doctors would be the reflection of higher proportions among the former of women, for whom age-specific death rates tend to be lower compared to their male counterparts.

Table 5.3 Estimates of annual losses due to mortality under age 60 among health workers in selected countries of the WHO Africa Region, based on life table analysis

Country	Premature death rate per 1000 workers	
	Physicians	Nursing and midwifery personnel
Central African Republic	25	21
Congo, Democratic Republic	23	19
Côte d'Ivoire	25	22
Ethiopia	23	20
Kenya	23	23
Liberia	24	20
Madagascar	21	20
Rwanda	25	19
Sierra Leone	26	22
Uganda	26	22
United Republic of Tanzania	24	22
Zambia	28	22
Total	**24**	**21**

Source: From the authors.

5.4.4 Workforce exits due to retirement and other reasons

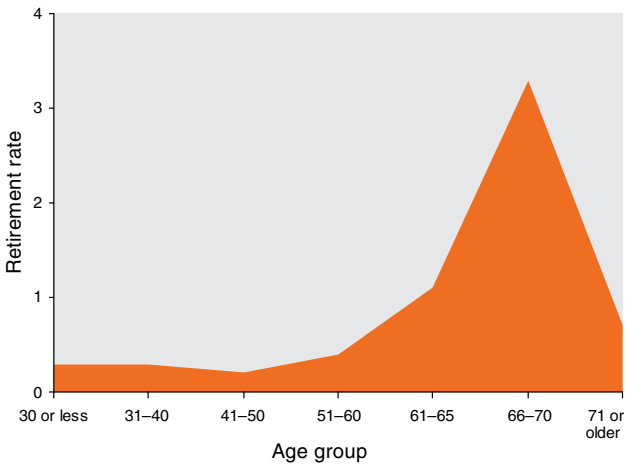
Generally, three types of data are used to shed light on health worker retirement: (i) routinely compiled numbers of individuals retiring from the health workforce as recorded in the payroll, social security records or professional registries; (ii) counts of retirees among those with the educational background to qualify for a health occupation as reported in a population census or survey; and (iii) in the absence of direct measures, qualitative survey data on retirement intentions among health workers. Retirement data plotted against the age distribution of the active workforce are commonly used in workforce projection models to estimate future supply.

Regardless of the information source, one complexity to monitoring trends in workforce retirement is that there is no universal definition of what "retirement" actually means. Some analyses may consider retirement as the period immediately following gainful employment, or the period of life above a certain age. In a case from Canada, where many parts of the country do not have mandatory retirement, the national medical association records any physician who exits the medical workforce as "retired", regardless of age and cause (*18*). In this context, as seen in Figure 5.4, even workers as young as 30 are considered to have retired.

Most HRH databases do not allow differentiation between retirement, death and departure from the workforce for other reasons, either in the short or the long term. With regard to temporary exits, special absenteeism surveys including unannounced visits may capture data on proportions of facility-based practitioners who were not at their assigned post. In one such application in Bangladesh, over one third (35%) of health workers were found to be temporarily absent on the day of visit (for explained or unexplained reasons). Proximity of the worker's residence to the health facility, opportunity cost of the worker's time and other indicators of general socioeconomic conditions (road access, rural electrification) were identified as the main correlates of absenteeism patterns (*19*).

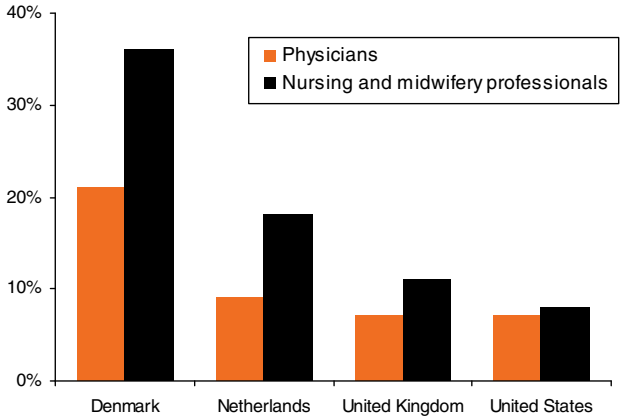
It is possible that some recorded long-term workforce exits are due to change of occupation, notably to one outside the health sector. Labour force surveys – which include data across all economic branches in the national economy – can help shed some light on this point, although the ability to draw comparisons across countries or over time will depend on the questionnaire and sampling design of the original source. For instance, an analysis of labour force survey data from four countries showed wide cross-national differences in the proportion of respondents reporting an occupation in medicine or nursing but not working at a health service delivery point (and thus who might not be captured in facility- or payroll-based data sources) (Figure 5.5). The highest proportion was found in the Denmark sample, which included those who were unemployed or had returned to school at the time of the survey (*20*).

Figure 5.4 **Retirement rate among physicians by age group according to the National Medical Association registry, Canada, 2005**



Source: Pong, Lemire and Tepper (*18*).

Figure 5.5 **Proportion of survey respondents reporting a health occupation but not working in the health services industry at the time of interview, selected countries**



Source: Gupta et al. (*20*).

5.5 Concluding remarks: implications for policy and planning

This chapter has reviewed the current state of knowledge on measuring and monitoring health workforce transitions and exits for policy and planning purposes. Understanding these workforce dynamics could help in identifying imbalances in health worker distribution within and across countries, and in implementing retention policies that encourage workers to stay (or return to) where their skills and services are needed most. It is also being increasingly recognized that the key to maintaining a sufficient workforce for achieving health systems goals is to educate, recruit and retain young health practitioners, while also reinvesting in the mature workforce. In this context, having and making use of appropriate data from different sources to monitor and address HRH challenges across the working lifespan is critical.

Information on past and projected movements of the workforce is needed to make future workforce supply projections, necessary as a basis for formulation of evidence-based HRH planning and rationalized decision-making. Given their nature, few types of transitions and exits (aside perhaps from retirement) can be accurately predicted; however, all types need to be accounted and planned for in national HRH development strategies. In most countries, transitions within the health workforce – such as change of employment sector or rural–urban migration while remaining in health services – are likely to be an important workforce dynamic; however, timely and reliable data tend to be scarce. Often, policy- and decision-makers must rely on information from special HRH assessments (ad hoc in nature) or periodic assessments based on stock-based estimates of the current situation observed at two different points in time (and then making inferences on the flows that actually occurred between the two points). When it comes to monitoring exits from the national health labour market, data must often be collated from sources outside the health sector or even outside the country altogether.

Notably lacking in many countries is systematic data collection on morbidity and mortality among health workers, crucial for monitoring workplace health and safety – often a major factor influencing attrition from the health sector. Understanding the causes of workforce losses can help inform, for example, strategies for preventing HIV and other diseases among health workers to reduce premature mortality in the longer-term, while providing appropriate treatment for health workers who need it to enable them to work longer (*21*).

Even data on health workforce retirement, increasingly becoming a major issue given global patterns of workforce ageing, are often deficient. Relying on a given age (for example statutory retirement) to project numbers of retirees is likely to be inadequate, as differences in actual age at retirement are often observed across occupations or by sex. Having a good sense of retirement rates is valuable to plan future health workforce supply, and can also be used to prepare flexible work policies encouraging delayed retirement. For instance, a flexible-retirement initiative in the United Kingdom enabled physicians nearing retirement to move into part-time work while preserving pension entitlements (*22*).

Recruiting back individuals trained in health services delivery but either working outside the health sector or economically inactive can represent an attractive option to increase health system capacity. For that purpose, it is crucial to determine the size of the potential pool of individuals concerned in order to evaluate the opportunity and potential impact of such an initiative. In the United States of America, as of 2004, almost 17% (or some 488 000) of surveyed nurses included in the national professional registry were not employed in nursing (*23*). Although many were older, and thus unlikely to return to active nursing service, the number below the age of 50 totalled approximately 160 000 potentially employable nurses. Considering that hospitals of the United States have reported some 116 000 vacant nursing positions (*24*), policies and strategies to attract back qualified nurses could have high returns.

International migration of health professionals from low- and middle-income countries to wealthier countries is another issue of increasing global attention. Doctors and nurses represent a small proportion of all highly skilled workers who migrate, but the HRH loss for developing countries can mean that the capacity of the health system to deliver health services equitably is compromised (*25*). Many developed countries that previously actively recruited health workers abroad as a solution to (real or perceived) workforce shortages at home have now recognized the need to address the adverse impacts in some of the main sending countries, notably in sub-Saharan Africa (*26, 27*). One policy option for receiving countries is the formulation of ethical practices for the international recruitment of health workers. For example, in 2001 the United Kingdom's Department of Health adopted a code of practice for employers in the national health system seeking, among other things, to prevent targeted recruitment from developing countries experiencing severe shortages of health-care staff. While assessing the impact of such a code is challenging, due to the numerous factors driving labour migration, it can be noted that

nursing migration from Africa to the United Kingdom would seem to have declined substantially in the period following its adoption (as previously illustrated in Table 5.2).

At the same time, it should be recognized that health personnel movement and migration is bi-directional. Health workers move from rich to poorer countries and from urban to rural areas for a variety of reasons and through a number of mechanisms, although in much smaller numbers – and even less well documented. In many instances, health personnel migrate abroad for a shorter period of time and return to their country of origin, which can be beneficial to source countries as these workers return with more experience, skills and personal resources than when they left (*3*). Sending countries therefore need to consider policy options regarding whether outflow of health workers should be supported or encouraged (for example to stimulate remittance income or to address oversupply relative to national health labour market absorption capacity) – or constrained or reduced (to counteract "brain drain") (*26*). In all cases, monitoring international flows is pre-requisite for evaluating policy effectiveness.

The contribution of existing data sources and analytical approaches is growing significantly for monitoring health workforce transitions and exits, and for supporting HRH policy development at the national and international levels; however, some areas need further consideration. One of the main factors constraining in-depth analysis is the general lack of disaggregated data on the different types of workforce exits, which makes it difficult for decision-makers to address specific retention issues in the most pertinent manner. Strengthening efforts for systematic data gathering and improved coordination among stakeholders in data collection and use across different sectors and countries should act as a catalyst for improving the availability, quality and comparability of HRH data, thereby strengthening the evidence base needed to advocate policy options and guide decision-making.

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Part III:
MEASUREMENT STRATEGIES AND CASE STUDIES

6 Measuring expenditure on the health workforce: concepts, data sources and methods

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6.1 Introduction

Payments to labour have been assessed as constituting the largest single expenditure item for national accounts and, where they have been measured, in health services provision. However, in many countries, data on the extent and nature of expenditure on health workers are not routinely available and information is often scattered across multiple sources. Where data collation occurs, it may only have partial coverage and is rarely used for policy and planning. Timely accessibility among decision-makers and stakeholders to information about expenditures on the health workforce would require a systematic consolidation and harmonization effort, with modifications in the way data are recorded. The nature and intensity of the effort implied would, of course, vary by country.

Notwithstanding the weight of human resources for health (HRH) in overall health expenditure, there is no full documentation of health accounting methods specifically related to the health workforce. Other measurement approaches describe how to measure expenditure on the labour force in general, notably the provision of health-care services in the system of national accounts – that is, a conceptual framework that sets the international statistical standard for the measurement of the market economy – and in methods used to guide the measurement of expenditures on government-funded health services.

The construction of a comprehensive, reliable and integrated system of HRH expenditure measures typically requires a compilation of data from routine administrative records and periodic surveys. Some countries are beginning to store all labour-related surveys that have been undertaken in a single repository. In many cases, additional surveys are required to complement existing sources in order to cover the field adequately.

The main aim of this chapter is to encourage a greater number of countries to monitor expenditure on human resources in health systems to inform decision-making. Tracking the financial resources contributed to HRH can facilitate monitoring of resources to achieve the Millennium Development Goals, the national poverty reduction strategy plan and other initiatives. Disentangling HRH expenditure within existing frameworks focusing on resource use helps provide that information. If implemented on a regular basis, accounting systems can track health labour expenditure trends, an essential element in HRH monitoring and evaluation.

Several lines of action are presented here, intended to be a how-to guide for operational use by people actually monitoring these expenditures. Following this introduction, the chapter offers a brief presentation on the purpose of the exercise and the core indicators proposed. It moves to a description on how to begin to construct and maintain a minimum database on HRH expenditure. Issues of data collection and use at country level are discussed, enriched with case studies to illustrate various procedures and recommendations for enhancing comparability across countries and over time.

Recognizing that many countries are unlikely to develop sophisticated, integrated systems of data collection and collation in the short run, this chapter suggests how the different sources of data typically found in countries can be used to establish the order of magnitude of expenditure on HRH. The approach proposed here does not posses the attributes of a fully fledged HRH account linked to official health accounts, strictly covering the same boundaries. It is offered as a short-term solution while waiting for some of the main internationally agreed-upon estimating methods to be updated and refined – notably the updates, expected to be completed by 2012, of the current versions of the System of National Accounts 1993 (henceforth referred to as SNA93) (*1*), the System of Health Accounts (or SHA1.0) (*2*) and the *Guide to producing national health accounts* (*3*).

6.2 What should be measured

Before addressing measurement issues and data sources, it is important to be clear about what is to be measured and why. Choices of indicators on HRH expenditure should be driven by policy needs, although it is also important to take into account feasibility and costs of data collection and processing.

6.2.1 Defining a core set of indicators

A first step is to define a desirable minimum set of indicators. There are two goals: to offer a means for countries to develop a practical reporting system for their own policy purposes, and to facilitate comparisons over time and across settings. Standardization and harmonization of information enables countries to track the impact of changes, and allows opportunities to learn from the experiences of other countries and regions.

The proposed core set of indicators is outlined in Box 6.1. Six basic indicators are listed, referring to the total, relative size and distribution of expenditure on health workers. The total is proposed in absolute and per capita levels, specifying currency units useful for international comparisons (*4, 5*).

Countries lacking reliable private sector data can use the general government or public sector data as an entry point. General government expenditure refers to expenditures incurred by central, state or regional, and local government authorities, as well as social security schemes and non-profit institutions that are controlled and mainly financed by government units. Monitoring public expenditure is related to the question of how much funding is raised for HRH development and can also be considered to reflect government commitment.

The sixth proposed indicator is meant to provide more detail by breaking down expenditure data into various components that would be useful for policy, such as place and sector of work, employment status or occupational function.

6.2.2 Expanded set of indicators

Some governments may wish to track an additional set of indicators to, for example, monitor equity and efficiency of HRH expenditure, detail labour expenditure for specific service areas or programmes, or identify sources of cost escalation. Among a wide range of possibilities, often complemented with other types of data on health system performance, the most common might include the following:

Box 6.1 Proposed minimum set of indicators for monitoring expenditure on human resources for health

1. HRH expenditure, total and per capita (in national currency units, in US dollars and in international dollars)[a]
2. Expenditure on HRH as a proportion of total expenditure on health[b]
3. Expenditure on HRH as a proportion of gross domestic product or gross national income
4. Government expenditure on HRH as a proportion of general government expenditure on health
5. Government expenditure on HRH as a proportion of recurrent general government expenditure on health
6. Breakdown of HRH expenditure by:
   a. place of work: hospitals, ambulatory centres, public health offices, etc.
   b. sector: public, private for-profit, private not-for-profit
   c. employment status: regular employees, self-employed workers
   d. occupational function: health service providers (direct patient care), health system management and support personnel.

a. Values for per capita expenditure are usually based on population estimates in the mid-year period. International dollars are derived by dividing national currency units by an estimate of their purchasing power parity compared with the US dollar, i.e. a measure that minimizes the consequences of differences in prices between countries. Definitions of selected health financing terms can be found in the *National health accounts* section of the World Health Organization (WHO) Statistical Information System (*4*).
b. For comparative purposes, data compiled by WHO by country on total expenditure on health, using health accounting figures when available, can be freely accessed at WHO *National health accounts* (*5*).

- HRH expenditure by skill level and skill specialization of health workers, for example physicians, nurses, midwives, pharmacists, community health workers, ambulance drivers;
- HRH expenditure by different service areas or types of health interventions, such as workers providing mental health services or attending deliveries;
- average earnings among health workers, i.e. hourly, weekly or monthly income from wages, practice or business.

The last of these can be a particularly useful indicator for monitoring equity in the health workforce (for example gender equity). Its proposal here is consistent with the International Labour Organization's recommendation that statistics on average earnings, as well as hours of work (useful for calculating full-time equivalents for job positions), should be maintained and updated regularly, covering all important categories of wage-earners and salaried employees, including those in the health branch of the economy (*6*).

6.3 Approaches to measuring HRH expenditure

Information on total HRH expenditure, the most important component of the minimum set of indicators outlined in Box 6.1, is typically found in national accounts and health accounts. These systems consist of an integrated set of macroeconomic accounts, balance sheets and tables based on internationally agreed concepts, definitions, classifications and accounting rules, which together provide a comprehensive accounting framework within which data can be compiled and presented in a format that is designed for purposes of analysis, decision-taking and policy-making (*1*). This section describes the main models and ways data are compiled, in order to understand how they can be used and compared across contexts and over time.

6.3.1 Delineating expenditure on the health workforce

In general terms, expenditure on HRH is the product of the number of health workers and their prices. Capturing the heterogeneity of the health labour market requires consideration of many types of workers: people who directly provide health services (including preventive, promotional, curative and rehabilitative services) as well as administrators, suppliers and other support workers who help the health system function. The workforce includes those who are salaried or self-employed, working full time or part time, having short-term or long-term contracts, holding one job or multiple positions. To capture such diversity, workforce size is often measured both in terms of headcounts (physical persons) and full-time equivalents (a measurement equal to one staff person working a full-time work schedule for one year) (see also Chapter 3 of this Handbook for more on measuring workforce stock).

Because country-specific and tool-specific data are often collected and classified in different ways, it is useful to adopt an internationally standardized classification procedure to improve comparability. The relevant classifications for the purposes of harmonizing data on human resources in health systems include the International Standard Classification of Occupations (ISCO), the International Standard Classification of Education (ISCED), the International Standard Industrial Classification of All Economic Activities (ISIC), the Central Product Classification (CPC), the Classification of the Functions of Government (COFOG) and the Classification of the Outlays of Producers According to Purpose (COPP) (*7–12*).[1] For example, labour expenditure data by occupation should ideally be mapped through the latest ISCO revision (with most health occupations falling under sub-major groups 22, "health professionals", and 32, "health associate professionals"). Health-care goods and services are classified by CPC under group 931, "human health services". Relevant government expenditure or activity data are delineated in COFOG under division 07, "health", including services provided to individuals or on a collective basis. COPP can be used to itemize expenditure on human resource development, notably under class 5.1, "outlays on education and training", which includes vocational training and on-the-job training.

Standard descriptions of the concepts and methods of HRH expenditure are available in the System of National Accounts (in particular, see SNA93 paragraphs 7.21–47 for approaches to the generation of original data) and in the European System of Accounts (*13*, Chapter 8). The System of Health Accounts is another useful resource, covering three core dimensions: health care by function or service area, providers of health-care goods and services, and sources of funding (in particular, Table 10 of SHA1.0 refers to "total employment in health care industries", covering both numbers of employees and full-time equivalents). Expenditure on health workers is approached directly in the adaptation by WHO, World Bank and the United States Agency for International Development (USAID) (*3*) for low- and middle-income countries – the economic classification in that guide includes compensation of employees and owners, and distinguishes resource costs on wages (code 1.1.1), social contributions (code 1.1.2) and

1 See Chapter 2 for further details on some of these classifications.

non-wage labour income (code 1.1.3) – and then further expanded in an SHA data collection tool jointly developed by the Organisation for Economic Co-operation and Development (OECD), Eurostat and WHO (*14*). Countries and stakeholders should find it useful to work with these complementary materials in the process of building a specialized dataset on expenditure on the health workforce.

The boundaries of "health" set the scope and content of HRH expenditure data, and the results produced will differ somewhat depending on the measurement system used. Typically, in national accounts, the health sector is defined as human health activities – an industrial division as classed by code 86 in the fourth or latest ISIC revision (or equivalent in national classifications) – encapsulating only the people involved in the provision of health-care services. Other approaches focusing more on health accounting tend to adopt a broader definition, also including other key actions related to health, such as regulation and management of health services delivery, provision of health-care goods and products, and, in some cases, complementary activities such as administration of health insurance.

In this chapter, and as compatible with the System of Health Accounts, except when specified, the wider range activities of the health system is referred to (Box 6.2) (*15*). Although utilization of information available in national health accounts or national accounts is recommended to the extent possible (rather than a construct of own estimates based on the number of health workers and their remuneration), it is important to remember that there is no unique data display format for HRH expenditures and, as such, analysts and decision-makers need to carefully read the fine print attached to any reported numbers (e.g. the metadata) to understand how they can be used and interpreted.

6.3.2 Data requirements and potential sources

The estimation procedures used to derive country-level figures in national accounts and health accounts integrate volume and price data. Accounting involves the use of a large mix of documentary sources and types of information, both monetary and non-monetary, and recurrent and one-off, including:

- surveys and censuses, for example labour force and other household surveys, establishment surveys, economic and population censuses;
- administrative records, for example budgetary records of government ministries, employment registries, social health insurance records, taxation files, earnings statistics, business and facility registries, registries of health professional regulatory bodies, bookkeeping records of private facilities;
- special administrative monitoring of labour and employment characteristics, such as sickness absence, non-resident workers, seasonal workers;
- other information sources, such as ad hoc data collection and processing activities, special analyses using complementary sources, extrapolation and other projection methods.

Box 6.2 Expenditure components under a health accounting approach through classes of the International Standard Industrial Classification of All Economic Activities (fourth revision)

a. Health services: division 86 "human health activities" (groups 861 "hospital activities", 862 "medical and dental practice" and 869 "other human health activities"); part of groups 871 "nursing care" and 881 "social work"; part of group 712 "laboratory testing and analysis"; and parts of divisions 49, 50 and 51 "transportation" (as related to patients)

b. Manufacturing and sale of medical goods: retail sale of pharmaceutical and medical goods (class 4772 – excluding toiletries); manufacture of medical and dental instruments and supplies (class 3250)

c. Other activities held by law or according to the culture and traditions of the country to contribute to the restoration, maintenance or enhancement of human health, formal or informal, not specifically included in ISIC, e.g. distribution of traditional, complementary and alternative medicines

d. Administration and planning, which are part of ISIC classes 8412 (public administration) and 8430 (compulsory social security).

Source: Poullier (*15*).

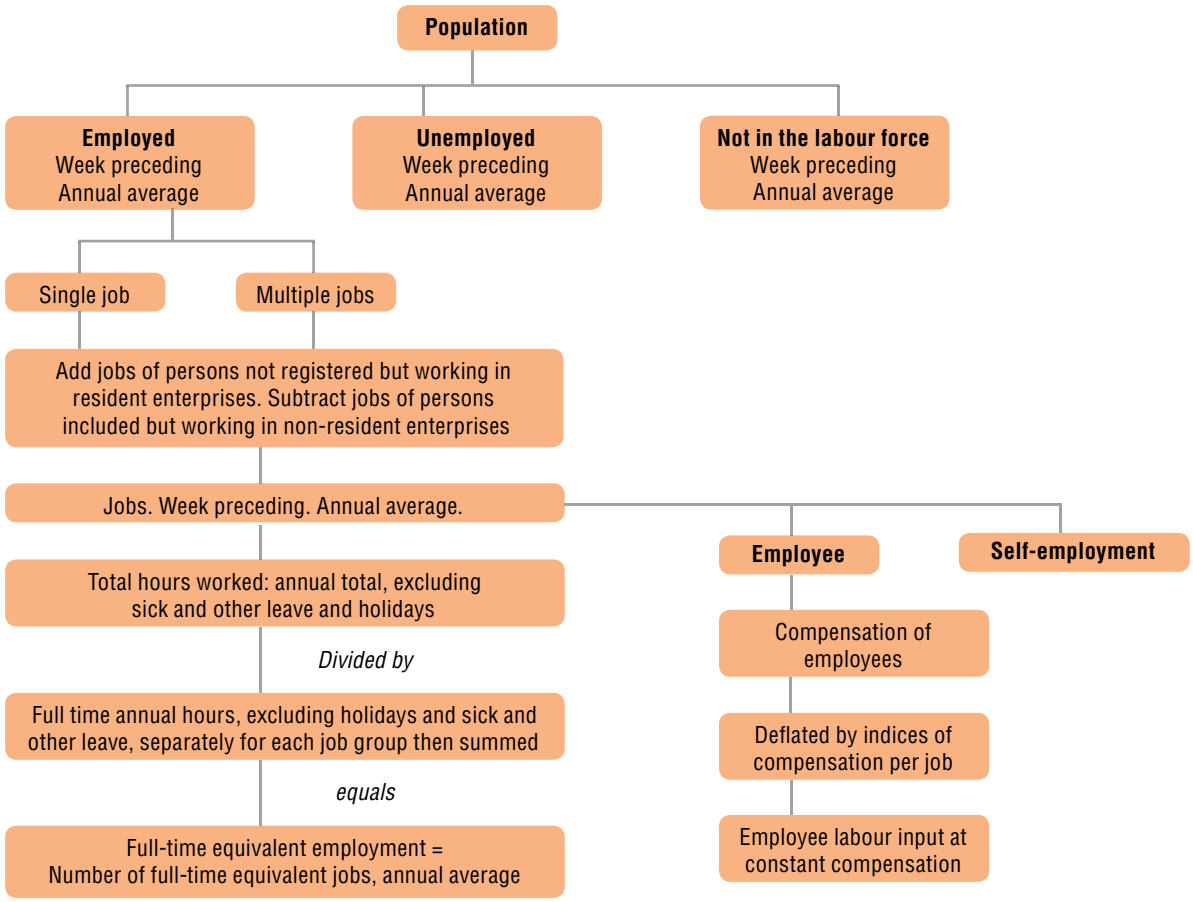
The collation, synthesis and analysis of these various types of data is generally the outcome of collaboration among a wide range of stakeholders, including government ministries (health, labour, finance), central statistical agencies, development partners, research and academic institutions, workers' associations and insurance agencies. New data collection should be undertaken only when the required information is not available elsewhere and sufficient resources have been secured to do it well. The initial challenge is to ensure all relevant records have been retrieved; for example, remunerations and incentives for health workers paid by special funds (for example international sources) or entities as a secondary activity (for example occupational health services in industries) may be reported independently of government records on wages and salaries.

A standard estimation procedure for monitoring labour expenditure is recommended by SNA93. Relatively minor adjustments have been developed for detailed entries under health and according to country-specific data characteristics. For example, sample sizes of labour force surveys are usually too small to allow statistically valid inferences about specific branches of economic activity. As such, labour force survey data are usually complemented with data from administrative and other sources (*16*).

Figure 6.1 displays a typical path the estimator of labour expenditure could consider (*1*). For illustrative purposes, the use of labour force surveys versus other data sources in national accounting is described within a selected group of countries of OECD and the European Union:

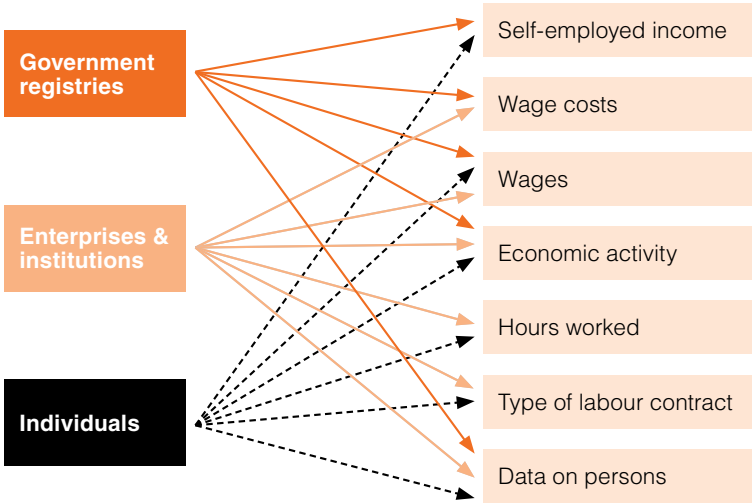
- Labour force surveys constitute the main source of data in Australia, Canada, Cyprus, Estonia, Hungary, Ireland, Lithuania, Switzerland and the United Kingdom.
- Labour force survey data are partially replaced with administrative data and other recurrent surveys in Bulgaria, Greece, Latvia, Portugal and Romania.
- Countries combining supply and demand data include Austria, Denmark, Finland, Germany, Italy, Malta, Norway, Slovakia, Spain and Sweden.

Figure 6.1 Overview of the estimation process for measuring labour expenditure in the System of National Accounts



Source: SNA93 (Figure 17.1: Population and labour concepts) (*1*).

Figure 6.2 Information on the labour market in the Netherlands' national accounts



Source: van Polanen Petel (*18*).

- Only a minimal use of labour force surveys for national accounting is made by Belgium, the Czech Republic, France, Iceland, Japan, Luxembourg, the Netherlands, Mexico, Poland, Slovenia and the United States of America.

Health accountants use the same techniques and data sources as national accountants, but limited to the health labour force. Both share the same challenges of multiple data sources and inconsistency across them. When differences arise, a first step is to identify reasons for them and then to decide whether one is the more suitable, or whether a composite is better. In contexts with many statistical sources, consistency is obtained mainly by adjusting employment rather than wages and salaries (*17*). The Netherlands illustrates the diversity of aggregation levels and content of the data sources required to estimate the expenditure on HRH (sketched in Figure 6.2) (*18*).

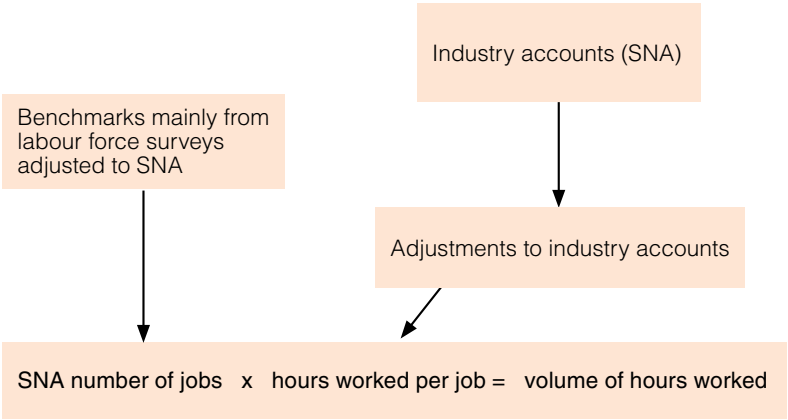
Where countries move towards the expanded set of indicators (as described in section 6.2.2 above), information is needed on health workers' characteristics (for example gender, education) as well as on labour activities, such as hours worked in the health system, including overtime but subtracting hours of absenteeism due to vacation, sickness or other reason – dimensions for which routine data are rarely available at the national level. Two examples of the process to indirectly estimate hours worked in different contexts are supplied in Figure 6.3 (*19, 20*) and in Box 6.3 (*21*).

Additional efforts are typically required to treat special groups, such as interim labour and home-based personal care workers, and to derive figures where there are no direct records (of hours worked, for example). In order to ensure consistency across the various components and types of data, HRH expenditure figures should be verified against national accounts data, notably the earnings of workers in the supply and use tables (that is, tools used to check the consistency of statistics on flows of goods and services on the principle that the total supply of each product is equal to its total uses). A simplified overview is described in Figure 6.4 as a "calculation square", in which each box implies a specific process to identify the best data source and the adjustments required (*18*).

Personnel in health services may also perform non-health activities; as such, an additional refinement may be required if only the health-care component is to be examined. Most general accounting rules should apply to these estimations, for example measurement based on the accrual principle (i.e. payable and receivable), not on a cash basis (i.e. received and paid) (see United Nations Statistics Division (*22*) for an introduction to basic concepts in national accounting). Specifically, the volume measurement of the workforce and its value should follow this rule. The original definition as presented in SNA93 is detailed in Box 6.4 (*1*).

Labour costs beyond remunerations of employees that need to be considered include expenditure on recruitment, education and training, incentives for worker retention and motivation, miscellaneous costs such as work clothes, and taxes on employment (*23*). Costs that are tax deductible can be measured through tax records. With regard to (pre-service) education, direct costs – including remunerations of educators – are treated outside the boundary of the health system in SHA1.0, but some guidelines are proposed for their recording "below the line". In-service training entails

Figure 6.3 Process to estimate hours worked in the Canadian national accounts



Sources: Statistics Canada (*19*) and Maynard, Girard and Tanguay (*20*).

Box 6.3 Labour data estimation criteria in the national accounts of the Russian Federation

Hours worked =

Workplaces x average actual hours worked in the accounting period

Full-time equivalent employment =

Hours worked/average hours performed by full-time employees

Full-time equivalent =

Number of workplaces in full-time equivalent employment

Reference criteria:

40 work hours per week; 52 weeks per year – 4 weeks of leave

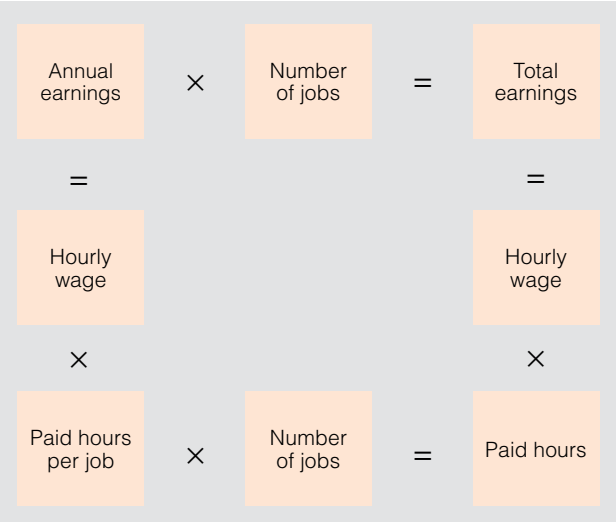
Maximum total workable hours: 1920

An adjustment is required to establish the main job and the hours worked in additional jobs.

Source: Surinov and Masakova (*21*).

both direct costs and indirect costs (for example trainees' salaried work time). Clinical or hands-on training as part of health services delivery represents a joint product that is also accounted for in HRH expenditure measures (at least in theory).

Figure 6.4 Calculation square



Source: van Polanen Petel (*18*).

Lastly, in some contexts, complementary data collection or estimation procedures may be needed where non-observed payments are likely to be significant: unregistered (legal activities but deliberately concealed from public authorities), informal (legal activities with a low level of organization with little or no division between labour and capital as a factor of production) and illegal (activities forbidden by law or which become illegal when carried out by unauthorized persons). The labour imputed method is frequently used to identify the need for any such adjustment: a comparison of the volume of work of the supply of labour (usually through labour force surveys) with estimates of demand obtained from business or facility surveys. Other methods involve triangulation of various sources, the commodity flow method and input–output comparisons (*24*).

Box 6.4 Defining remuneration of employees and self-employment income

Remuneration of employees

The remuneration of employees comprises the total compensation, in cash or in kind, payable by enterprises to employees in return for work performed during the accounting period. Wages and salaries as well as employer social contributions are included.

Wages and salaries of health employees include remuneration in-cash and an allowance for benefits in-kind for health activities such as regular interval payments, piecework, overtime, night work, weekend or other unsocial hours, allowances for working away from home, in disagreeable or hazardous circumstances, as allowances linked to housing, travel or sickness benefits, ad hoc bonuses, commissions, gratuities, and in-kind provision of goods and services not required to carry out their work, such as meals and drinks, uniforms and transportation.

Social contributions paid for health employees involve actual or imputed payments to social schemes to secure an employee's entitlement to non-wage benefits. The valuation of social contributions includes payments by employers to social security schemes or to private funded social insurance schemes designed to secure social benefits for their employees; imputed social contributions by employers providing unfunded social benefits are to be added. A statistical convention considers that employees receive a gross compensation from which they pay their share of contributions to social protection schemes, whether social security funds, private funded schemes or unfunded schemes.

Social contributions are monitored through administrative records. Imputed social contributions of employers are estimated for unfunded social benefits paid by employers and correspond to the amounts that would be needed to guarantee their right to social benefits. Taxes payable by an employer on the wage and salary bill are excluded.

Self-employed income

Self-employment income refers to the independent health practitioners. After deducting compensation of employees, taxes and subsidies from value added, the balancing item of the generation of income account obtained is described as operating surplus or mixed income.

The *operating surplus* reflects the surplus or deficit accruing from production before taking account of any interest, rent or similar charges payable on financial or tangible non-produced assets owned, borrowed or rented by the enterprise. The gross operating surplus includes the returns of owned assets used in the production process; these should be netted to isolate the remuneration component.

This component is called *mixed income* for unincorporated enterprises owned by members of households, either individually or in partnership with others, in which the owners, or other members of their households, may work without receiving any wage or salary. Their labour income is mostly an entrepreneurial income. The mixed income contains an element of remuneration for work done by the owner, or other members of the household, that cannot be separately identified from the return to the owner as entrepreneur. The unincorporated enterprises owned by households that are not quasi-corporations are deemed to fall in this category, except owner-occupiers in their capacity as producers of housing services for own final consumption and households employing paid domestic staff, an activity that generates no surplus. The mixed income is increasingly reported as an independent value.

- The concept of operating surplus or mixed income is not applied to measure the income of workers in governments and not-for-profit enterprises.
- Household unincorporated enterprises who regularly sell most of their output should be treated as market enterprises. Groups of households that engage in communal activities for their own individual or community use should be treated as informal partnerships engaged in non-market production. Households producing services are included when they occupy their own dwellings in their production, and services produced by employed paid staff. The production of these services does not generate mixed income. There is no labour input into the production of the services of owner-occupied dwellings

Continues…

so that any surplus arising is operating surplus. No labour input is assigned when measuring surplus generated by employing paid staff (SNA93 4.148 to 4.150).

Employment relationship

The nature of the employment relationship has to be identified. An employer–employee relationship exists when there is an agreement, formal or informal, between an enterprise and a person on a voluntary basis, whereby work for an enterprise is contracted in exchange for a remuneration in cash or in kind, based on time or product done. The self-employed, by definition, work for themselves (SNA93: paragraphs 7.23–24). As applied, the concept excludes work not entitled to remuneration by members of a household within an unincorporated enterprise owned by the same household.

Payments

The nature of payments should also be explicit and treated according to international agreements: wages and salaries in cash should not include the reimbursement by employers of expenditures made by employees in order to enable them to take up their jobs or to carry out their work, e.g.

- the reimbursement of travel, removal or related expenses made by employees when they take up new jobs or are required by their employers to move their homes to different parts of the country or to another country;
- the reimbursement of expenditures by employees on tools, equipment, special clothing or other items that are needed exclusively, or primarily, to enable them to carry out their work.

The amounts reimbursed are treated as intermediate consumption by employers. For example, employees required by their contract of employment to purchase tools, equipment, special clothing, etc., when they are not fully reimbursed, the remaining expenses they incur should be deducted from the amounts they receive in wages and salaries and the employers' intermediate consumption increased accordingly. Expenditures on items needed exclusively, or primarily, for work do not form part of household final consumption expenditures, whether reimbursed or not.

Source: SNA93 (Chapter 7) (*1*).

6.4 Measurement frameworks and applications

As previously discussed, the most comprehensive and standardized measurement strategy for monitoring HRH expenditure is within the systems of health accounts and national accounts. These are built on various types of data, both new and existing, and must typically undergo a consolidation and harmonization effort as there are often at least some inconsistencies across sources. A key consideration is to understand the boundaries implied by different data sources, and what has been included and excluded. In this section, we outline the main frameworks used in HRH expenditure monitoring and present some reality checks on their actual uses, along with illustrative examples from selected countries.

6.4.1 Health accounts framework

Health accounting is designed to measure all resource flows earmarked to provide health care or a substantial amount of health status enhancement by medical means, whether labelled "health care" or not in national statistics (*2*). The health accounting model comprises a set of standard rules, tracking all resources entering the health system during a period, expressed in monetary terms. Health accounting uses existing data structures, through data compilation and consolidation, to create new information, aiming to provide a consistent picture (*3*).

A health accounting system analysis involves three basic dimensions: financing, production and final use – services purchased, services produced and services consumed, respectively. Data on HRH are meant to be included as a specific class in the "resource cost" classification, intended to measure the cost of the resources involved in the production of health commodities, as part of the production dimension (Figure 6.5) (*25*). Flows of resources are recorded in two-dimensional tables showing the origin and the direction of the transactions. The tables for HRH cross-classify the flows by categories of health workers, by financing agent (for example government, private sector) or

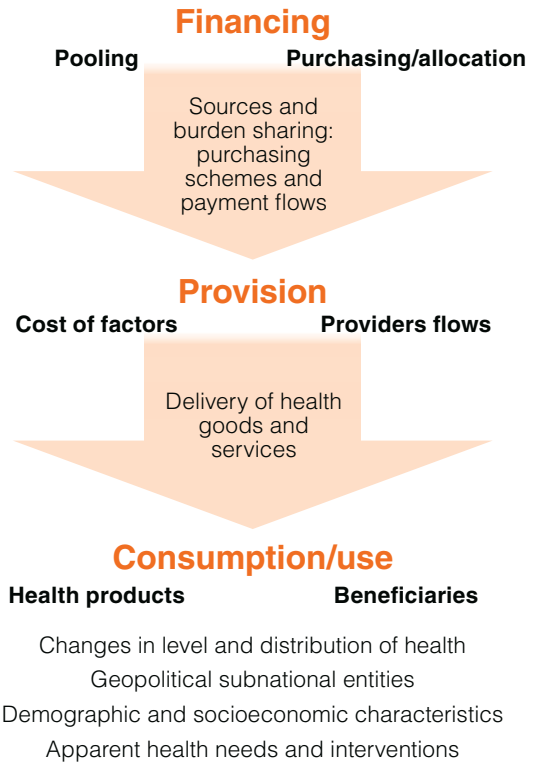
by type of health service or good that they contribute to producing (also called health functions). The data sources should usually link information on HRH by place of work (hospital, health centre, etc.).

In reality, few countries collate and disseminate detailed expenditure data on HRH, including who is paying for their work and in which services they are involved. Health accounts rarely report expenditure on health workers that allow the basic set of indicators of Box 6.1 to be measured and monitored. As a result, the policy analysis of the aggregate spending flows and the relative productivity of the system have been reduced. Tools such as the System of Health Accounts (*2*) and the *SHA guidelines project* (*26*) invite countries to display the number of health workers, but typically no expenditure breakdown for HRH is spelled out. Other tools and resources also exist; for one, the *Guide to producing national health accounts* (*3*) lists a resource cost classification detailing the uses made by providers of the funds they capture, cross-classifiable with financing agent purchases of these resources (paragraphs 5.19 and 5.20). A related manual on health spending measurement by the Pan American Health Organization (*27*) includes a cost structure, banking on SNA monitoring of resource flows, intended to rely on available health information systems and other (new and existing) data sources to perform indirect calculations (for example paragraph 282). The joint data collection questionnaire by OECD, Eurostat and WHO (*14*) includes HRH costs used up by health-care delivery only as HRH by provider in a "memorandum" table.

In a resource cost table listing the main expenditure headings incurred in the production process, the human factor emerges as an aggregate measure for all employees (collated at institutional level), as well as non-salaried labour income. There is usually a greater availability for public entities, allowing a display as the sum of total income without a breakdown by type of worker. To date, few health accounts reports include a detailed cost table containing HRH, labelled by some accountants as "line item" or "type of expenditure". Data are usually displayed cross-classified by providers or with financing agents.[2]

Illustrative examples of (simplified) data displays from two national health accounts are presented in Tables 6.1 and 6.2 (*28, 29*). The first, from Mexico, shows distribution of payments to providers under the column "personal services". The second, from Peru, presents more information on the institutional breakdown across the various health system actors. The "value added" components allow identification of remunerations of employees and self-employed income (see the next section and also Box 6.4 for technical details on related accounting principles).

Figure 6.5 Resource flows in a health system: an accounting representation



Source: Adapted from Hernandez and Poullier (*25*).

6.4.2 National accounts framework

The system of national accounts describes the financial flows across different components and dimensions of a market economy: production, income, consumption, accumulation and wealth and their interrelations. The system is broken down into many different branches of which health is only one (identified under "human health and social work activities" as one of 21 branches in ISIC). The boundaries and rules of the accounts framework allow the generation of a set of indicators, reported in core tables, showing the size of the health branch compared to other social and economic branches and to the economy as a whole. Income accounts report the wages and salaries of employees in each branch (primary income distribution tables) and related payments for social contributions (secondary income distribution tables); income for self-employed health workers is ideally recorded as gross operating surplus and mixed income. Increasingly, national reports display an independent mixed income and also

2 In health accounting wording: provision x resource cost (HP x RC) table and/or financing x resource cost (HF x RC) table.

Table 6.1 Percentage distribution of expenditure by type of health-care agent, Mexico health accounts, 1995

Institution	Type of expenditure (%)					Total
	Personal services	General services	Supplies	Infrastructure[a]	Not specified	
Health social insurance	44.4	39.4	12.1	3.3	0.9	100
Tax funded services	65.8	9.5	9.3	6.1	9.3	100
Private medical insurance	22.6	25.7	43.9	7.9	–	100
Private medical services	19.3	22.0	51.9	6.7	–	100

a. Expenditure on infrastructure is included in this table but in search of a tri-axial accrual approach, a two-tier approach involves only current spending.

Source: Adapted from Fundación Mexicana para la Salud (*28*).

Table 6.2 Percentage distribution of expenditure by main providers, Peru health accounts, 2000

Components	Public (%)		Private (%)	
	Ministry of Health	Health social insurance	For profit	Not-for-profit
Intermediate consumption	**40.5**	**41.5**	**32.7**	**55.0**
Medical inputs and pharmaceuticals	11.2	21.1	8.0	13.8
Non-medical goods and services	29.3	20.3	24.7	41.2
Value added	**48.5**	**50.4**	**61.8**	**43.6**
Remunerations	45.1	45.3	12.3	38
Professional services	–	–	13.6	–
Taxes	1.0	1.6	9.3	2.7
Depreciation	2.4	3.4	3.3	2.9
Operation surplus	–	–	23.3	0
Investment	**8.4**	**8.1**	**5.5**	**1.4**
Transfers to community bodies	**2.6**	**–**	**–**	**–**
Total	**100**	**100**	**100**	**100**

Source: Adapted from Ministerio de Salud del Perú (*29*).

net values (capital consumption is deducted to obtain net values).

The recommended display of the income components is presented in Table 6.3 (*30*). When available, compensation of employees and net mixed income can be drawn directly from this display for decision-making purposes.

For a large number of countries, statistical information on HRH expenditure as obtained through national accounts is displayed as part of the primary income distribution tables disseminated by various international agencies (as well as related research and methodological resources), notably OECD (*31*), Eurostat (*32*) and the United Nations Statistics Division (*33*).[3] Remuneration to government health employees is also increasingly reported in the component of national accounts dealing with general government expenditures (mapped to COFOG division 07) (*33, 35*). Although SNA93 recommends more complex breakdowns (tables 18.2–18.4), they are rarely produced.

3 It may be noted that, as of mid-2008, the tables produced in many countries still correspond to the previous 1968 edition of the SNA manual, and so do not necessarily reflect the evolving standard for national accounts (*34*).

Table 6.3 Remuneration components in the "use" table of the income account, System of National Accounts

		S11	S12	S13	S14	S15	S1
Code	Transactions and balancing items	Non-financial corporations	Financial corporations	General government	Households	Non-profit institutions serving households	Total economy
D1	**Compensation of employees**	**549**	**15**	**142**	**39**	**24**	**769**
D2	Taxes on production and imports						235
D3	Subsidies						-44
B2g	Operating surplus, gross	254	55	44	92	7	452
B3g	Mixed income, gross				442		442
P61	Consumption of fixed capital on gross operating surplus	137	10	30	32	3	212
P62	Consumption of fixed capital on gross mixed income				10		10
B2n	Operating surplus, net	117	45	14	60	4	240
B3n	**Mixed income, net**				**432**		**432**

Source: System of National Accounts 2008, Table 7.1: The generation of income account – concise form – uses (concise version) (*30*).

Table 6.4 presents a simplified example of the tables displayed in the national accounts in South Africa, including a selected list of industries from both columns and rows from the supply and use table (*36*). The column "health and social work" allows tracking of the purchases of products; further refinement is possible by subdividing into the health services versus social services components (not shown here).

As previously mentioned, HRH data taken from national accounts are generally limited to workers in services provision and thus may undervalue the total expected from a health accounts framework. Where national accounts are the only information source, these estimates should be supplemented to ensure reflection of the wider range of health system activities, tracked through a detailed display at the provider or product level and mapped through ISIC and CPC, respectively (see section 6.3.1 above).

6.4.3 General government accounts

The expansion of public finance monitoring and other good governance approaches yields relatively comprehensive information on public sector expenditures in many Asian and Latin American countries, and in a growing number of countries of the African and Eastern Mediterranean regions. Data for monitoring general government accounts are drawn from the various public sector institutions. Although some countries map health-related data to COFOG or ISIC, there is no single classification method for HRH expenditure used consistently across, or even within, all countries. For example, in the case of Portugal, differences in the health sector universe across accounting exercises have meant that, in particular, activities of legal forensic institutions have been excluded from the Portuguese health accounts but included in the 2008 national accounts.

An ongoing push by the International Monetary Fund to implement a standard classification for government finance statistics deals with a breakdown for health, including compensation of employees defined similarly to the SNA93 approach – that is, in terms of wages and salaries (in cash and in kind) plus social contributions (actual and imputed) (*37, 38*).[4] While more and more

4 See International Monetary Fund *Government finance statistics manual 2001*, paragraph 4.26 and table 6.1: Economic classification of expense (*37*). Companion materials and research on government finance statistics, including treatment of HRH data in the annual questionnaire, are available on the web site of the International Monetary

Table 6.4 National accounts supply and use table, South Africa, 2002 (millions Rand, partial display)

Use of products	Total supply at purchasers' prices	Taxes on products	Subsidies on products	Industry						Total industry	Total economy
				Agriculture	Coal	Gold	General government	Health and social work	Activities/ services		
				I1	I2	I3	I92	**I93**	I94	I95	I96
Agricultural products	102 613			3 296	11	12	146	58	77	52 298	
Coal and lignite products	38 543			3	2	28	81	80	5	23 742	
Petroleum products	88 240			3 503	548	234	1 582	958	288	51 295	
Pharmaceutical products	36 256			1 979	11	66	5 269	6 670	–	22 857	
Optical instruments	22 594			–	93	132	2 736	3 512	550	12 590	
Electricity	39 269			490	493	2 130	434	347	537	26 628	
Buildings	64 294			168	8	10	874	334	242	25 501	
Transport services	137 197			4 917	7 338	185	2 731	931	744	79 089	
Communications	102 299			27	77	86	3 403	2 353	2 220	76 669	
Insurance services	133 078			1 232	–	41	1 467	609	1 745	88 447	
Real estate services	125 178			16	33	34	1 639	4 306	1 544	57 045	
Other business services	111 811			68	759	1 550	7 709	5 153	2 792	102 245	
General government services	241 233			–	–	–	21 139	2 832	–	24 755	
Health and social work	63 153			975	–	–	2 497	80	496	6 097	
Purchases by residents	19 601									–	
Purchases by non-residents	–									–	
Total uses at purchasers' prices	2 961 897			41 816	19 590	17 353	82 359	35 565	23 342	1 453 588	–
Total gross value added/GDP		109 660	(4 762)	44 179	17 464	26 915	157 391	24 664	37 966	1 063 879	1 168 777
Compensation of employees				10 730	6 420	14 255	136 085	**12 059**	31 693	520 501	520 501
Taxes less subsidies		109 660	(4 762)	(749)	328	461	2 260	802	763	21 543	126 441
Taxes on products		109 660								–	109 660
Subsidies on products			(4 762)							–	(4 762)
Other taxes less subsidies on production				(749)	328	461	2 260	802	763	21 543	21 543
Gross operating surplus/mixed income				34 198	10 716	12 199	19 046	**11 803**	5 510	521 835	521 835
Total output at basic prices				85 995	37 054	44 268	239 750	60 229	61 308	2 517 467	

Source: Adapted from Statistics South Africa (*36*).

countries are issuing reports complying with this standard, any attempt at comparative analysis requires careful checking of the actual boundaries of HRH expenditure; variations may occur in the treatment of some key items that may affect labour dynamics, such as allowances and incentives.

6.5 Summary, conclusions and further developments

This chapter has focused on the tools, methods and usual means of measuring expenditure on the health workforce as a component of overall monitoring and evaluation of HRH strategies. It has been argued that there are many advantages of an integrated estimation of HRH expenditure within routine accounts estimates – either the system of national accounts or, preferably, health accounts. There are certainly economies of scale and quality gains from a comprehensive and harmonized process in collating and processing the required data, and in identifying and filling information gaps through complementary data collection and analyses.

To complement or refine available estimates on HRH expenditure, close collaboration between health accountants and national accountants is advisable. When the data are taken from national accounts records, the most important adjustment required is an expansion of the boundaries of the health system to reach concordance with health accounts boundaries. As such, there is an advantage in generating the data as a bottom-up exercise (estimating each of the various components independently and then adding them up); this allows greater flexibility to use the data in different ways according to specific needs. When full records and updates of HRH expenditure are not readily available, a series of progressive steps can be taken to move towards a comprehensive assessment: from simply persons working in health services delivery to those across the whole spectrum of health system activities, from measuring just wages and salaries to inclusion of non-wage contributions, or from government expenditure to all (internal and external) financial sources.

Ensuring the quality, coherence, consistency and relevance of the data – which may be drawn from multiple sources – requires continuous verification during compilation, integration, adjustment and modelling (*39*). This may include data validation and adjustments (to correct biases, errors, incompleteness and discontinuities); conceptual adjustments (for example to bring figures using definitions from national accounts in line with those from health accounts); comprehensiveness adjustments (to cover hidden activities, informal payments and others); and balancing adjustments (for example between supply and demand for health labour).

In addition, different policy concerns may require a specific breakdown of HRH expenditure estimates or additional analyses beyond standard health or national accounting methods. Guidelines for health sub-accounts to produce additional estimations are being developed and tested by WHO (*40, 41*) in the following areas:

- sub-accounts for specific diseases and programmes (including malaria, reproductive health, HIV and tuberculosis services);
- sub-accounts on child health programmes;
- regional health sub-accounts (distributional tables for specific regions within a country – particularly relevant for decentralized health systems);
- sub-accounts for specific population groups (distributional tables in terms of expenditure allocation according to characteristics of health service clients, such as by age, sex or other socioeconomic characteristics).

At the same time, it must be recognized that there are presently no specific guidelines for disentangling the whole set of health labour cost estimations, and this across the stages of the working lifespan. Based on measurement results from several countries, the need has been recognized for further development in the following areas in order to reach a comprehensive assessment of expenditure on HRH:

- boundary problems to distinguish between labour resources in the health system devoted to health-care services delivery versus other functions and activities;
- challenges regarding completeness and coverage of information on HRH stock and distribution (for example lack of centralized database, lack of sufficient detail for disaggregation);
- problems with consistency of HRH information across various data sources, such as lack of standard practices to classify workers by occupation and education; differences in practices to estimate full-time equivalents across health worker groups; potential double-counting of health workers (for example due to multiple qualifications or job positions); and, given such differences, resulting difficulties in interpreting and comparing statistical findings across and within countries.

In sum, strengthening of national information systems, better use of available data and intensified efforts for harmonizing definitions and measurement units relevant for health labour accounting should ensure that investments in the health workforce are appropriately

monitored and evaluated. This is critical information that could help address many important policy questions, such as the costs of scaling up health interventions or providing incentives for improving staff retention and motivation to ensure high quality and efficiency of services.

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7 Use of facility-based assessments in health workforce analysis

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7.1 Introduction

The global health literature demonstrates that health-care service coverage and quality are directly correlated with health worker numbers and performance. For instance, the World Health Organization (WHO) has presented evidence showing that coverage of selected primary health-care services, including maternal, newborn and child health interventions, tend to rise with higher national health workforce densities (*1*). Using the Millennium Development Goals as the benchmark, WHO reports that countries with the highest shortfalls in numbers of physicians, nurses and midwives are the ones most at risk of not meeting coverage targets. The African region – home to only 3% of the estimated 59.2 million health workers in the world but having 24% of the global burden of disease – is the area hardest hit by health worker shortfalls and imbalances worldwide (*1*).

Securing improvements in the size and quality of the health workforce is important for achieving regional and country-specific Millennium Development Goals in health. Overcoming human resources for health (HRH) shortages and imbalances requires strengthening education and training programmes for health workers, improving health sector working conditions (including staff salaries and benefits) and forging cooperation and collaboration in health workforce management within and across countries. Evidence-based monitoring of health workforce dynamics is important for ensuring that policy and programmatic inputs lead to the expected outcomes.

Often, a lack of comprehensive, timely and reliable data on HRH results in poor knowledge of workforce status and curtails development of evidence-based policies among national and international stakeholders. Several factors have contributed to the weak information and evidence base on the health workforce in many low- and middle-income countries. These include lack of a common framework from which to understand HRH issues; poor data availability and quality; imprecise definitions and classifications of certain health worker categories; weak technical capacity to conduct in-country workforce analysis; lack of appropriate measurement tools; and underinvestment in national health information systems (*1–3*). In particular, lack of standardized approaches to HRH assessment limits the potential for comparative analysis over time and across countries to better understand how different situations, policies and interventions impact the performance of human resources and health systems and, ultimately, population health outcomes.

Health facility assessments (HFAs), the focus of this chapter, are tools for gathering data that are a potentially important source of information for health workforce monitoring. A number of countries already conduct such assessments, and demand for them is increasing. Health facilities refer to service delivery points in the formal health sector, including hospitals, health centres, dispensaries and health posts. HFA protocols capture real-time information (i.e. at the moment of the assessment) on a key component of the overall health system: facility-based service delivery. Depending on the nature of the data collection instruments, HFAs can provide detailed information on health workforce availability, distribution, qualifications, skills mix, training and performance. This information can be used to determine, for example, how existing staffing patterns relate to desired or planned staffing levels, how well staff members' qualifications match their assigned scope of work and the nature and extent of geographical or other staffing imbalances. HFAs can also provide insight into the broader health labour market context, including management practices and other features of the work environment (for example infrastructure and availability of medical supplies and equipment), and how these variables affect health worker supply and performance. In short, HFAs can inform workforce policy by telling us what is happening on the ground, in the real world of service delivery.

The main objective of this chapter is to describe the current and potential usefulness of HFAs as a source of

information for health workforce planning, management, monitoring and policy-making. Illustrative examples are presented based on empirical data from HFAs conducted in Kenya, Nigeria and Zambia. Facility-based assessments cover a broad array of data collection techniques, including facility audits, observations of services delivered, interviews with service providers and interviews with clients. These various methods, along with other practical considerations in planning an HFA, are reviewed here. However, this chapter does not elaborate step-by-step instructions on designing and implementing facility assessments; for general information and relevant resources see International Health Facility Assessment Network tools (*4, 5*).

7.2 How facility-based assessments can be used for health workforce monitoring

As detailed in Chapter 1 of this Handbook, there are three interdependent stages in the lifespan of the health workforce: (i) pre-service or entry into the workforce; (ii) active workforce; and (iii) exit from the workforce. Ongoing measurement and monitoring of performance indicators for each of the three stages is needed to determine the health system's readiness and ability to maintain a sufficient stock of qualified workers. Because the stages are interactive and interdependent, monitoring must be holistic rather than fragmentary, focusing on the whole rather than little slices of the pie. While detailed analysis of the entry and exit stages is beyond the scope of HFAs (for example health education outputs and costs, and mortality and migration among health workers, respectively), facility-based sources can provide valuable information to complement data obtained using other methodologies (such as special studies on education or migration).

Box 7.1 shows a list of indicators that can potentially be measured for each of the workforce stages using HFA data. Most population-based sources of health workforce statistics (for example population censuses, labour force surveys) tend to relate workforce data to the general population; while important in their own right, they provide little insight into the service delivery environment, service quality or other operational factors within the health system that can play a major role in workforce performance. HFA data can help address this information gap by describing health labour dynamics at facility-based service delivery points.

Box 7.1 Core health workforce indicators potentially measurable with HFA data

Entry stage of the working lifespan

- Number of new medical/health graduates entering the facility-based health workforce
- Ratio of new medical/health graduates entering the facility-based workforce to the total facility-based health workforce

Active workforce stage

Supply

- Stock or total number of facility-based health workers
- Number of facility-based workers relative to total (catchment) population
- Number of facility-based workers relative to planned staffing norm
- Number of staff per health facility (by type of facility or services offered)

Distribution

- Skills mix of facility-based staff
- Geographical distribution of facility-based staff
- Age and sex distribution of facility-based staff

Capacity, motivation and performance

- Level and field of education among facility-based staff
- Years of professional experience among staff working at the facility
- Staff receiving in-service training during a reference period (by type of training)
- Services provided by staff during a reference period
- Proportion of staff working full time versus part time at the facility
- Proportion of staff assigned to the facility (in post) working at the facility on the day of the assessment
- Proportion of staff receiving (non-monetary) incentives at their job

Exit stage

- Facility-based health workforce attrition rate (by reason for leaving workplace)
- Ratio of facility-based health workers entering the workforce to those exiting the workforce

7.3 Overview of key HFA methodologies

This section provides an overview of issues of importance when planning an HFA, and describes the methods and focus of data collection for several different HFA tools developed by different private, public and international organizations.

7.3.1 Issues when planning an HFA

All HFAs collect data at the facility level, but methodologies and protocols may vary in relation to information needs, costs and sources of funding, and local implementation capacity. Here the main practical and methodological issues are discussed, as they relate to HRH monitoring.

Selection of facilities to be covered in the HFA: census or survey sample

The design of an HFA requires careful attention to the strategy for data collection from the initial planning stages, particularly the sampling method: census or survey sample. The choice of method often depends on trade-offs in scope and depth of information to be obtained with cost and time factors.

Census method. A census is a full enumeration, or the collection of data from all facilities that meet eligibility criteria. Examples of eligibility criteria that have been used for HFAs include: (i) managing authority, whether government, private for-profit, nongovernmental or faith-based organization, or other management or funding criteria; (ii) facilities offering certain services (for example maternal and newborn services, child health services, HIV-related services); (iii) facilities of a given type (from primary health-care centres to tertiary-level hospitals); or (iv) facilities within a certain geographical area. Often, a combination of several such criteria is used. Advantages of a full enumeration, or facility census, include having information specific to every facility and the potential for simpler data analysis and interpretation of results (no need for sampling weights or calculating a statistical margin of error). Disadvantages include difficulties in ensuring a complete enumeration of all eligible facilities and higher costs, especially when the number of facilities to be enumerated is large.

Survey sample method. In survey approaches, probability sampling principles are used to draw a selection of facilities for inclusion in the assessment. First, the eligibility criteria (see above) are developed; then, a number of facilities are selected based on a sampling frame or list of all eligible facilities. The larger the sample size, the greater the precision of the results; however, the total size will often also depend on budget and other constraints. Usually, once the list frame has been developed, a multistage sampling plan is followed to ensure representation across various domains of the universe of eligible facilities. The stages are determined by the different eligibility criteria (for example administrative authority, type, geographical location). When a multistage sampling is used, sample weights need to be applied when analysing the data to calibrate for national representation. The weights are mathematically derived by sampling experts.

A key weakness in generating a list frame of health facilities is that different authorities do not always have up-to-date records of facilities functioning in the country. Experience shows that oftentimes facilities, particularly in the private sector (either for-profit or not-for-profit), may have closed or changed addresses, and there is no standard definition for a type of facility in the private sector. An initial list obtained from the ministry of health will usually need to be complemented with information from multiple other sources, such as private sector coordinating bodies, social ministries where nongovernmental organizations register their activities, or directly from faith-based, private and parastatal organizations.

Where the HFA includes interviews with individual providers, the health worker to be interviewed is randomly selected from the list of those present on the day of survey. Although ensuring an unbiased (non-zero) chance of selection for each health worker is an important factor, practical considerations of availability and relevance are also essential. In most situations, health workers providing direct client services tend to be prioritized over those performing administrative duties, such as maintaining health information records or other activities not directly entailing services delivery. A major advantage of a well-designed sampling plan is that in-depth data collection is feasible within a reasonable time and cost. More information on sampling methodologies to provide unbiased estimates of facilities and their characteristics is available elsewhere (see, for example, the MEASURE Evaluation manual (*6*)).

Data collection methods and tools

Facility-based assessments may employ one or more techniques for data collection, including facility audit (often referred to as an inventory), observation of services delivered, interviews with clients, and interviews with service providers and other facility staff. Tested data collection tools exist for each of these methodologies (see section 7.3.2 below).

Facility audit. This is the method used to collect information on infrastructure, availability of equipment and

supplies, staffing levels, services offered, and management and support systems in place. While structured questionnaires are always used in facility audits, there may be differences across tools in how the information is collected. Protocols tend to differ with regard to choice of respondent to the questionnaire (for example interviewing the person in charge of the facility's operations overall, versus selecting a range of persons considered most knowledgeable for each information domain); where within the facility physical data collection will occur (enumeration of all items regardless of location in a facility, versus counting only those located and functioning in the relevant service delivery area on the day of the assessment); and whether there is validation of reported responses (accepting as legitimate any interview response, versus requiring additional data collection by other approaches such as inspection of equipment or review of administrative records). Using multiple respondents, validating reported information by observation and ensuring items are in the relevant service area each take time, particularly in large and complex facilities. In addition, validation exercises may require engaging more highly skilled data collectors who are familiar with health services and systems (see next subsection on selection of data collectors). However, these techniques tend to provide the most uniformly reliable and valid information, and allow for more in-depth assessments of capacity to provide quality services. For example, if blood pressure monitors are found to be available somewhere in the facility, but none are within the specific area where a health worker who might require such equipment is providing services, it is unlikely that clients will have their blood pressure measured. Past experience also indicates that when interview responses from key informants are not validated, respondents sometimes provide answers that describe the usual or even desired situation, rather than the actual situation on the day data are collected. This is especially true in larger facilities, where an overall administrator may not be closely familiar with the day-to-day state of affairs in each service delivery area.

Observation of key services. Client observations are service specific, and may be based on a full census (observing all eligible clients who receive services during the period of data collection) or opportunistic sample (clients served when the data collector was available and present). Most of the data collection tools are checklists that measure process, for example information shared, examinations carried out and medicines or tests prescribed. In general, observation data are used to assess compliance of health worker practice to established guidelines. Direct observation may be followed by special studies in order to improve data credibility. These are sometimes referred to as "gold standard" observations, whereby someone more highly skilled and specialized than the observed worker revisits with the client afterwards to determine whether correct diagnosis, care and treatment were provided.

Interviews with clients. Client or exit interviews are often used to ascertain client perspective on the quality and responsiveness of services received, which can be useful for assessing health worker performance. Exit interviews may be conducted among a random sample of all attenders on the specific day, or include only those whose consultations were observed. A major weakness in exit interviews is the bias toward more recent and possibly more self-motivated clients whose care-seeking behaviours may not be representative of the target population, or the universe of those receiving such services. Additionally, exit interviews, by their nature, provide a superficial rather than an in-depth examination of the client's perspectives on the services received. An in-depth analysis is preferable, but requires time inputs that may be unduly burdensome to clients who may have already spent many hours in the facility waiting for and obtaining services.

Interviews with service providers. Interviews with service providers are used to collect information on types of services provided, opinions related to the working conditions, educational attainment, in-service trainings and working experience. The method may also be used to evaluate health workers' knowledge in specific topic areas. As with the exit interview, health worker interviews are, by design, short in order to minimize disruption to service provision, since data collection occurs during regular business hours. As such, HFAs are not a source of detailed information for human resource development; additional information on workforce performance will have to be obtained from special studies, which are imperative in any HRH monitoring and evaluation plan. Facility records of staff training may provide an alternative source for some of these data, provided such records are available, complete and routinely updated.

Selection of data collectors

A combination of persons with clinical and social science backgrounds is recommended for data collection activities in health facilities. A mix of persons with skills in the science of data collection and those familiar with the functioning of health facilities helps to assure the quality of data collected. For instance, it is generally agreed that interviews with providers and clients can be handled well by non-health personnel, but observations of provider–client interaction require observers with advanced training in a health-related field. Having data collectors with a health background may be less important for facility audits, depending on the complexity of the tool being used, but knowledge of the health

system processes is likely to enhance the efficiency and reliability of data collection in any context.

7.3.2 Examples of tested HFA instruments

A number of different HFA tools have been developed and implemented under the auspices of international technical cooperation programmes for collecting data relevant for HRH analysis. They include the Health Facility Census (HFC) developed by the Japanese International Cooperation Agency (JICA); Service Availability Mapping (SAM) developed by WHO; the Service Provision Assessment (SPA) developed by Macro International; and the Situation Assessment of Human Resources in the Public Sector developed by Partners for Health Reform*plus* (PHR*plus*) (*7*). Overall such methods can be tremendously useful for updating and validating national databases of health system statistics, including HRH, and should be considered for this purpose by any country interested in investing in its HRH information system. Customized modules can also be added to supplement these standardized approaches if they are needed for comprehensive HRH assessment in a given context. The types of health workforce information collected are generally similar across sources, but results may not be directly comparable, given each tool's specificity.

JICA Health Facility Census

The JICA Health Facility Census tool is designed to provide detailed information on the status of physical assets at all health facilities within a country (*8*). The focus is on information useful for public health system infrastructure investment planning (*9, 10*). Designed as a physical asset mapping, the HFC also conducts a headcount of all health workers present on the day of visit. Data obtained include staff qualifications, the number of staff present versus the number assigned, demographic composition and staff qualifications.

Service Availability Mapping

Developed by WHO, SAM is designed to determine the availability of key programmes and resources, and map common services (*11*). While originally developed for implementation at the district level, the facility-based data can be aggregated to provide evidence for decision-making at the national level when all districts in a country are included. SAM consists of a suite of tools, including district and health facility questionnaires, each of which is administered to key informants; a data entry programme on personal digital assistant (PDA); and a geographical information system software (*HealthMapper*). The district questionnaire is meant to be administered to all district medical officers in a country (a subset of districts may be sampled in very large countries). The health facility module captures information on all public and private facilities within districts. The capturing of geographical coordinates allows unique identification and charting of health facilities. Data collected on HRH include staff qualifications, staff availability on the day of visit versus staffing norms – that is, approved staffing positions for the specific facility as assessed based on service utilization or other workload indicator (see *12* for related tool) – and working hours. Although essentially a district-level monitoring tool, SAM is expandable to include more HRH questions in order to provide detailed data on health personnel at the district level. The method can be combined with the HRH targeted approach, such as that developed in the PHR*plus* tool (described later in this section), to produce data for more robust HRH analyses that take into account national sociodemographic and epidemiological contexts.

Service Provision Assessment

SPA is designed to assess the quality of health services as measured through resources, systems and some observed practices (*13*). Developed with funding from the United States Agency for International Development (USAID), SPA collects data on current workforce size versus staffing norms. Additional data may be collected on each staff member's qualifications and working hours and on seconded workers (for example numbers and salary source). An example of where this kind of assessment may be useful is the Caribbean region, where physicians frequently rotate on a schedule between several facilities. Interviews based on a subsample of staff, including primary providers of key services, are used to assess the workforce skills mix in terms of workers' levels and fields of pre-service education, types of in-service training received during a reference period and years of experience at the given facility. (The tool does not presently collect data on specialty education received after the initial clinical qualification, although some information may be inferred from respondents' reported duration of schooling for their current occupation.) The proportion of staff performing activities in the specific area of in-service training can be measured by this instrument, and can be utilized to assess whether training is targeted to the appropriate staff and whether staffing assignments take training into account.

Partners for Health Reformplus situation assessment

The PHR*plus* survey tool presents an example of how a facility-based assessment of HRH may be construed. Developed by Partners for Health Reform*plus* with funding from USAID, this tool collects data on

workforce size, skills mix, distribution and turnover rates in the public health sector (*7*). Data on individual workers are supplemented with a situation analysis of national health planning, information and strategy documents, plus a modelling exercise to determine human resources needed for achieving targets under the United States President's Emergency Plan for AIDS Relief and the health-related Millennium Development Goals. Estimates based on the modelling exercise developed for Nigeria – focusing on provision of services for HIV, malaria, tuberculosis, maternal and child health, and family planning – illustrate how this approach could inform the development of a standardized version for cross-country analysis (*14*). Such adaptation should be made in the context of indicators that health managers need for programme monitoring and should factor in country- and disease-specific contexts.

Selected additional tools

Other HFA methodologies useful for assessing the HRH situation have been developed, tested and implemented at the national, subnational and programme levels. A list of these tools, though not exhaustive, follows below.

- The **Facility Audit of Service Quality** is a rapid and simple assessment tool developed by MEASURE Evaluation to help district- and programme-level officials design and implement a tailored HFA (*15*). The audit employs a strategy that recommends a complete enumeration of all facilities in the target districts. When implemented in the intended fashion – that is, with local district or programme staff serving as data collectors and asking local stakeholders to tailor the protocol to their needs – results are not likely to provide the consistency required for aggregation at the national level. As such, the approach is not designed or recommended for use for national-level planning and evaluation.
- The **Assessment of Human Resources for Health** is a survey instrument developed by WHO for collecting quantitative and qualitative HRH information (*16*). Four questionnaires are included in the tool, focusing on the following areas: health professional regulation, training institutions, health facilities and health-care providers. The questionnaire for health-care providers – which covers topics such as professional qualifications, dual employment and occupational mobility – is meant to be implemented among a representative sample of facility-based health workers, and can be merged with the data collected at the facility level for collating information on the environment within which workers operate.
- The **Quantitative Service Delivery Survey** is an outgrow of the Public Expenditure Tracking Survey of the World Bank, whose original purpose was to analyse the efficiency of financial resource flows and estimate the leakage of public resources from central government to the front-line service providers (*17*). The tool includes questionnaires addressing all levels of service delivery: ministry of finance, ministry of health, regional and district administrations, health facilities, health service providers and clients of health services. The facility instrument, intended for the head of facility, gathers financial data (both revenue and expenditure sides) and information on institutional arrangements and governance, to name a few. The providers survey can be used to study worker morale, absenteeism and coping strategies such as informal payments. Some surveys also include vignettes to assess the level of knowledge of doctors and nurses, which serves as a proxy for the quality of care provided.

7.3.3 Implications of HFA methodologies and data collection issues

When it comes to the sampling approach, in general, censuses are more appropriate when facility-specific information is needed, such as infrastructure, human resources, equipment, supplies and other essential inputs. Survey samples are best when more in-depth information is needed, including particular details reflecting systems processes, services provision, health information and record-keeping practices, provider productivity, management and supervision, and client perception of service quality. A mixture of the HFA methods may be most appropriate when assessing HRH at the facility level. Censuses (such as the HFC or SAM) can provide precise pictures of the numbers and distributions of health workers, whereas sample surveys (such as SPA) including provider interviews offer the means to identify systems issues that affect worker motivation and satisfaction and the information base to design retention strategies. It is sometimes possible to mix sampling methods within the same assessment, collecting some (basic) information from all facilities and more in-depth data from a sample.

Several variations of HFA data collection tools have been developed and used to meet a wide range of specific information needs. It is essential that any generic tools are country-adapted before they are utilized so that precoded responses capture local terminologies and processes. This applies not only to certain equipment and supplies (for example names of medicines) but notably also to occupational titles and qualifications of staff, which would then be harmonized and mapped against standard definitions during data

processing and analyses for enhancing comparability across sources and over time.

Overall, there is no single HFA method that will meet all needs. Understanding the benefits and problems with different methods and tools will help stakeholders to select those most appropriate for their needs.

7.4 Some limitations of HFA methodologies for HRH data

While HFAs present a number of advantages for HRH analysis, there are also some limitations to this methodology that need to be considered.

7.4.1 Assessment coverage

As with all population- or establishment-based data collection exercises, availability of an adequate sampling frame for selection (either universal selection for census or sample for survey) is a key factor. Ideally, for HFA approaches, a complete list of all service delivery points in a country (or targeted areas) can be obtained from registration or licensing offices, or from the country's routine health information system. Often however, these sources are non-existent, incomplete or out of date when it comes to health facility information. Likewise, if a representative sample of staff within selected facilities needs to be drawn for interviews, this requires a further step in sampling design, notably a complete listing of all facility-based personnel (and even time-specific duty rosters). Inadequately designed or poorly implemented sampling at any level compromises the validity of generalizations to the health workforce as a whole and severely compromises the utility of such data as evidence for decision-making.

It is not uncommon for HFAs to cover only facilities in the government or public sector, with obvious implications for applicability of ensuing analysis to reflect the true national situation. In some cases, this limitation reflects weak enforcement of regulatory mechanisms overseeing service provision outside the government sector (and thus poor data on the operations and locations of such providers from which to complete the sampling frame), and in others the difficulty of collecting data from privately operated facilities (where refusals to participate are more common). When private sector facilities are included, coverage tends to favour not-for-profit facilities (for example parastatal facilities or those sponsored by recognized nongovernmental and faith-based organizations). In many low- and middle-income countries, private for-profit facilities tend to be smaller, geographically concentrated in urban areas, less standardized in terms of staffing and breadth of services, and more likely to cease operation within a relatively short timeframe. In countries where a large portion of health services are provided by the private sector, government-only HFAs will underestimate the overall human resource stock and flow.

On the other hand, including the private sector could increase the risk of double-counting health workers, particularly in settings where dual employment across both sectors is common but not sanctioned by regulatory and legal frameworks. Dual practice (that is, where a worker holds two or more jobs at different locations) is present in virtually all countries regardless of income level and does not necessarily impact negatively on health system performance. Even in contexts with strict regulatory restrictions of health professional activities, such as China and much of Latin America, physicians often hold jobs in both the publicly funded and private systems (*18*). The implication for HRH monitoring is that careful consideration of ways to avoid double-counting personnel should be an important component of any health facility-based assessments. Methods that have been used to address this issue include collecting information from health workers on the proportion of working hours during a week spent in a particular facility, or specifically asking about other facilities where they work.

7.4.2 Lack of standardization of definitions and statistical classification of health workers

The lack of standardization of health worker definitions across the various HFA approaches, including consistent definitions for occupational categories, is a serious hindrance to the usefulness of HFA data for comparative analysis of HRH within and across countries and over time. Most HFA approaches use country-specific or tool-specific occupational labels with no provision for translation to an internationally comparable set of categories. Many national occupational titles – especially those referring to staff other than medical, nursing and midwifery professionals – and the underlying data on staff qualifications are often not captured in a way that can easily be mapped to the International Standard Classification of Occupations (ISCO) (*19*) or the International Standard Classification of Education (ISCED) (*20*), respectively.

Occupational categories that present special challenges include those for health workers providing community or counselling services and those in the assistant or aide category. The job criteria and responsibilities assigned to these categories vary widely from country to country, and even across the public and private sectors within a given country. These categories of workers are numerous and, especially in

countries where highly educated medical practitioners are scarce, they often serve as the primary, on-the-ground providers of health services. Nationally defined occupations with labels such as "medical assistant" or "clinical officer" can be mapped to ISCO only if information on the level and specialization of educational qualifications are known. In some countries, workers with these labels work at an associate professional or lower level, while in other countries workers with the same labels have education requirements and responsibilities at a level higher than a professional nurse. Reliable mapping of national to international occupational and educational classifications depends on the detail with which data on the national categories are obtained, including, for example, data on staff training and responsibilities. Existing HFA tools tend to vary on this level of detail.

7.4.3 Lack of uniformity in definitions of facility types

To date there has been no uniformity across countries and tools in definition of common categories of health facilities. Even within a given country, facilities assigned the same label can vary greatly in size and function. In Kenya, for example, HFA data have shown that almost one in three facilities officially classified as health centres had no overnight or inpatient beds, but one in six had 20 or more beds. Standardized definitions for the most common types of health facilities are needed to enable comparisons within and across data sources. The International Standard Industrial Classification of All Economic Activities offers some guidance on this matter (*21*), but the definitions and categories in this generalized resource are broader than required in a typical HFA; even the lowest level of disaggregation classes just "hospital activities" and "medical and dental practice activities". Recent efforts towards establishing a common, detailed standard for HFAs have experimented with using the number of inpatient beds as a proxy for facility size and service complexity. These issues are important for considering, in particular, staffing norms and other indicators pertinent to HRH analysis.

7.5 Empirical examples based on HFA data

This section provides illustrative examples of the types of HRH data produced when using existing HFA tools, and how such facility-based data can be used in monitoring and analysis of the HRH situation. The illustrative analyses draw on microdata collected in Kenya and Zambia using three different HFA techniques (HFC, SAM and SPA) and published results for Nigeria using the PHR*plus* tool. The SPA sample survey data are weighted to correct for unequal selection rates across sampling units. Data from the HFC and SAM methods, which used census sampling (or complete enumeration of all facilities), did not need to be weighted or adjusted.

7.5.1 Entry to the health workforce

HFAs can be used to estimate the number of new entries or incoming staff to the facility-based workforce, and the ratio of new entries to the total facility-based stock of health workers in a particular reference period. Table 7.1 presents an example of such data for selected categories of health workers in Nigeria's public sector. The data show the numbers who entered the public health service in 2005: 1214 physicians, 1331 nursing and midwifery personnel, 501 laboratory technologists and technicians, 443 pharmaceutical staff (about half of whom were pharmacists) and 2742 community health workers (including community health officers and community health education workers). New entries constituted 7.7% of the existing stock of physicians, 1.1% of nurses and midwives, and 3.6% of pharmaceutical staff (*14*).

When compared to the number of graduates from health professions education institutions in the same year, it can be observed that entries into the public sector accounted for 60.7% of all newly graduated physicians, but only 2.4% of newly graduated nurses and midwives. Such information, even if incomplete, is important for understanding health worker preferences in choice of employment – in this case, public sector service – and how this varies by cadre.

In the absence of information from health education institutions on numbers of new graduates, an examination of the age profile of health workers can provide some insight into workforce renewal patterns. Data from the Kenya 2004 SPA (*22*) indicate that the health workforce in the country is quite young, with over one quarter (26%) of all facility-based staff aged less than 30 years. As shown in Figure 7.1, the ratio of younger workers to those closer to retirement age (45 years and over) is relatively high, especially among medical personnel. On the other hand, the ratio of younger to older personnel in the nursing and midwifery field is much lower. Public facilities tend to have younger health workers than private facilities (results not shown). This type of information might indicate a need to further investigate the reasons younger health workers may be less likely to serve in certain facilities and develop appropriate incentives for their recruitment, or to investigate the reasons older workers may be more likely to leave this kind of service and improve incentives for their retention.

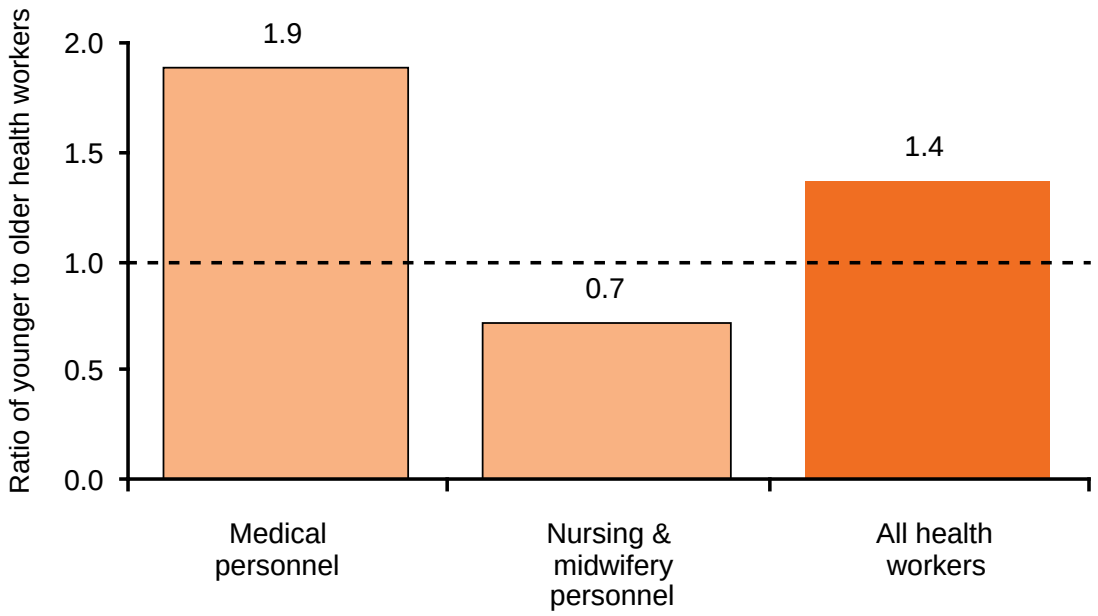
Table 7.1 Estimated number of new graduates entering the public sector facility-based health workforce, by cadre, Nigeria 2005

Cadre	Number of new incoming facility-based staff	New incoming staff as % of existing stock	Number of graduates from health professions education institutions	New incoming staff as % of annual education institution turnout
Physicians	1214	7.7	2000	60.7
Nursing & midwifery personnel	1331	1.1	5500	2.4
Laboratory personnel	501	3.4	n.a.	n.a.
Pharmaceutical personnel	443	3.6	800	55.4
Community health workers	2742	3.3	n.a.	n.a.

n.a. Not available (no information collected).

Source: Chankova et al. (*14*).

Figure 7.1 Ratio of facility-based health workers aged under 30 to those aged over 45, by cadre, Kenya 2004 SPA



Source: Kenya 2004 SPA (*22*).

7.5.2 Active health workforce

Workforce supply

Table 7.2 and Figure 7.2 describe the supply of the active health workforce in two national contexts: Zambia and Kenya, respectively. The stock and density of facility-based health workers in Zambia is shown in Table 7.2. The overall density, across all cadres, is 10.5 health workers per 10 000 population (*23*). In particular, for physicians the ratio is 0.8 per 10 000 and for nursing and midwifery personnel it is 6.9 per 10 000. Although these calculations do not account for health workers who are not facility based, they present tracers of the health system capacity and can serve as a proxy for the overall health workforce density in those countries where most service providers work at least part time in health facilities (for example through dual practice).

Table 7.2 Number and density of facility-based health workers, by cadre, Zambia 2006 HFC

Cadre	Number	Density of health workers (per 10 000 population)[a]
Physicians	908	0.78
Nursing & midwifery personnel[b]	8068	6.91
Paramedical practitioners[c]	1342	1.15
Pharmacists	115	0.10
Physiotherapists	114	0.10
Environmental health workers	679	0.58
Nutritionists	62	0.05
Hygienists	2	<0.01
Laboratory technicians	480	0.41
Pharmaceutical technicians	116	0.10
Radiography technicians	139	0.12
Orthopaedist technicians	14	0.01
Other technicians	35	0.03
Other health workers	145	0.12
Total	**12 219**	**10.46**

a. Based on the estimated 2005 national population (11 683 704).

b. Cadre includes all levels of nursing and midwifery personnel, including enrolled and registered nurses and midwives.

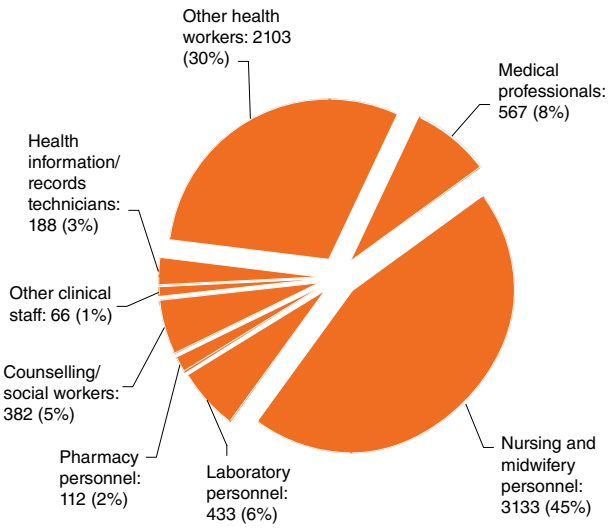
c. Cadre includes all similar levels of paramedical practitioners, such as medical officers and clinical assistants.

Source: Herbst and Gijsbrechts (*23*).

Figure 7.2 shows a total of 6985 health workers officially assigned or hired (in post) in the sampled facilities at the time of the Kenya SPA survey. Among these, medically trained personnel (including physicians and paramedical practitioners) comprise 8% of the total; nursing and midwifery personnel comprise almost half (45%); laboratory personnel 6%; pharmaceutical personnel 2%; counsellors and social workers 5%; staff in other clinical areas such as nutrition and rehabilitation 1%; health information and medical records technicians 3%; and nearly a third fall into other categories, such as aides, clerks and community-based workers who are also facility staff.

Tabulating staffing levels by the type of facility can provide a useful common reference for comparisons. The number of staff generally increases with the size of the facility, but the ratio of increased need for human resources to facility size will vary and depends on many different factors. An interesting feature observed from the Kenya SPA data (Table 7.3) is the situation at standalone sites for voluntary counselling and testing (VCT) for HIV. In Kenya, these specialized outpatient sites are staffed by a generous average of 4.5 counsellors per site, and at a total staffing level higher than that for outpatient clinics and dispensaries with no overnight beds (7.2 versus 5.4). VCT service sites, representing a small proportion of all facilities (9 of 440 facilities), usually offer one service, so they may rely more heavily on providers with counselling qualifications. It may also be that counselling services are being provided in other facilities by other categories of health workers, such as nursing staff. Systems that train one service provider to offer multiple services are common, where

Figure 7.2 Number and percentage distribution of staff currently in post at health facilities, by cadre, Kenya 2004 SPA



Source: Kenya 2004 SPA (*22*).

Table 7.3 Mean number of health workers by type of facility, according to cadre, Kenya 2004

Cadre	Facility type/size						
	VCT stand-alone[a]	No overnight/ inpatient beds	1–9 beds	10–19 beds	20–49 beds	50–99 beds	100+ beds
	(n=9)	*(n=237)*	*(n=93)*	*(n=40)*	*(n=39)*	*(n=8)*	*(n=14)*
Medical practitioners	0.1	0.3	0.9	1.1	1.5	6.7	16.1
Nursing & midwifery personnel[b]	0.4	2.4	3.9	5.7	7.4	23.7	107.5
Laboratory staff	0.1	0.4	0.9	1.2	1.2	3.5	9.6
Pharmaceutical staff	<0.1	<0.1	0.3	0.2	0.2	1.6	3.3
Counselling/social work	4.5	0.3	0.6	1.1	0.8	4.4	6.5
Other clinical	0.2	<0.1	0.1	0.2	0.1	1.1	2.2
Health information/ records technicians[c]	0.3	0.1	0.3	0.4	0.4	2.1	6.5
Other health workers	1.6	1.8	3.1	4.2	4.0	23.9	70.1
Total	**7.2**	**5.4**	**10.1**	**14.1**	**15.4**	**67.4**	**225.4**

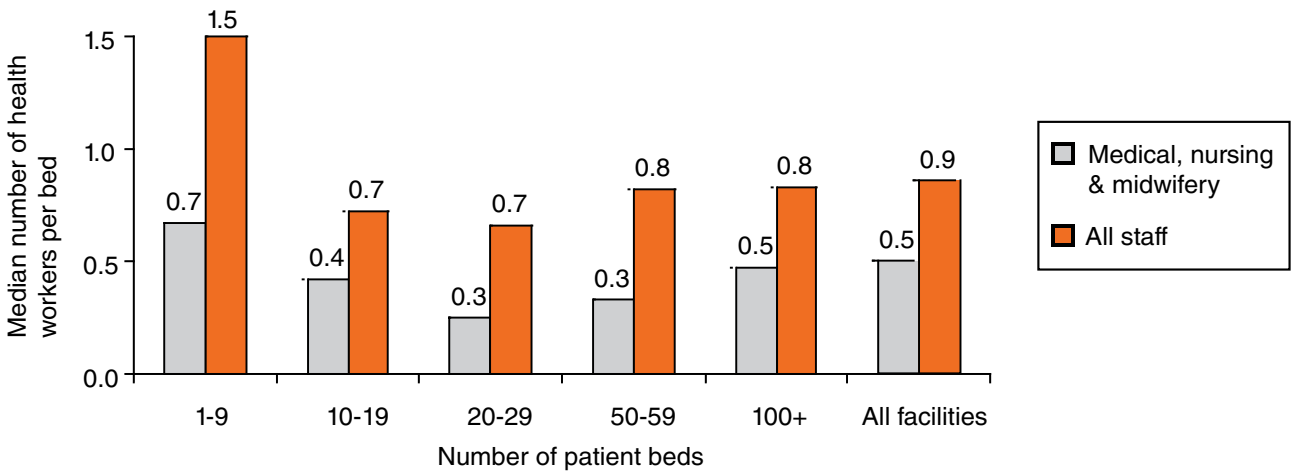
a. Service site that primarily offers voluntary counselling and testing for HIV.

b. Cadre includes all levels of nursing and midwifery personnel, including enrolled and registered nurses and midwives.

c. Cadre includes all staff with primary responsibility of implementing and managing administrative records-keeping processing, storage and retrieval systems.

Source: Kenya 2004 SPA (*22*). Data weighted to reflect survey sampling procedures.

Figure 7.3 Ratio of health workers per inpatient bed, by facility size, Kenya 2004 SPA



Source: Kenya 2004 SPA (*22*).

scarce human resources do not allow a specialist for every service.

Another useful indicator for monitoring workforce supply is the ratio of health workers per patient bed. Figure 7.3 graphs the median ratio of health workers per bed in Kenya, disaggregated by facility size, with facility size used as an indicator for complexity of services offered and numbers of clients receiving services. This information can be used to identify potential outliers in levels of staffing and to monitor changes in staffing ratios over time.

Table 7.4 Number of health workers currently in post, number recommended by staffing norm, and number requested by facility managers to meet the norm, by cadre, Kenya 2004

Cadre	(1)	(2)	(3)	(4)	(5)
	Number of health workers currently in post	Number of health workers recommended in facility staffing norm	Percentage of norm currently in post =(1)/(2)	Number requested by facility managers to meet work requirements[a]	Percentage of requested staff currently in post =(1)/(4)
Medical practitioners	567	1 114	51	1 852	31
Nursing & midwifery personnel	3 133	4 343	72	6 295	49
Laboratory staff	433	742	58	1 175	37
Pharmaceutical staff	112	315	36	563	20
Counselling/social work	382	970	39	1 861	21
Other clinical staff	66	385	17	779	8
Health information/records technicians	188	444	42	779	24
All other staff	2 103	2 183	96	2 740	77
Total	**6985**	**10 495**		**16 044**	

a. Includes staff reported by facilities managers as being needed to meet their staffing norm, plus staff needed to meet work requirements as reported by managers of facilities without a staffing norm.

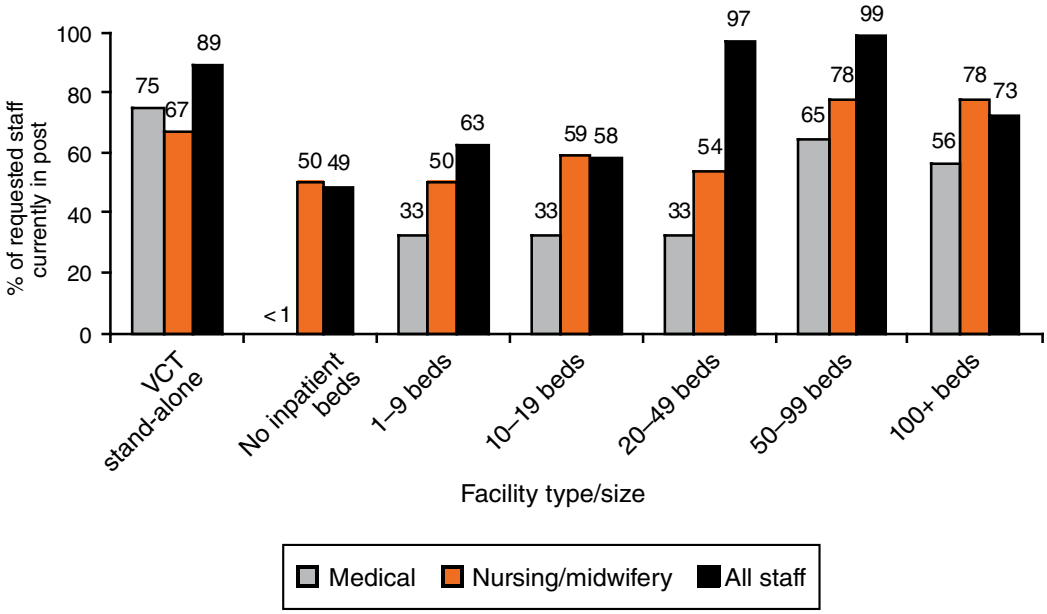
Source: Table produced by Macro International, based on Kenya 2004 SPA microdata.

Information on workforce supply is especially useful when placed in the context of staffing need. To supplement information on existing levels of staffing, it is important to have some idea of the extent of actual or potential staff shortages. One way in which health ministries attempt to address this issue is to develop staffing norms. These norms are meant to take into account the services offered and the numbers and types of clients to be served. The difference between the staff in post and the staffing norm is the vacancy rate (Table 7.4, column 3), which provides information on how well the managers are able to fulfil their planned staffing patterns. Additional information from the Kenya SPA presented in Table 7.4 shows a more complex picture that compares the number of staff recommended under current norms to the number reported by facility managers as required to meet the service utilization at their facility. It appears that facility managers in Kenya have less than half of the staff members they require in every cadre, except in the "all other staff" category. Pharmaceutical, counselling and other clinical staff are especially underrepresented. Further taking into account the numbers of additional staff reported as being required to meet work requirements among those facilities without a staffing norm, the perceived staffing shortage becomes even more apparent.

Among the total number of health workers that facility managers reported are needed, the percentage that are currently assigned to the facility is presented in Figure 7.4 for medical practitioners, nursing and midwifery personnel, and all categories of health workers, by facility type. Only in VCT sites and the larger facilities (most of which are located in Nairobi and other major urban areas) are at least three quarters of the overall staffing requirements met. Virtually none of the outpatient clinics and dispensaries has the minimum number of medical practitioners. Smaller facilities tend to have only half of the nursing and midwifery personnel needed to meet staffing norms and work requirements. This type of information gives us a quick assessment of the staffing situation in the surveyed facilities. However, interpreting the consequences associated with unfilled positions requires additional knowledge of how the assigned staffing relates to the actual human resource needs at the facilities and for their catchment populations.

In addition to regular staff members, health facilities may have at their disposal seconded workers, those who are not on the facility's payroll but who are assigned to work there and are paid by another entity. Frequently, nongovernmental organizations or groups

Figure 7.4 Percentage of health workers requested by facility managers to meet staffing requirements who are currently in post, by facility type, Kenya 2004 SPA



Source: Kenya 2004 SPA (*22*).

Table 7.5 Percentage of facilities reporting having at least one seconded health worker[a], by cadre, according to management authority of the facility, Kenya 2004

Cadre	Facility managing authority				
	Public	Private			Total
		For-profit	Nongovernmental organization	Faith-based organization	
	(n=246)	*(n=63)*	*(n=21)*	*(n=110)*	*(n=440)*
Medical practitioners	2	25	48	8	8
Nursing & midwifery personnel	3	17	5	13	6
Laboratory staff	1	14	0	1	2
Counselling/social work	1	2	15	1	2

a. Seconded worker defined as a person who works at the facility routinely (either full or part time) providing health-care services, but who is paid by another entity.

Source: Kenya 2004 SPA (*22*). Data weighted to reflect survey sampling procedures.

dedicated to offering specialized services, such as laboratory or HIV-related services, will second their staff to provide services in facilities where there is a perceived health worker shortage, and perhaps also to provide on-the-job training to a regular staff member when the service is being newly introduced at the facility. Table 7.5 provides information from Kenya on seconded health workers according to the facility's management authority. Facilities in the nongovernmental sector report a widespread presence of seconded workers: nearly half (48%) of these facilities have at least one medically trained seconded worker, and 15% have seconded counsellors. Government-operated facilities are least likely to have seconded workers. The survey did not collect information on the source of secondments, but most are likely to be foreign health workers hired by international organizations and seconded to a local affiliate. Monitoring secondments should be assessed not only in terms of perceived health worker shortages, but also in terms of strategies for maximizing benefit and ensuring sustainability in the provision and quality of services that currently depend on non-regular personnel.

Distribution

The distribution of health workers helps to provide some indication of the accessibility of health services to the population, the quality of services offered and the rational allocation of human resources. One indicator that is useful and measurable via HFAs is the skill mix, which provides information against which (regular) staffing patterns can be analysed. In Kenya, the data revealed the presence of a median ratio of 1.9 other staff to medical, nursing and midwifery personnel across all facilities (Table 7.6). There was little marked difference in this ratio by the size of the facility. However, the ratio of nursing and midwifery personnel to medical practitioners does vary widely by facility size. The median ratio is more than twice as high in very large facilities, those with 100 or more inpatient beds, compared to smaller facilities with 10–50 beds.

This may reflect staffing patterns that take into account client load and the higher costs associated with some categories of personnel compared to others. On the one hand, skills substitution may be common in smaller facilities, where human resources are less numerous and even highly skilled staff can be expected to perform tasks outside their initial field of specialization or undertake administrative responsibilities such as completing statistical records. On the other hand, larger facilities with higher client loads and more complex services may find it more practical to employ more specialized staff, such as pharmaceutical, counselling and management staff. Higher nursing to medical personnel ratios are expected in facilities with more inpatient beds, as inpatient care is highly dependent on 24-hour nursing services.

Table 7.7 presents data on the distribution of health workers by facility management authority in Kenya. The government is the largest provider of health services and also the main employer of Kenyan health labour. About two thirds (62%) of facility-based health workers are in the government sector. Less than a fifth can be found in either private for-profit facilities (17%) or faith-based organizations (18%), and only 3% in facilities operated by nongovernmental organizations. This general pattern tends to hold for most categories of health workers, with the notable exceptions of pharmaceutical staff, who are found more often in the private for-profit sector (28%), and counsellors, who are more often in the nongovernmental sector (16%), where many VCT sites are found.

In another example from Kenya, Table 7.8 shows the distribution of health workers by geographical region, in this case the country's eight provinces. The largest concentrations are in Nairobi and Rift Valley provinces: 25% and 23% respectively. While in the latter the number of health workers roughly corresponds with that of the provincial population, in Nairobi this is not the case. Here the concentration of health workers is roughly three times greater than the total population. Conversely, North-Eastern and Western provinces appear likely to be underserved, as these provinces' share of the country's health workers are disproportionately low.

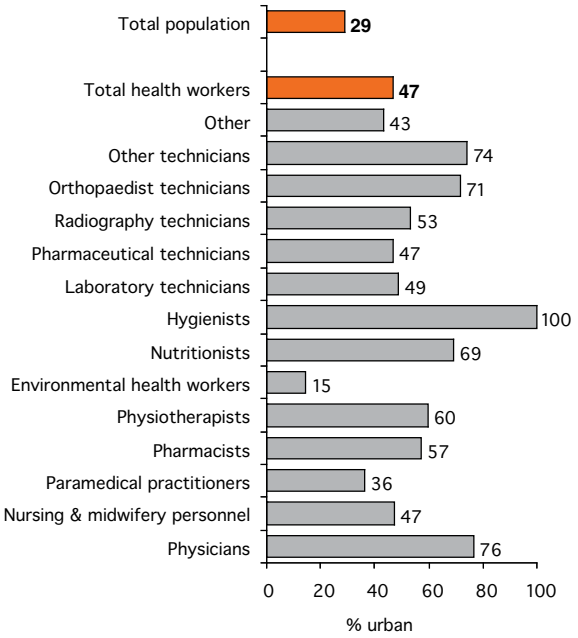
Table 7.6 Skills mix of facility-based health workers, by type of facility, Kenya 2004

Facility type/size	Median ratio	
	All other staff to medical, nursing & midwifery personnel	Nursing & midwifery personnel to medical practitioners
No beds	1.7	..
1–9 beds	1.9	..
10–19 beds	2.1	2.5
20–49 beds	1.8	2.5
50–99 beds	1.9	3.5
100+ beds	1.5	5.5
All facilities	**1.9**	**..**

.. Not calculated due to small number of surveyed facilities with medical staff in post.

Source: Kenya 2004 SPA (*22*). Data weighted to reflect survey sampling procedures. VCT stand-alone sites are excluded due to small number with medical or nursing staff in post.

Figure 7.5 Percentage of health workers and of the total population located in urban areas, Zambia 2006 HFC



Source: Herbst and Gijsbrechts (*23*).

Table 7.7 Percentage distribution of health workers in post at health facilities by managing authority, according to cadre, Kenya 2004

Cadre	Facility managing authority				
	Public	Private			Total
		For-profit	NGO[a]	FBO[a]	
	(n=246)	*(n=63)*	*(n=21)*	*(n=110)*	*(n=440)*
Medical practitioners	60	22	4	14	100
Nursing & midwifery personnel	70	11	2	17	100
Laboratory personnel	53	17	4	26	100
Pharmaceutical personnel	56	28	4	12	100
Counselling/social work	52	17	16	15	100
Other clinical staff	70	10	7	13	100
Health information/records technicians	74	13	2	11	100
Other	56	22	2	20	100
Total	**62**	**17**	**3**	**18**	**100**

a. NGO = nongovernmental organization, FBO = faith-based organization.

Source: Kenya 2004 SPA (*22*). Data weighted to reflect survey sampling procedures.

Table 7.8 Percentage distribution of facility-based health workers and of the total population by geographical region, Kenya 2004

Cadre	Province								Total
	Nairobi	Central	Coast	Eastern	North-Eastern	Nyanza	Rift Valley	Western	
Medical practitioners	22	10	10	15	1	10	26	6	100
Nursing & midwifery personnel	22	14	8	17	1	10	22	6	100
Laboratory personnel	20	11	11	14	1	11	25	7	100
Pharmaceutical personnel	51	7	8	9	1	7	13	4	100
Counselling/social work	13	7	16	13	1	11	29	10	100
Other clinical staff	21	13	4	11	2	11	31	7	100
Health information/ records technicians	18	16	8	10	1	12	28	7	100
Other	33	2	13	16	0	10	21	5	100
Total health workers	**25**	**10**	**11**	**14**	**1**	**10**	**23**	**6**	**100**
Total population[a]	**8.1**	**12.2**	**8.7**	**15.6**	**4.1**	**14.8**	**24.9**	**11.6**	**100.0**

a. Based on the estimated 2004 national population (32 808 268).

Source: Kenya 2004 SPA (*22*). Data weighted to reflect survey sampling procedures.

Geographical imbalance of the health workforce can also be seen in another context, notably that of Zambia. Figure 7.5 compares the proportion of health workers and of the total population located in Zambia's urban areas. Although urban dwellers account for less than a third (29%) of the population, roughly half (47%) of all health workers are found in urban facilities. Three quarters of physicians and half of nursing and midwifery personnel are urbanites. Among the different cadres of health workers examined, only environmental

health technicians are underrepresented in urban areas compared to the general population. For some specializations, workers in higher-skilled categories are more likely to be situated in urban areas compared to their lower-skilled counterparts: physicians versus paramedical practitioners; pharmacists versus pharmaceutical technicians.

Further analysis of the workforce distribution by district reveals that 2224 or 18% of Zambia's 12 219 facility-based health workers are located in the national capital, Lusaka. Thirteen of the country's 71 districts have no physicians assigned to a health facility, while only three districts (Lusaka, Kitwe and Ndola) are home to 67% of all facility-based physicians (*23*). Such lopsided distributions of HRH may have serious implications for equitable accessibility, coverage and quality of health-care services in rural and underserved areas.

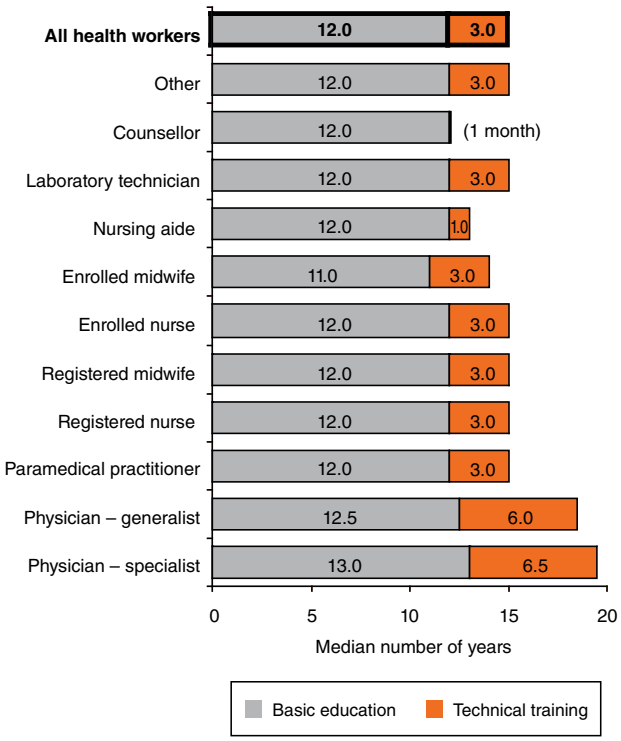
Health workforce education, motivation and performance

Information on the levels and fields of education and training of the health workforce is critical for tailoring health labour training needs and for understanding the overall technical capacity of various health worker cadres within a country. This is particularly true in contexts of rapid scaling up of human resources development initiatives, where it is not uncommon to find wide differences in the training received among workers with the same occupational title, due to changes over time in the standards of both basic and advanced education required for a health qualification. Information on educational attainment is also useful for enhancing mapping of national occupational titles to the ISCO standard, which categorizes occupations according to the skill level and skill specialization normally required for competent performance.

Figure 7.6 offers an illustrative example of the levels of HRH educational attainment as reported by interviewed health workers in Kenya. As can be expected, while the level of basic education prior to training for a health qualification remains similar for all types of service providers, the number of years of advanced technical training varies across cadres. Medical doctors (including specialist and generalist physicians) have the highest overall educational attainment, while nursing aides and counsellors have the lowest.

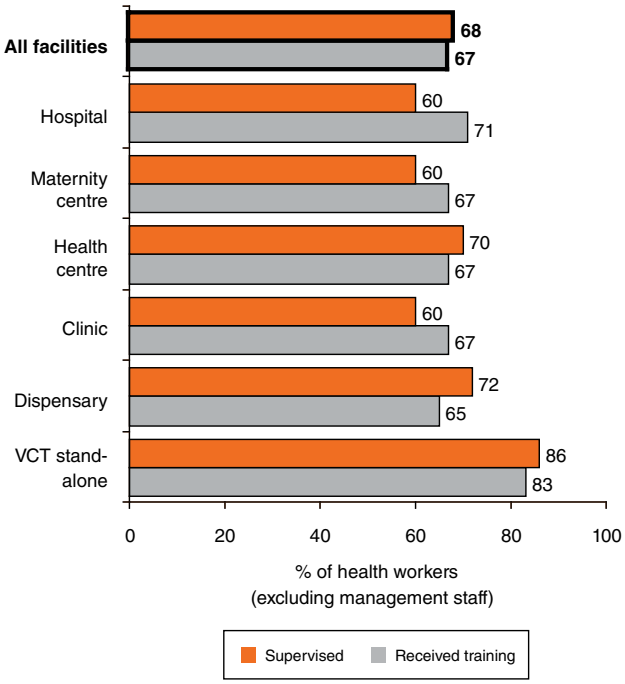
Profiles of the number of years health workers have been employed at a particular facility help provide insights related to professional experience, ongoing training needs and staff retention. Table 7.9 presents interview responses from the Kenya SPA on staff members' years of service in their current location by the

Figure 7.6 Median number of years of education and training among health workers, by cadre, Kenya 2004 SPA



Source: Kenya 2004 SPA (*22*).

Figure 7.7 Percentage of health workers who received in-service training in the past 12 months, and who received personal supervision in the last 6 months, by type of facility, Kenya 2004 SPA



Source: Kenya 2004 SPA (*22*).

Table 7.9 Median number of years of service in current position among facility-based health workers, by type and management authority of facility, Kenya 2004

	Medical practitioners	Nursing & midwifery personnel	All health workers
Facility type			
VCT stand-alone	..	4.1	1.0
Dispensary	3.0	3.0	2.0
Clinic	4.6	4.3	3.0
Health centre	2.0	2.5	3.0
Maternity centre	1.1	7.2	2.0
Hospital	3.0	5.0	5.0
Managing authority			
Public	3.0	4.0	3.0
Private	2.0	3.0	3.0
All facilities	**3.0**	**4.0**	**3.0**

.. Not calculated due to small number of surveyed facilities with medical staff in post.

Source: Kenya 2004 SPA (*22*). Data weighted to reflect survey sampling procedures.

type and management authority of the facility. Overall, half of the facility-based staff reported having been at their current employment for a short period of time, about three years, with little variation in terms of the facility's managing authority. Nursing and midwifery personnel at hospitals and especially maternity centres tended to have been in their current position for longer. Conversely, the median number of years of service was lowest among physicians at maternity centres (most of which are privately managed in Kenya) and staff at VCT stand-alone facilities, which are a relatively new category of service and facility type.

Training and supportive supervision may not only improve the quality of health worker performance but may also act as incentives that motivate health workers in their jobs. Figure 7.7 presents data from Kenya on the proportion of facility-based health workers who received formal in-service training during the 12-month period before the survey, that is, structured training sessions not including individual instruction received during routine supervision. Overall, excluding management staff, two thirds (67%) of health workers reported having received in-service training with little variation in this proportion across the various types of facilities. The main deviation is noted with regard to VCT sites, where the proportion is by far the greatest (83%).

Additional findings from Kenya on support supervision received among health-care providers are presented in Figure 7.7. Excluding management staff, about two thirds (68%) of health workers reported having been personally supervised during the six-month period preceding the survey. Service providers at VCT sites were most likely to have received supervision (86%). The concentration of health workers who had recently received training or supervision in these centres probably reflects the high attention that HIV-related services are receiving worldwide. The survey did not collect information on the competencies acquired or used following the trainings or on the quality of supervision; many HFAs do gather at least some information on points discussed or activities conducted during the supervisory visit.

Among the four HFA survey and census tools considered here, none presently collects information on staff incomes or wages, and as such these sources do not allow analysis of financial incentives among health workers. In the absence of data on wages and salaries, other incentives that might influence worker motivation and performance and favour retention were examined. The HRH literature suggests that the availability of a clear scope of work and other non-monetary benefits contribute to improved worker performance and reduced attrition (*24, 25*). An example of this type of information from the Kenyan context is provided in Table 7.10. Only 8% of health workers were able to produce a written scope of work at the time of interview, with little difference in this percentage by cadre. Somewhat wider variations exist by facility type, but even where the proportions were highest (at maternity centres and clinics) only about one of every ten workers was able to produce a written scope of work. These numbers

Table 7.10 Percentage of facility-based health workers with written job descriptions, perceived promotion opportunities and other non-monetary incentives, by cadre and type of facility, Kenya 2004

	Percentage of health workers		
	With written job description at the time of interview	Who perceive promotion opportunities	Who receive incentives other than salary[a]
Cadre			
Physicians	8	50	40
Nursing & midwifery personnel	8	42	58
Laboratory personnel	7	35	35
Counselling/social work	8	43	60
Other	6	43	44
Facility type			
VCT stand-alone	8	41	64
Dispensary	6	41	51
Clinic	10	37	56
Health centre	6	37	47
Maternity centre	13	13	63
Hospital	9	50	56
All health workers	**8**	**42**	**54**

a. Non-monetary incentives include subsidies for medicines or other goods, uniforms or other clothing, food and training.

Source: Kenya 2004 SPA (*22*). Data weighted to reflect survey sampling procedures.

may be underestimating the situation, however, as an additional 30% of health workers reported that they had written scopes of work but were unable to show them to the interviewer (results not shown).

Further analysis of Kenya SPA data show that 42% of health workers perceive promotion opportunities in their current job (Table 7.10). Physicians and hospital-based staff are most likely to say they perceive promotion opportunities. More than half (54%) of health workers report receiving other non-monetary incentives from their employer, including subsidies or discounts for medicines or other goods, uniforms or other clothing, food or training. Considerable variations are observed according to cadre (from 35% of laboratory staff to 60% of counsellors) and by facility type (with the highest percentage being at VCT sites, the workplace of about a quarter of Kenya's counsellors). Although the inclusion of training opportunities as a form of incentive may have inflated the results for the latter indicator, this information offers some guidance on the potential differences in compensation schemes by worker and facility characteristics and the related implications for staff performance and retention.

One way to look at health worker performance is by means of the absenteeism rate. This was examined using SAM data for Kenya for selected urban areas and rural districts where the facility census was conducted: Kilifi, Kisumu, Mombasa, Nairobi, Nakuru and Thika (*26*). Overall, less than one third of all assigned health workers (that is, on the duty list) were actually found at their post on the day of interview (Figure 7.8). Physicians were least likely to be present, followed by nursing and midwifery personnel, with only about one in four of the assigned staff at their post. Several reasons could account for why health workers may not be present at their duty post on a given day, including scheduled leave, unscheduled absence or unexplained absence. A more detailed case study on assessment of worker absenteeism can be found in Chapter 11 of this Handbook.

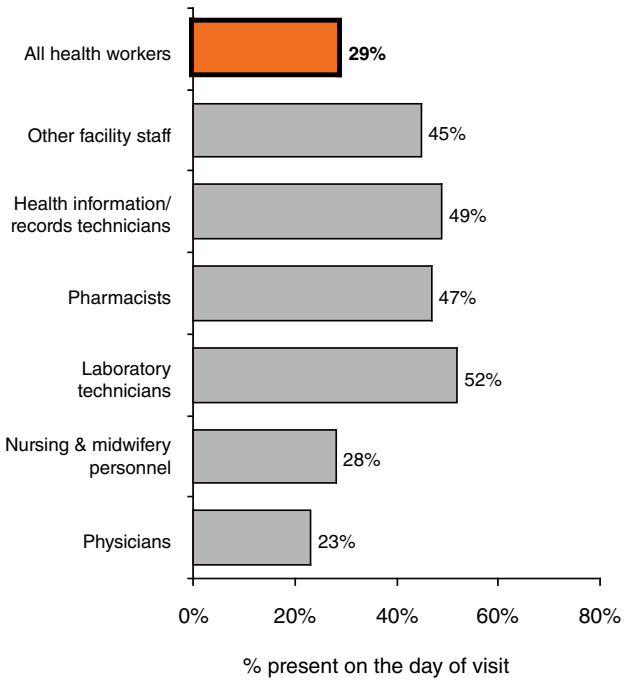
Information on working hours is important for HRH planning and can be used to calculate, for example, health system capacity in terms of full-time equivalents for job positions, and to support the development of flexible management practices that could favour worker retention. Table 7.11 presents HFA data for Kenya on

Table 7.11 Percentage distribution of facility-based health workers by number of hours normally worked per week, according to cadre, Kenya 2004

Cadre	Normal hours worked per week in facility				Total
	40+	30–39	20–29	<20	
Physicians	83	7	2	8	100
Nursing & midwifery personnel	93	5	0	2	100
Laboratory personnel	98	1	1	0	100
Counselling/social work	57	11	29	3	100
Nursing aides	78	9	0	13	100
Other	74	6	9	11	100
All health workers	87	6	3	4	100

Source: Kenya 2004 SPA (*22*). Data weighted to reflect survey sampling procedures.

Figure 7.8 Percentage of assigned health workers present on the day of the assessment, by cadre, Kenya 2005 SAM (selected districts)



Source: Kenya 2005 SAM (26).

the number of hours normally worked per week in the facilities where health workers were interviewed. Most (91%) of the facility-based staff are full-time employees, usually working at least 40 hours per week. Laboratory and nursing and midwifery personnel are least likely to work part time, while counselling staff are most likely to be part time. Almost two in every ten physicians work in the facility part time. Areas for further exploration in future HFA tools could include the nature of work activities outside the facility among part-timers (for example whether in another facility, in research or teaching, outside the health sector or not working more hours due to voluntary or involuntary reasons).

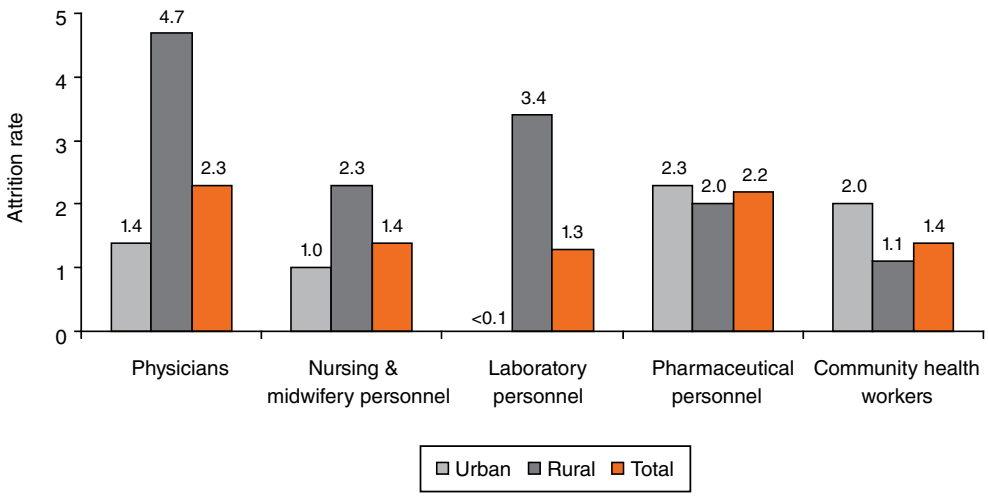
7.5.3 Exits from the workforce

Some HFAs have collected information to assess workforce retention. Challenges with collecting information on HRH transitions and exits may make such data incomplete, however, particularly for measuring international outflows. Figure 7.9 shows estimated attrition rates for Nigeria's public sector health workforce by cadre and for urban and rural areas. According to these results, overall attrition is highest for facility-based physicians compared to other categories of health workers. Attrition is higher for rural workers compared to their urban counterparts, with the exception of pharmaceutical personnel and community health workers. The latter are recruited and trained specifically to work in rural areas, so these staff may be less likely to have many tempting alternative employment opportunities beyond their area of residence.

In the same context, resignation is by far the most common reason for workforce attrition, the reason cited for nearly half (46%) of measured health worker exits (Figure 7.10). Although the underlying causes of resignation were not determined in the present assessment, experience suggests that poor service conditions are often at the root. Twenty-three per cent of worker exits are attributable to involuntary termination of employment. Retirement and death account for about one in seven exits each. While the available data do not offer a complete picture of the dynamics of health worker attrition, they can be used to highlight areas where programme managers and policy decision-makers can further invest in research and retention interventions.

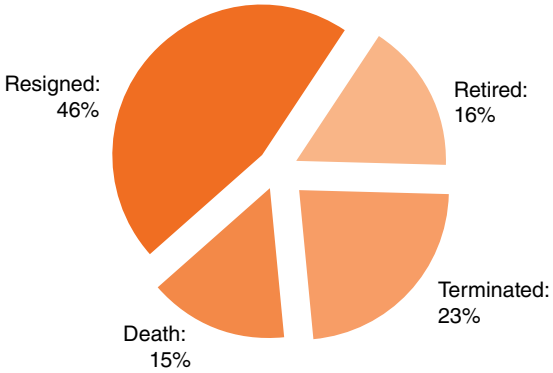
Lastly, as a crude estimate of the health workforce regeneration ratio, the ratio of health workforce increase

Figure 7.9 **Attrition rates for health workers in public sector facilities, by cadre, Nigeria 2005**



Source: Chankova et al. (*14*).

Figure 7.10 **Percentage distribution of outgoing health workers by reason for leaving the workforce, Nigeria 2005**



Source: Chankova et al. (*14*).

due to new graduates from health professions education institutions joining the facility-based workforce can be compared to the attrition rate at these facilities. The results in Table 7.12 suggest that for every physician departing Nigeria's public sector health workforce, three new ones enter. The estimated ratios of incoming to outgoing staff are well above 2:1 among laboratory staff and community-based workers. However, fewer new graduates of nursing and midwifery training schools seem to be entering Nigeria's public workforce compared to the number of nurses and midwives who are leaving it.

7.6 Summary and conclusions

There is worldwide consensus that the HRH situation is in a state of crisis and that low- and middle-income countries are most at risk. It is also widely accepted that overcoming the crisis requires effective monitoring of the three stages of the workforce lifespan (entry, active workforce and exit), which in turn requires access to measurement methodologies and analytical tools that can be used to collect and analyse workforce data in a timely and credible manner.

This chapter has documented use of HFAs as one such methodology and has presented examples of the types of HRH information it can provide. Potential statistics that can be produced from HFA sources include health workforce stock and supply, education, skills mix, geographical distribution, productivity and other contextual practices supportive of efficient job performance (for example adequate resources and infrastructure, in-service training, management and supervision practices, and incentives) and estimates of staff entry and retention. When analysed in conjunction with national staffing norms (when they are in place), HFA data can be used to ascertain the degree to which perceived staffing needs are being met, and to support effective planning for HRH education and training, recruitment, management and eventual retirement.

A number of limitations of currently available data from HFA sources were also discussed. Among these is a dearth of information on migration of health workers, especially international outflows. By nature, HFAs do not directly collect data on the pre-service stage, or on workers outside facility-based service delivery points. As discussed elsewhere in this Handbook, the need to improve methods for monitoring the pre-service and

Table 7.12 Comparison of the increase in stock of the public sector health workforce from new graduates with the attrition rate, Nigeria 2005

Cadre	New incoming graduates from health professions education institutions as % of existing stock	Attrition rate	Ratio of new incoming staff to outgoing staff
Physicians	7.7	2.3	**3.3**
Nursing & midwifery personnel	1.1	1.4	**0.8**
Laboratory personnel	3.4	1.3	**2.6**
Pharmaceutical personnel	3.6	2.2	**1.6**
Community health workers	3.3	1.4	**2.3**

Source: Chankova et al. (*14*).

exit stages is not limited to HFA sources. However, existing HFA tools could be strengthened by capturing the numbers of newly recruited staff that are fresh graduates, geographical in-migrants (internal or international) or returning to the workforce after an extended period of absence, and potentially perceptions among current staff of the main reasons their former colleagues left.

Other basic information that tended to be lacking in the HFA tools examined in this chapter (although not an exhaustive review) included workforce remuneration and sex distribution. Data on workers' wages and salaries are important both for costing and budgeting of strategies for scaling up services delivery and HRH development initiatives, and for evaluation of monetary incentives influencing provider performance. Only limited information was collected in the reviewed instruments on non-monetary benefits. In addition, understanding the gender dimension can help frame actions that may minimize the deleterious impact of gender imbalance on the workforce and service delivery, particularly when such imbalances are not detected early (see also *27, 28*). At the time of this report, the SPA and SAM data collection tools were already being updated to incorporate gender in future assessments.

One important constraint that is inherent in HFAs is the potential for sampling bias where a complete and accurate sampling frame, or listing of facilities for selection, is not available, as is the case in many low- and middle-income countries, especially for the private sector. Sampling variations, and differences in questionnaire design and other non-sampling issues, have often hindered comparability of HFA data across sources, hampering monitoring of trends across regions and over time. Despite the availability of rich, time-specific information on HRH from HFA data, there are limited (if any) examples of countries or stakeholders using this information for HRH policy and planning.

Since the overall objective of most HFAs is to assess health services, the tools tend to cover a broad range of topics, including not only facility staffing but also infrastructure, services delivery, supplies and equipment, protocols and client satisfaction. As such, they do not generally allow for detailed analysis of any specific component; expanding the information collected on HRH would enable more detailed analyses but would also increase the complexity of the assessments, with implications for interviewer training, fieldwork logistics, average length of interview, data processing and analysis, and of course budgeting. It is possible to conduct stand-alone surveys among health-care providers, but the sustainability of this approach, especially in low-income countries, needs to be examined.

Ideally, a comprehensive HRH analysis would optimize the use of periodically collected HFA data integrated in the national health information system with routinely (continuously) collected data drawing on administrative sources (the latter is further elaborated in Chapter 9 of this Handbook). Facility-based assessments should be carried out every seven to ten years in order to validate and augment the information provided through routine data sources (for example new deployments, support supervision, worker absenteeism, job vacancies and workforce exits). This periodicity is recommended to help keep costs low and allow sufficient time between exercises so that changes can be observed. Most countries can develop the technical capacity to carry out HFAs after one round with external technical assistance. However, ongoing international financial support is often needed, as well as technical cooperation to ensure the quality (and cross-national comparability) of the data collected. Further investment is frequently

needed in data analysis and dissemination strategies that put the information retrieved within the reach of policy-makers (*29*). Institutionalizing HFA capacity, whether within the ministry of health or another autonomous or semi-autonomous agency (such as private survey and research firms), should be prioritized if HRH information from HFAs is to become a fully integrated component of the health information system and widely used to bridge information gaps for HRH planning, monitoring and development.

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8 Use of population census data for gender analysis of the health workforce

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8.1 Introduction

Despite the undoubted importance of monitoring the health workforce and impacts on health systems performance, the empirical evidence to support policy formulation is often fragmented. Many sources that can potentially produce information relevant to this issue remain underused in health research, especially among low- and middle-income countries. Although a range of standard statistical sources can be exploited for conducting human resources for health (HRH) assessments – including national population censuses – their potential for HRH monitoring has generally not been met.

Population censuses can be a key source for statistics describing HRH, providing precise information on the stock and composition of the health workforce and on distribution by spatial units and sociodemographic characteristics (*1, 2*). One of the main strengths of census data for HRH analysis is the possibility of disaggregating individual-level information by sex. Censuses offer an advantage over survey sources in that they do not suffer from problems of sample sizes too small to allow estimates for specific subgroups. Moreover, as noted in Chapter 7 of this Handbook, health facility assessments have tended to be gender blind when it comes to monitoring the staffing situation.

The objective of this chapter is to present selected findings from multicountry analyses exploring gender dimensions of the health workforce using census data. Including this introduction, the chapter is divided into five parts. In the next section, an argument is presented for the importance of gender mainstreaming in health workforce analysis. Next, the sources of census data used here are presented. Fourth is the empirical analysis, with attention paid to each of the three stages of the working lifespan framework for HRH assessment. The chapter concludes with some recommendations for promoting the use of sex-disaggregated data, notably from census sources, as a step towards monitoring and evaluation of gender-sensitive human resources policy planning and management.

8.2 Importance of gender considerations in health workforce analysis

Women make up about 40% of the estimated global working population (*3*). Within the health sector, in many countries women comprise over 75% of the workforce (*4*), making them indispensable as contributors to the delivery of health services. However, gender issues remain a neglected area in most approaches to HRH policy and planning (*5*).

In many countries, women tend to be concentrated in the lower-status health occupations, and to be a minority among more highly trained professionals. In particular, the distribution of women by occupational category tends to be skewed in favour of nursing and midwifery personnel and other "caring" cadres such as community health workers (*6*). Women are often poorly represented in other categories, for example physicians, dentists, pharmacists and managers.

The underrepresentation of women in managerial and decision-making positions may lead to less attention to and poorer understanding of both the particular features of working conditions that characterize much of women's employment, and the health-care needs specific to women. In many contexts, access to female providers is an important determinant of women's health service utilization patterns (*7, 8*).

Omission of gender considerations may also lead to inadequate health system responsiveness to the needs of men: for example, reproductive health services are often not set up so as to encourage male involvement (*7*). Better recognition of and information on the role of men as caregivers may help to "de-gender" gender norms in health service provision (*9*).

Gender analysis of the health workforce may reveal that health systems themselves can reflect or even exacerbate many of the social inequalities they are meant to address and be immune from (*6*). Understanding

and addressing the gender aspect of the health workforce require better measures of women and men in the health workforce to help identify and prioritize HRH planning and management interventions.

8.3 Using census data for health workforce analysis

Strengthening the evidence base on gender and the health workforce in low- and middle-income countries is especially critical. Most of the (scant) available research on gender and HRH refers to countries with developed market economies, especially the United States of America (*6*). In particular, while census microdata archives exist for most countries, access to and use of these data for health systems research has generally been limited. For some countries, analyses of census data can be facilitated through collaborative research projects aiming to disseminate microdata for public use. In only a very limited number of low- and middle-income countries have national census-based HRH analyses been conducted and disseminated.

A gender-based analysis of the health workforce was conducted in 13 countries across different regions and contexts (Table 8.1). As discussed in Chapter 2 of this Handbook, censuses with questions designed to collect data on the nature of work activity can provide valuable information for HRH analysis (Box 8.1). The application of international standards for data collection and processing facilitates production of statistics that are comparable across countries and over time on many aspects of labour dynamics (*10*). Cross-national comparisons of HRH indicators can provide valuable opportunities for gaining insights into workforce issues that are of major concern to many countries, and learning how countries have dealt successfully or otherwise with these issues (*11*).

The data used for the analysis were drawn from three sources:

- For 11 of the countries – Argentina, Brazil, Cambodia, Chile, Ecuador, Hungary, the Philippines, Romania, Rwanda, South Africa and Viet Nam – microdata samples were obtained from the Integrated Public Use Microdata Series (IPUMS), a collaborative project dedicated to collecting, preserving, harmonizing and disseminating census data and documentation from around the world for social and economic research (*12*). As of late 2007, IPUMS-International had created a unique census microdata collection consisting of 80 censuses from 26 countries (*13*). For the present analysis, data from the last census round (covering the period from 1995 to 2004) were used for countries with developing and transitional economies where a variable for occupation was included that allowed identification of health occupations.
- For one country, Thailand, access to census microdata was obtained from the National Statistical Office with support from the International Health Policy Program, Thailand (*14*), a national research programme on health priorities related to health systems and policy.
- For another country, Uganda, data were drawn from a special census volume on health workers produced in collaboration with the Developing Human Resources for Heath Project (*15*). The publication included tabulations and maps of the stock and distribution of health occupations, as well as information on the variables used in the compilations.

In the present analysis, in order to enhance cross-national comparability, health workers were defined according to the self-reported main occupation among the economically active population as recorded in the census, with titles mapped where possible to the International Standard Classification of Occupations, 1988 revision (ISCO-88) (*16*). This includes the following broad groupings:

- health professionals (except nursing and midwifery): physicians, dentists, pharmacists and other professional-level health occupations;
- nursing and midwifery personnel: nursing professionals, midwifery professionals, nursing associate professionals, midwifery associate professionals;
- other health service providers: health technicians and associate professionals (for example medical assistants, dental assistants, laboratory technicians, therapeutic equipment technicians), traditional and complementary medicine practitioners, personal care workers (including institution-based and home-based nursing aides) and others not identified elsewhere;
- health management workers: administrators and supervisors in health services and similar occupations.

Other efforts were also undertaken to enhance comparability given the particularities of individual censuses; in particular, the analysis excludes workers abroad, who were counted in the Philippines but not in the other countries.

The number and density of workers with a self-reported health occupation at the time of the census, as per the boundaries retained here, can be found by country in Table 8.1. As could be expected, across countries, the density of health workers tends to increase with the national income level. The highest densities are found in the upper-middle-income countries of Hungary and

Table 8.1 Countries and sources of census data

Country	Income category[a]	Region[b]	Census implementing agency	Year	Workers with a health occupation	
					Number	Per 10 000 population
Argentina	Upper middle	Americas	National Institute of Statistics and Censuses	2001	418 530	115.4
Brazil	Upper middle	Americas	Institute of Geography and Statistics	2000	1 463 001	86.1
Cambodia	Low	Western Pacific	National Institute of Statistics	1998	26 940	23.6
Chile	Upper middle	Americas	National Institute of Statistics	2002	133 580	88.2
Ecuador	Lower middle	Americas	National Institute of Statistics and Censuses	2001	79 290	65.3
Hungary	Upper middle	Europe	Central Statistical Office	2001	169 960	166.5
Philippines	Lower middle	Western Pacific	National Statistics Office	2000	360 217	48.0
Romania	Upper middle	Europe	National Institute of Statistics	2002	295 880	138.4
Rwanda	Low	Africa	National Institute of Statistics	2002	10 230	12.1
South Africa	Upper middle	Africa	Statistics South Africa	2001	256 393	60.0
Thailand	Lower middle	South-East Asia	National Statistical Office	2000	294 905	48.4
Uganda	Low	Africa	Bureau of Statistics	2002	57 508	23.5
Viet Nam	Low	Western Pacific	General Statistics Office	1999	253 500	33.2

a. Income category as classified by the World Bank according to gross national income per capita.

b. Regions as classified by the World Health Organization.

Box 8.1 Questions used in the population census to determine main occupation, selected countries

Brazil (2000): *How many jobs did you have during the week of July 23–29, 2000?* (response options: "one", "two or more"); *What was the principal job done during [this] week?* (open question).

Chile (2002): *In which of the following situations did you find yourself during the last week?* (choice of 10 response options); *What occupation or type of work do you perform, or did you perform in the past if unemployed?* (open question).

Hungary (2001): *What is your source of livelihood?* (choice of up to 3 of 13 response options); *What is the name of the main occupation and what activities characterize it?* (open question).

Philippines (2000): *What was [respondent]'s usual activity/occupation during the past 12 months?* (open question).

Rwanda (2002): *During the month from July 15 to August 15, 2002, was [respondent] employed?* (choice of 8 response options); *What is (was) the main occupation of [respondent]?* (open question).

Uganda (2002): *What kind of work did [respondent] do in the last 7 days?* (open question).

Viet Nam (1999): *What was the main job that [respondent] performed during the last 12 months and what position did [respondent] hold (if any)?* (open question).

Romania, and the lowest densities in the four low-income countries included in the analysis (Cambodia, Rwanda, Uganda and Viet Nam).

8.4 Empirical analysis

In this section selected findings are presented on gender dimensions of the health workforce drawing on census data for 13 countries. The section is divided into three parts, according to the three stages of the working lifespan that form the framework for HRH analysis introduced in Chapter 1. A gender analysis of the active workforce is first presented, followed by examination of each of the stages that directly influence its size and distribution, namely entry and exit.

8.4.1 Gender and the active health workforce

Censuses with properly designed questions on labour force activity allow identification of workers with a health-related occupation. They also offer the advantage of allowing disaggregation of all key variables by sex. This offers the possibility of examining for occupational segregation by sex: a framework for assessing gender equity that can correspond to either vertical clustering (differentials in the sex ratio according to relative job status) or horizontal clustering (sex differentials according to specialization) (*17*).

In most of the 13 countries, women form the majority of the health workforce – a pattern contrasting with that observed for the rest of the national labour force, where men tend to be more numerous (Table 8.2). Exceptions to this trend are Cambodia, where women comprise a minority (40%) of the health workforce but a small majority (51%) of the rest of the labour force, and Rwanda, where the percentage of female workers is similar for both health occupations and all other occupations combined (some 55%).

Further examination of the evidence points to horizontal and vertical clustering within the health workforce. In all countries where data are available, women form the majority of nursing and midwifery personnel – in some cases over 90% – but this is not necessarily the case for other occupational categories (Table 8.2). Among health professionals (except nursing), women are consistently underrepresented relative to their share in the total health workforce. Women are likewise underrepresented among health management compared to their overall share in the health labour market, as observed in the two countries where the national occupational classification allows their identification, namely Argentina and Brazil.

Gender imbalances can also be found for certain specific occupations. As illustrated in Figure 8.1, the physician workforce is mostly male in those countries where data are available. On the other hand, the personal care workforce – one that is generally less skilled – tends to be numerically dominated by women (Figure

Figure 8.1 Sex distribution of the physician workforce, according to census data for selected countries (around 2000)

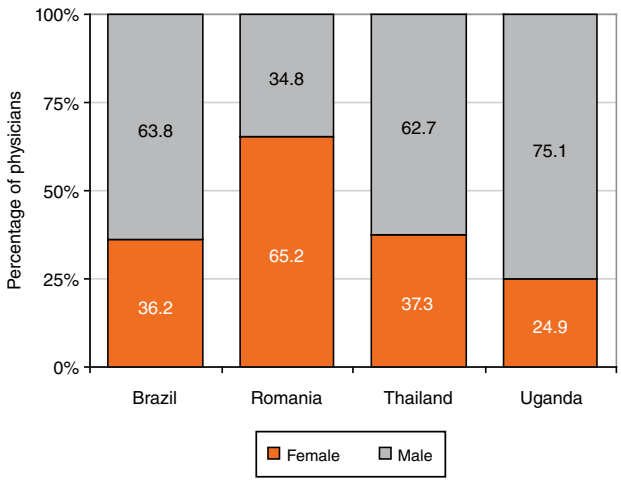
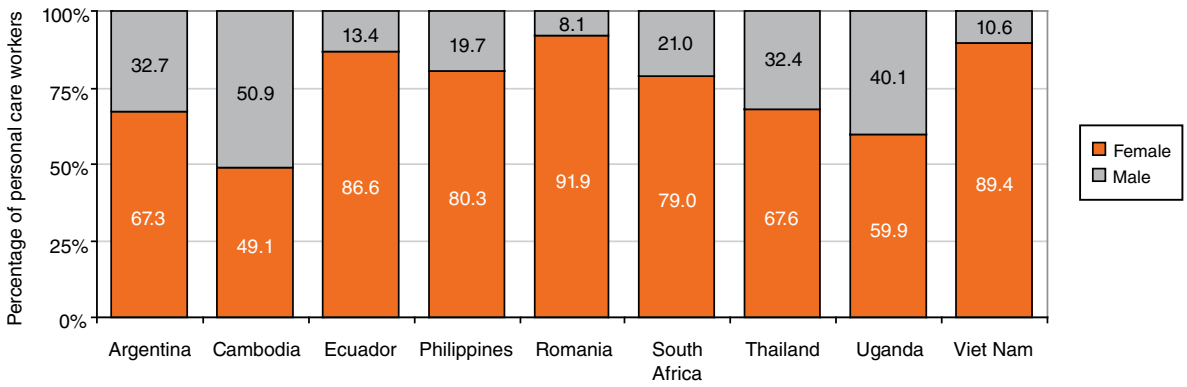


Figure 8.2 Sex distribution of the personal care workforce, according to census data for selected countries (around 2000)



8.2). A notable exception is Romania, the country with the highest proportion of women in the health workforce, and where female physicians are more common. It has been speculated that, given the longer history of high female labour force participation in transitional countries of eastern Europe, along with social policies

Table 8.2 Percentage distribution of the health workforce by sex, by occupation, according to census data for 13 countries (around 2000)

Country	Sex	Health workforce					Rest of labour force
		Health professionals (except nursing & midwifery)	Nursing & midwifery personnel	Other health service providers	Health management occupations	Total	
Argentina	Male	n.a.	n.a.	32.9	35.5	33.0	63.6
	Female	n.a.	n.a.	67.1	64.5	67.0	36.4
Brazil	Male	55.1	18.7	25.9	44.2	32.7	62.8
	Female	44.9	81.3	74.1	55.8	67.3	37.2
Cambodia	Male	74.6	45.4	60.1	n.a.	59.8	48.6
	Female	25.4	54.6	39.9	n.a.	40.2	51.4
Chile	Male	43.6	n.a.	32.7	n.a.	38.8	66.0
	Female	56.4	n.a.	67.3	n.a.	61.2	34.0
Ecuador	Male	57.7	8.5	18.2	n.a.	33.9	67.6
	Female	42.3	91.5	81.8	n.a.	66.1	32.4
Hungary	Male	43.3	n.a.	9.8	n.a.	21.3	55.8
	Female	56.7	n.a.	90.2	n.a.	78.7	44.2
Philippines	Male	39.4	14.6	31.7	n.a.	27.6	50.2
	Female	60.6	85.4	68.3	n.a.	72.4	49.8
Romania	Male	31.9	5.6	13.4	n.a.	17.2	57.5
	Female	68.1	94.4	86.6	n.a.	82.8	42.5
Rwanda	Male	61.9	35.4	50.5	n.a.	43.7	45.0
	Female	38.1	64.6	49.5	n.a.	56.3	55.0
South Africa	Male	62.8	8.2	27.4	n.a.	22.1	59.3
	Female	37.2	91.8	72.6	n.a.	77.9	40.7
Thailand	Male	48.4	6.7	30.8	n.a.	25.1	52.0
	Female	51.6	93.3	69.2	n.a.	74.9	48.0
Uganda	Male	68.8	13.0	54.9	n.a.	41.7	n.a.
	Female	31.2	87.0	45.1	n.a.	58.3	n.a.
Viet Nam	Male	55.2	22.2	31.4	n.a.	34.3	51.7
	Female	44.8	77.8	68.6	n.a.	65.7	48.3

Note: Health professionals include physicians, pharmacists, dentists and other professional-level health occupations as reported at the time of the census. Other health service providers include – depending on the country – health technicians and associate professionals, traditional medicine practitioners, personal care workers and others not identified elsewhere. Health management occupations include administrators and supervisors in health services and similar occupations. In Argentina, all health service occupations (health professionals, nursing and midwifery personnel) are grouped under "other health service providers". In Chile and Hungary, nursing and midwifery personnel are assimilated under either health professionals or other health service providers. In Uganda, health managers and planners are included under health professionals.

n.a. Not available (based on available data source or occupational classification).

emphasizing equality and supporting working women and their families, vertical gender imbalances may be less pronounced than in other regions (*18*).

In addition to providing opportunities for monitoring health occupations, censuses with data on place of work allow identification of those with other (non-health) occupations working in the health services industry, or health systems support staff. As seen in the illustrative example from Uganda (Figure 8.3), gender imbalances can also be seen among support staff. Women are underrepresented compared to men in non-health technical specializations (for example accounts and finance, engineering, information technology); moreover, within these fields they are less numerous at the professional level compared to their counterparts at the associate professional level. Conversely, women are overrepresented as clerks.

8.4.2 Gender and entry into the health workforce

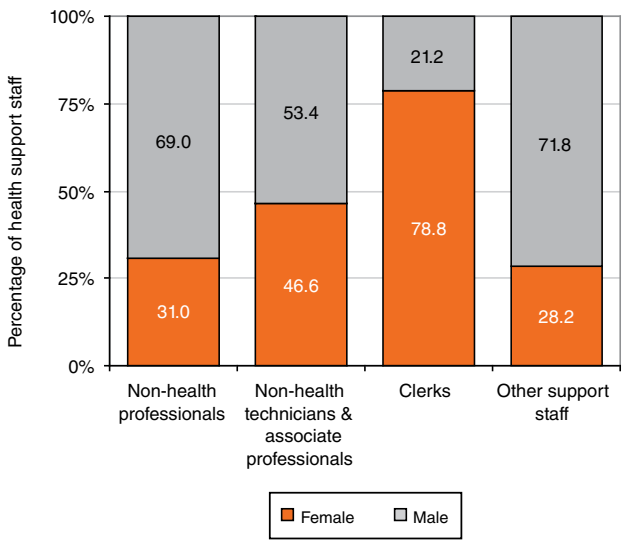
It is possible that occupational clustering by sex is a reflection of differential access among women and men to education and training leading to a skilled profession. One of the strengths of using censuses for monitoring the gender dimension of entry to the health workforce is the availability of nationally representative data on the pool of eligible candidates for advanced health education and training. Monitoring the pool of eligible candidates is an important HRH policy question, but one that is often overlooked in health workforce research and planning (see Chapter 4). Monitoring gender differences in access to education is also of particular importance: the ratio of girls to boys in primary, secondary and tertiary education is one of the core indicators of the Millennium Development Goals (*19*).

An illustrative analysis of gender imbalance in educational attainment drawing on census data is presented in Table 8.3. In almost all countries, women health workers outnumber their male counterparts in the lower education categories, i.e. at primary level and secondary level. Moreover, at these levels the imbalance tends to be more pronounced within the health workforce compared to the general adult population. It is especially pronounced in the two countries of the eastern European region. The exception is Cambodia, where there are fewer less-educated female health workers than males; this may be related to the fact that Cambodia is one of the countries with the lowest overall level of education (98% of the adult population with at most primary schooling).

While a high female-to-male ratio among HRH can be seen across all education levels in most countries – a trend reflective of the overall feminization of the health workforce – the ratio is generally much lower at the tertiary level of educational attainment than at the primary level. When it comes to the highest education category, the sex ratio among health workers tends to more closely follow that of the general population.

To further the analysis, as seen in Figure 8.4, countries with greater gender inequities in access to higher education tend to be those with greater gender imbalances in the health professional workforce. Among the 11 countries with comparable census data, a close and direct relationship is revealed between the sex ratio in

Figure 8.3 **Sex distribution of health systems support staff, by occupation, Uganda, 2002 census**



Source: Ssennono, Petit and Leadbeter (*15*).

Figure 8.4 **Relationship between sex ratio in tertiary-level educational attainment and health professional work activity, according to census data for selected countries (around 2000)**

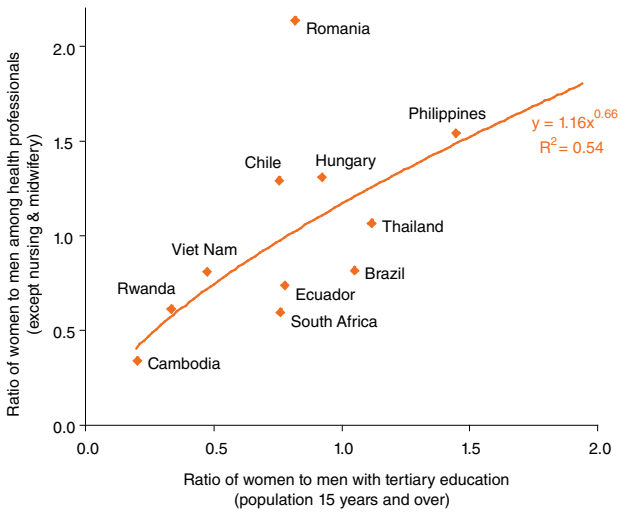


Table 8.3 Ratio of women to men by level of educational attainment, health workforce and total population, according to census data for selected countries (around 2000)

Country	Group	Educational attainment		
		At most primary	Secondary	Tertiary
Argentina	Health workers	4.5	3.0	1.2
	Total population	1.0	1.4	0.9
Brazil	Health workers	2.2	3.4	1.3
	Total population	1.0	1.3	1.1
Cambodia	Health workers	0.8	0.6	0.3
	Total population	1.1	0.4	0.3
Chile	Health workers	1.1	2.4	1.1
	Total population	1.0	1.1	0.8
Ecuador	Health workers	6.9	5.3	0.9
	Total population	1.0	1.1	0.8
Hungary	Health workers	12.4	9.4	1.3
	Total population	1.3	0.9	1.0
Philippines	Health workers	3.2	2.8	2.4
	Total population	1.0	1.0	1.4
Romania	Health workers	9.0	5.8	2.1
	Total population	1.3	0.8	0.9
Rwanda	Health workers	1.3	1.7	0.3
	Total population	1.1	0.8	0.3
South Africa	Health workers	3.7	5.5	1.3
	Total population	1.1	1.1	0.9
Thailand	Health workers	1.9	2.6	1.7
	Total population	1.1	0.9	1.1
Viet Nam	Health workers	2.5	2.4	0.8
	Total population	1.1	0.8	0.5

Note: Data on educational attainment refer to the population aged 15 years or over. Secondary attainment includes post-secondary education at the non-university level. Health workers are defined as persons active in the labour force and reporting a health occupation at the time of the census.

tertiary-level educational attainment among the general population and the sex ratio among active health professionals. Notably, the correlation coefficient, which gauges the strength of a relationship between two variables, is found to be relatively high by social science standards (0.54 for the trend analysis including all 11 countries, or 0.67 when excluding the outlier data point for Romania).

8.4.3 Gender and exit from the health workforce

Although a census is cross-sectional, i.e. time specific, it is possible to use a series of censuses to evaluate exits from the health workforce. In Thailand, as in many other countries, censuses are carried out once every decade. A cohort analysis approach was used across two successive censuses to measure net workforce attrition by sex, that is, using age-specific data for following the same cohort from one census to the next. For example, the number of nurses aged 35–39 in 1990 was compared with the number aged 45–49 10 years later to estimate net attrition (or net effect of workforce gains and losses) for this cohort. This entailed additional challenges for ensuring data comparability. In particular, the system of occupational coding was different across the two census rounds: in the 1990 census occupations had been coded according to the 1968 version of ISCO, while for the 2000 census they were mapped to the 1988 version. The analyses of Thai census data presented here were done using ISCO-88 as the reference.

Table 8.4 shows the change over the decade in workforce size for selected cohorts for two cadres, namely physicians and nurses. As almost all newly educated health workers enter the profession under the age of 35, and assuming there is no appreciable international in-migration, the number of workers aged 35 and over can be used to calculate the rate of workforce attrition, or percentage reduction in total health professionals over the previous 10 years.

Three key trends can be ascertained from the census data: increasing levels of attrition with age; higher attrition among male health professionals compared to their female counterparts; and, in the older age groups, higher attrition among nurses than physicians. The culmination is the observation of the highest rate of attrition among older male nurses. The reasons for leaving the health workforce can include retirement, out-migration, career change, work-limiting illness, death or other. Such findings underscore the importance for

Table 8.4 Estimates of intercensal health workforce attrition by sex, Thailand, 1990 and 2000 censuses

Age group		Males			Females		
		Number		% loss	Number		% loss
in 1990	in 2000	in 1990	in 2000		in 1990	in 2000	
Physicians							
35–39	45–49	1872	1543	**18**	661	583	**12**
40–44	50–54	1368	1114	**19**	527	466	**12**
45–49	55–59	732	543	**26**	332	272	**18**
Nurses							
35–39	45–49	694	596	**14**	7619	6755	**11**
40–44	50–54	562	407	**28**	5352	4541	**15**
45–49	55–59	459	270	**41**	3042	2217	**27**

HRH analysts, planners and policy-makers to consider workers' gender, equally with their occupation and age, among the core variables in national workforce supply and requirement planning and projection efforts.

8.5 Summary and conclusions

This chapter has focused on uses of national population census data for gender-specific HRH assessments as a basis for formulation of evidence-based policy options. Population censuses can be a useful source of information for health workforce monitoring and evaluation. In particular, appropriate census data allow calculation of a number of health workforce indicators and their disaggregation by sex, a critical requirement for assessing gender equity in the workforce.

For a census to be useful for health workforce analysis, the most important requirement is that it contains adequately defined and classified labour force variables that allow distinction of health occupations from other occupations. As previously noted in Chapter 2, ideally, occupational data gathered in a census should be processed to the lowest level of disaggregation as classified in ISCO (or its national equivalent). The case studies presented here have shown how censuses can provide relevant information for many aspects of workforce planning and policy development, notably from a gender perspective.

In order to be of greater value for research and policy, population censuses should be taken at regular intervals, at least every 10 years (*10*). Despite the recognized importance of the census, many countries did not participate in the previous 2000 round; in Africa, a third of all countries (17 out of 53) did not participate, resulting in nearly half of the continent's population not being enumerated. With intensified national, regional and international efforts and support, as of mid-2008, censuses have been undertaken or are being planned in 51 African countries for the 2010 round (*20*).

One of the main constraints to census sources for HRH analysis (in addition to relatively lengthy periodicity) has been limited access to and use of microdata for health research, especially in many low- and middle-income countries. In order to optimize census uses, collaborations should be planned in advance between ministries of health, census bureaus and other stakeholders for developing a strategy for data collection and processing and for dissemination and use. The latter should ideally include some combination of each of the dissemination tools used here: (i) public access to microdata samples for scholarly research (anonymized to protect confidentiality); (ii) limited access to full census databanks (such as secured access for approved researchers); and (iii) specialized health workforce profiles as part of the national series of census publications. In practical terms, the cost of collecting, processing and tabulating nationally representative data on HRH will be marginal for census exercises already including questions on labour force activity.

In general, the analysis supported the notion that the situation of human resources in health systems is often a reflection, or even exacerbation, of broader societal gender norms and inequalities, particularly with regard to access to the education and training required to become a skilled health professional. Most HRH analyses are approached using occupational lens, with little explicit attention to gender dimensions within and

across occupation groups. Gender mainstreaming in health workforce monitoring and evaluation strategies is needed to ensure that evidence-based gender-sensitive approaches are undertaken to health workforce planning and management, relevant to the needs and interests of both women and men health workers. Research, policy and programme efforts to address gender equality in the health workforce should lead to strengthened health systems more broadly. Access to reliable, comprehensive information on gender and the health workforce – such as through sex-disaggregated data from a population census – can inform the steps needed to achieve gender equity.

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9 Use of administrative data sources for health workforce analysis: multicountry experience in implementation of human resources information systems

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9.1 Introduction

The most efficient and immediate way to track changes to a health workforce is to use data from a routine administrative information system. Censuses and surveys, both population based and facility based, are key tools to provide an accurate snapshot of a country's health workforce, but must be fully reconducted periodically to look at a changing situation. As these tools are prohibitively expensive to implement on a regular basis, data from such sources should be considered as a basis (albeit an essential one) for complementing the national routine human resources information system (HRIS), which provides a continuous record of changes in the health workforce and serves as the timeliest source of information available. These systems are typically used by administrative organizations in the country, such as ministries of health, professional councils and professional associations, to qualify, manage and plan the health workforce. It is in the interest of these organizations to maintain updated and accurate information in the HRIS.

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 analyse workforce problems and assist in identifying possible solutions. The strength of an HRIS does not depend on technology but on its ability to be adapted to address current workforce issues and generate accurate and timely information. In most low- or middle-income countries HRIS data are routinely collected in paper form. While such a system can represent a functioning HRIS, there are often serious limitations to the use of these data. Although records representing a single role or individual can be located and accessed (with varying degrees of ease), often these records cannot be used efficiently because of the intensive effort involved in updating or aggregating data, difficulties linking data on an individual level across various records, and issues of data quality, such as incomplete records, timeliness and inconsistencies. As a result, decision-makers may not have access, in a timely and accurate fashion, to critical pieces of information necessary to developing an effective human resources for health (HRH) strategy. For example:

- How many physicians and nurses are being trained and in what specialties?
- How are health workers distributed across urban and rural areas?
- Why are health professionals leaving the health-care services industry?
- How many health professionals are currently not employed?

Understanding the answers to these and other key policy questions will help decision-makers effectively:

- ensure a steady supply of trained health professionals;
- deploy human resources with the right skills to the right positions and places to meet health-care needs;
- retain health worker skills and experience in the country.

A mature, comprehensive HRIS links all human resources data from the time health professionals enter pre-service training to when they leave the health workforce. Using such a system, decision-makers can quickly find the answers they need to assess HRH problems, plan effective interventions and evaluate those interventions. If well designed, managed and maintained, HRIS data can provide a cost-effective yet extremely useful source of information with which to monitor and evaluate the impacts of changes in social policy at the national and subnational levels.

Country experience indicates that, while often less accurate than census or survey data, particularly in the initial phases, routine health data systems improve in accuracy over time (*1*). A well-functioning HRIS has an

advantage over a survey because it allows for ongoing monitoring of detailed information in large sample sizes, including subnational geographical analyses. In addition, it is longitudinal in nature with the capability to record health workforce dynamics. Continuous and current information on the same individual can be tracked over long periods of time at less cost per data point. Due to advances in computer technology, linking various administrative databases is easier, less expensive and more reliable than ever before (*2*).

At the same time, many low-income countries need to build capacity, both human and technical, in order to improve the use of HRIS data, including planning, software design, infrastructure support and management, as well as strategies for data use and strengthening. The implementation of a comprehensive country strategy should include the following underlying principles:

- a participatory approach that involves stakeholders from various ministries and sectors from the outset and increases the ownership of the system;
- an iterative development methodology that incorporates existing systems, tools and processes as much as possible to lower costs and speed up implementation;
- a mature software solution designed for the country context and to answer key HRH policy questions for that country;
- an emphasis on building capacity, ensuring sustainability and continuously improving the system through training and technical support;
- a continuous effort to train decision-makers to analyse and use the data that the HRIS provides to make sound HRH decisions.

In this chapter, an overview is provided of the essential elements and lessons learnt to date in the implementation of a comprehensive HRIS strengthening initiative. A series of critical stages in the development and strengthening of a complete HRIS is first discussed, followed by presentation of a number of case studies drawing on experiences in selected low- and middle-income countries.

9.2 Recommended first steps to develop a human resources information system

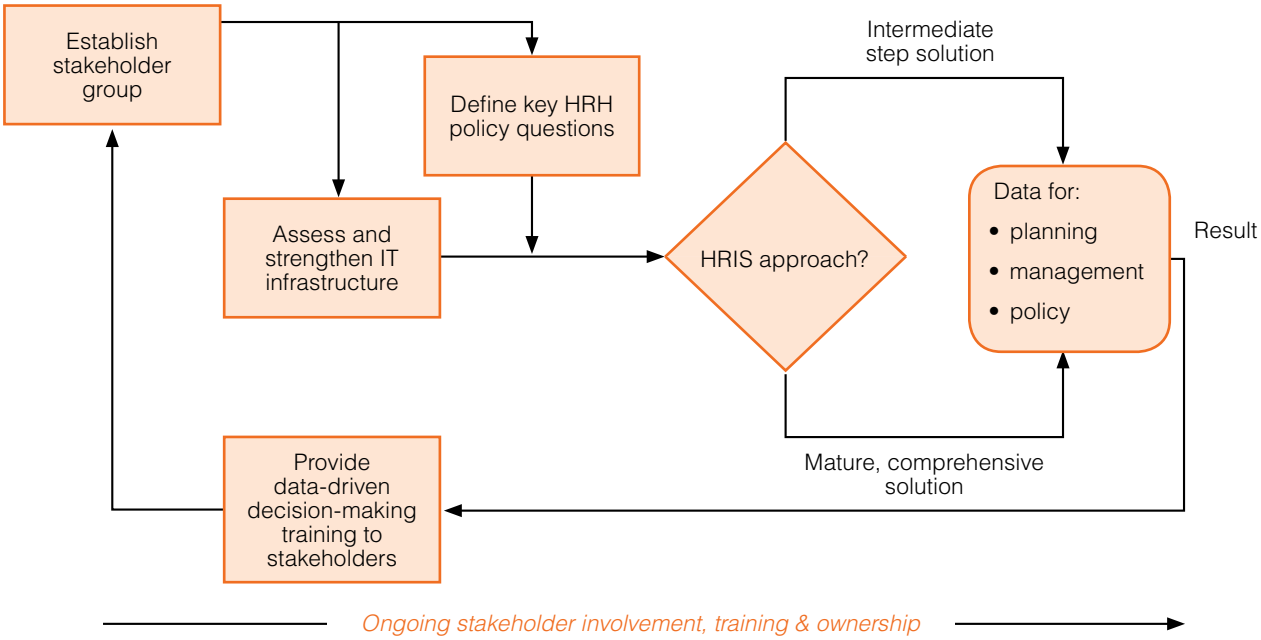
The first and most important thing to keep in mind when developing an HRIS is that just as human resources are a building block of a health system (*3*), so the HRIS is a part of the comprehensive health information system. And just as every aspect of the health system (including facility- and community-based service delivery, availability of medical products, financing and governance) contributes to the success of health workers and health workers influence the functionality of the system, there is also a critical interdependence of the HRIS and the other components of the health information system. In a mature and comprehensive health information system, the HRIS will be the authoritative source of HRH data for each of the other building blocks. This underscores the critical nature of the HRIS to the integrity and success of the whole health system.

Ideally, the HRIS development and strengthening process comprises five key stages using a participatory approach (Figure 9.1). First, a stakeholder leadership group is established, or a national task force involving all key stakeholders and led by the ministry of health, and the key HRH policy questions are identified. Next, HRIS technical staff conduct a needs assessment to focus on the current infrastructure (for example existing networks, Internet connectivity, software) and data already being collected by the different ministries, councils and other organizations. After the questions and infrastructure are agreed upon by the stakeholder group, HRIS software solutions should be customized to answer the key health workforce policy and management questions for a respective country. The end result could either be a step solution or a mature (multiple component) system able to support managers and decision-makers in their efforts to effectively use and analyse data for informed and confident decision-making. At the stage of data use, attention is paid to how data are actually used for decision-making. Throughout the process, sustainability and continuous improvement of the HRIS can be ensured through training and building of capacity in the country team to independently support, use and improve the system into the future.

9.2.1 Building a stakeholder leadership group

A key to the success of implementing an HRIS is the ability to respond to in-country needs. Developing a leadership group of all the essential stakeholders that produce and use HRH information assists in developing a country-focused HRIS. This group will initiate, lead and monitor all subsequent activities in HRIS strengthening. The stakeholder leadership group empowers stakeholders to develop an HRIS that meets their needs, ensures ownership of the system and builds the necessary capacity to support, use and improve the HRIS. Another benefit of including the key stakeholders is that it opens communication channels between groups of individuals that typically do not meet together, thereby facilitating collaboration and sharing of data across groups.

Figure 9.1 Framework for institutionalizing a human resources information system



Source: Capacity Project (*1*).

The stakeholder leadership group should include experts in health workforce planning and production, and in information systems. The outcome of the first meeting should be the terms of reference for the group (such as its leadership, membership, accountability, mission, function and duties) and the principles of operation for the meetings (such as the equality of all members, the need to hear from all participants and the need to reach consensus for decisions to occur).

After deciding on the terms of reference and principles of operations, the group is ready to begin defining the key HRH questions that need to be answered and the indicators that will be used to monitor the status of the health workforce via the HRIS, and considering issues pertaining to data confidentiality, ownership and policies for data sharing. It is critical that the country identifies and owns these questions to ensure the success and usability of their HRIS. Once the stakeholder group identifies these questions, the group will continue to meet regularly to provide direction for the infrastructure development, programming, data inputting, report development and use of data for decision-making. It is particularly important that issues of data confidentiality and data ownership are addressed from the onset since these are not typical considerations with a paper-based system and could have serious consequences if safeguards are not considered and instituted from the very beginning.

Many stakeholders are involved. Ministries, licensing and registration or certification bodies, private sector organizations and other stakeholders must 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. Depending upon the scope of the HRIS development, there may be a need for employees of facility-based service delivery points to be included in the stakeholder leadership group to ensure that individual-level data remain accurate and that they have access to necessary information (for example, direct salary deposits into their bank account). At every juncture, the most important outcome is that ownership of the HRIS is being built and capacity is being developed.

9.2.2 Infrastructure development

Despite the momentum that is often generated by the stakeholder leadership group, experience suggests that no country is ever ready to deploy a complete and mature HRIS in the first instance. Strengthening the information system in planned steps provides quick gains without overwhelming the infrastructure needed to support the system. Data collectors and managers, technical support staff and decision-makers should receive training at each step, become comfortable with the new system and then take the next step when they are ready. In particular, training should occur in updating new information at each stage of the workforce life span (for example pre-service training, new deployment, redeployment, migration, retirement, death).

Improvements to existing information technology infrastructure can generally be implemented quickly and often result in increased efficiency and productivity.

Proposed infrastructure improvements should be based on a technical assessment and consider low-cost solutions that can rapidly but significantly enhance existing systems and processes. Recommended improvements might include procuring computers for workers who need to enter or access data in the system, improving software applications and tools that are currently being used, increasing data storage capacity, upgrading network connections for transmitting data or expanding technical support services.

9.2.3 HRIS development steps

Depending on the current form, existing HRH information systems may be strengthened in iterative steps. A step solution is any interim solution for managing HRH data that is deployed while a mature system is being developed. Step solutions can be deployed to enable the ministry or another organization to quickly start entering and managing its HRH data. The data can then easily be migrated to the mature solution when it is available and the end user is ready to implement it.

Where there is only a paper-based system, an electronic register can be implemented. Where an electronic register is already in place, a simple database can be built. Where there is a simple database, that database can be progressively strengthened or expanded. For example, a situation may arise where the routine database system is so out of date and unreliable that policy-makers cannot manage the results. One particularly useful step solution is to develop a short survey form to collect minimal accurate information on health workers at the facility level and enter these data into a register. These data can be used to update databases and make the system operational again. Another important step solution could be the specification of a gender-sensitive HRIS.

The goal of such an iterative strengthening methodology is to ensure that every country or organizational programme can quickly benefit from an HRIS strengthening process regardless of resources. Proceeding in iterative steps also lessens the impact of too much change too quickly, while ensuring that each step progresses towards the goal of a mature and complete solution.

When a country or organization is ready and the appropriate infrastructure and supporting systems are in place, a complete set of mature software solutions can be implemented to fully track skilled health service providers from the time they enter training until they exit the health workforce. Four components are needed to address the most critical health workforce planning, production and management issues:

- **Qualification.** This component is used to collect and aggregate data on skilled health service providers and speeds up the process of generating routine forms, such as registrations and licences or records of professional examination results, that were previously handwritten. It should reside with the licensing or certification authority for a health worker cadre, such as physicians or nurses. In most countries these authorities are boards or councils. These data are critical for hiring authorities throughout the country to ensure that only qualified professional health workers are hired, since forging paper documents is reported in many countries.
- **Management.** This component tracks detailed information about health workers who are employed by the ministry of health, a public sector health-care facility such as a hospital, or a private sector service delivery point within the country. In addition to individual deployment information, other pertinent information may include performance appraisal, disciplinary action, retirement, change of occupation and payroll information.
- **Education and training.** There are two main training components: (i) pre-service education, which tracks the level and field of education leading to qualification for a health occupation; and (ii) continuing education and in-service training, which update the professional knowledge, practice and skills of individual health service providers. Continuing education may be required to maintain an active licence to practise in certain countries. These two components of training may be included in either the qualification or management systems or they may be stand-alone systems, depending on the needs of a country.
- **Planning.** This component uses data from each of the other systems and statistical modelling applications to form a complete picture of the health workforce in the country and allow projections on how that workforce will change in the future (based on known influences such as retirement age, number of trained health workers annually entering the workforce, attrition rates, changes in population, staffing norms, disease patterns and other factors). The planning and modelling component of the HRIS can help decision-makers assess their health workforce needs and make effective policy decisions to meet those needs.

Together, these four components can provide a powerful feedback loop for analysing, planning and managing health workforce resources and needs. If all four components use the same core programming, database architecture and supporting hardware and software systems, once one is fully deployed, the others can be added at a significantly lower cost. Each of the four

systems may 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 (*1*).

9.2.4 Supporting use of data for effective decision-making

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 HRH policies and practice. However, it would be very difficult for a few people poring over data reports to make sound and binding decisions. The ways in which data are used for effective decision-making rely on the active involvement of a broad range of stakeholders working together. Understanding the context in which data are used to make decisions is also essential.

Rather than having an external consultant supply a packaged training programme for using data for decision-making, for instance, all national stakeholders should be engaged in understanding how they use data now, both individually and organizationally, and what factors are important in their context for using data effectively. Examples of approaches that have been employed in countries to improve the use of data for decision-making include:

- mapping how data are used to support a decision, resulting in case studies of practical data use;
- providing opportunities for decision-makers to experience critical decision-making moments so they can develop their skills using real data in real-life situations;
- improving communication among users of data;
- identifying and leveraging opportunities for improved data sharing across different levels of the organization and with other stakeholders.

9.2.5 Methodology for sustainability and continuous improvement

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 of 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. As part of this, the HRIS strengthening process should include the training of decision-makers and stakeholders to effectively use and analyse data for informed and confident decision-making. In addition, the training of data collectors, system support staff and system managers helps to improve the technology infrastructure, data quality and integrity. 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.

Data accuracy and completeness are necessary to inform decision-making. Standardization of data collection forms and data coding can facilitate ease of use and internal validity. In addition, procedures to minimize data entry errors when transferring data from paper to electronic forms can result in improved data quality. Dual data entry, in which a record is entered into an electronic database at two separate times by two separate staff, can reduce data entry errors by ensuring that discrepancies in data are compared against the original document. 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 original record, can be used. Both dual data entry and spot-checking permit data managers to identify, record and correct data errors. A data error log can also serve as a starting-point for later improvements in training methods, data collection forms or software modifications.

Routine, reliable updates can also improve data quality by ensuring that data remain relevant for planning and decision-making. Data reports at the central level can be sent (either electronically or via paper forms) to provincial or district representatives for review and updating on a regular schedule. Similarly, processes should be put in place to facilitate the flow of data and reports between the central and district levels, and between hospitals, health centres and other service delivery points. This exchange of information allows the HRIS to better account for changes in the workforce, such as new deployments, transfers, specific in-service trainings and workforce exits. Sharing data not only improves accuracy but also enables health planners at all levels to gain access to information valuable for policy and administrative decisions. Furthermore, enabling public access to aggregated HRIS data may facilitate HRH planning and research across sectors, including nongovernmental organizations, academic researchers and policy-makers.

Although sharing data is essential in order to improve data quality and encourage evidence-based decision-making, maintaining data security is equally critical. HRIS data includes personal information that must remain secure in order to build confidence and trust in the system. Implementing and adhering to a data security policy starting from the initial stages of development of the information system can help ensure data confidentiality and integrity (Box 9.1) (*4*). A system can be built with several levels of access based on

Box 9.1 Confidentiality and security of HRH information

With increasing attention to human resources opportunities and constraints to achieving health systems objectives, greater emphasis is being placed on the collection of information to improve HRH development and monitoring. Having longitudinal data, or information gathered at different points over time, allows individual health workers to be tracked in their labour market activities and other significant events, supporting evidence-based decision-making for policies and programmes at critical junctures along the working lifespan.

Provider-level information becomes even more important when used for human resources development strategies or health services delivery monitoring. This will require information systems, whether paper based or electronic, that ensure health worker confidentiality yet allow relatively easy access to the information at both the individual and aggregate level. Implemented systems must also address issues of system availability.

Using personal data for health systems goals must be balanced against individuals' rights to privacy and confidentiality, and should be based on human rights principles.

When developing approaches to protecting data, a distinction should be made between providing for the physical protection of data to guard against environmental threats, and the protection needed to guard against inappropriate use of sensitive information, whether due to inadvertent or deliberate activities.

Three interrelated concepts, each implemented in a different manner, have an impact on the development and implementation of protection of sensitive data: privacy, confidentiality and security.

Privacy is both a legal and an ethical concept. The legal concept refers to the legal protection that has been accorded to an individual to control both access to and use of personal information and provides the overall framework within which both confidentiality and security are implemented.

Confidentiality relates to the right of individuals to protection of their data during storage, transfer and use, in order to prevent unauthorized disclosure of that information to third parties. Development of confidentiality policies and procedures should include discussion of the appropriate use and dissemination of health worker data with systematic consideration of ethical and legal issues as defined by privacy laws and regulations.

Security is a collection of technical approaches that address issues covering physical, electronic and procedural aspects of protecting information collected as part of the HRIS. It must address both protection of data from inadvertent or malicious inappropriate disclosure, and non-availability of data due to system failure and user errors.

Source: Adapted from UNAIDS (*4*).

user roles. For example, such a system could enable some users to enter records without accessing reports, other users to see reports without the ability to enter or modify data, and a third group of users to access only aggregate reports, without the ability to view or edit individual records. All HRIS users should be supplied with a password that is regularly changed, and a system should be put in place to back up data on a regular schedule.

The development of skills is necessary for supporting, maintaining and developing computerized information systems. This part of the strategy could include the development of regional user communities to facilitate problem solving and share system improvements, possibly in collaboration with local educational institutions.

Taking full advantage of HRIS results to improve HRH planning and management in developing countries requires a concerted supportive process. When policy-makers and other key stakeholders obtain access to extensive information about the health workforce, it may be difficult for them to see uses for these data beyond the usual reports that they formerly generated

with paper records. Additionally, the HRIS data are being produced in a policy-making context that is highly political, and appointments to positions may change frequently (*5*). The data for the decision-making process involves the key stakeholders in a practical, participatory procedure of using, interpreting and applying the new HRIS information while considering what capacity needs to be developed to implement changes on an individual, organizational and policy level. This may involve sharing information and reports that are now available and training on different ways to interpret the information and present evidence effectively to respond to key policy questions. Having the key stakeholders present their own data to their peers helps to build the ownership and confidence in using these data to inform management and policy decisions. The final phase involves developing a plan for disseminating these HRIS data regularly, based upon the reporting cycle within the country.

9.3 Country case studies

Examples are now provided from HRIS development, strengthening and evaluation efforts in three low- and middle-income countries: Uganda, Sudan and Brazil.

9.3.1 Building a health professional licensure information system in Uganda

In Uganda, the Ministry of Health (*6*) and four health professional regulatory councils, including the Nurses and Midwives Council, needed updated and reliable information on how many health professionals by cadre were licensed to work in the country, what training they had received, if they were leaving the health workforce and if so, why. Until recently, although a complex system of paper forms was in place, there was no way to aggregate or analyse the information, and it was difficult even to track down a given nurse's current address or licensing information.

A stakeholder leadership group was formed, including representatives from several departments in the Ministry of Health, the four professional licensing associations, training institutions and nongovernmental organizations, as well as consultants in health workforce planning and information systems from the Capacity Project (*1*), a global HRH initiative funded by the United States Agency for International Development. The goal was to develop a registration and licensing information system that would track all health professionals from the time they entered pre-service training until they left the health workforce. One of the first activities of the stakeholder group was to identify the key policy questions that it wanted addressed regarding nursing and midwifery personnel, so that the first HRIS strengthening step could focus on generating regular reports to answer those questions.

Improvements were made to the network and hardware infrastructure at the Uganda Nurses and Midwives Council, the regulatory body that licenses professional nurses and midwives working in the country. An open source software application was installed: *iHRIS Qualify*, a training, certification and licensure-tracking database (*7*). "Open source" refers to computer software distributed under a licence that allows anyone to study, copy and modify the source code (the set of instructions that creates a piece of software) and redistribute the software in modified or unmodified form, without restriction and without the need to pay a licensing fee. This means that products can be distributed at minimal cost, and users can continue to use and improve their systems without paying onerous licensing or upgrade fees. Open source software does have some disadvantages, most importantly the potential for poor support for users in countries with a shortage of skilled personnel in new information and communications technologies, and a lack of accountability if software glitches or unauthorized access occurs. However, using open source software has the advantage of encouraging software development in context, and often represents the least-cost alternative where there is a foundation of computer skills in the country, or better yet, the health system. It is also possible to draw on the global open source support community that has developed around these technologies to voluntarily support and improve the systems. This can be quite advantageous in helping users answer questions, fix problems with software and even develop new modules. The result is a completely tailored (but still low-cost) system that can grow and change over time.

In the Ugandan context, implementation teams were formed to programme and deploy the software. Entry of historical registry data from the Uganda Nurses and Midwives Council was completed first, followed by the other three licensing bodies – for medical and dental practitioners, pharmaceutical practitioners and allied health professionals. Quality controls were incorporated into the data entry and processing procedures, notably the assignment of a unique identification number within and across cadres to address potential biases such as double-counting (for example, when a health professional has more than one type of training), and a dual data entry system to ensure accuracy and permit tracking of data entry problems. Another method used for validating the data was to request each individual health worker, upon entry to the appropriate council, to verify the contents and update any information that may have changed based on a printout of their electronic record. This process keeps the database updated and

gives the health professionals an appreciation of the need for data accuracy.

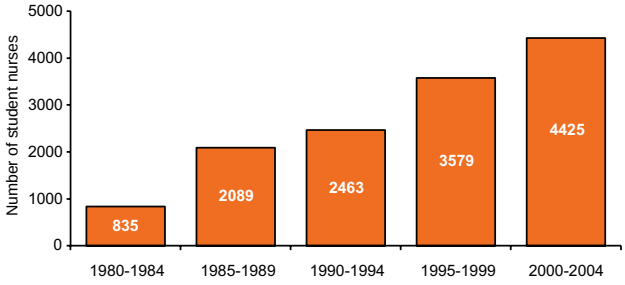
The next three figures offer examples of the type of information that can be examined with the database, drawing on administrative records for all student nurses and midwives that entered training between 1980 and 2004. Figure 9.2 shows the increase in enrolment in nursing and midwifery training programmes during this timeframe.

Figure 9.3 presents findings on completion of training programmes and professional qualification among student nurses and midwives in Uganda. Of the 21 888 student nurses and midwives that entered training from 1980 to 2004, only 17 297 completed the training programme and sat for the exam. Of those who passed the examination, 16 658 qualified to register with the Nurses and Midwives Council and 14 637 eventually registered – approximately two thirds of those who originally entered training. One way in which these data are being used is to ensure that nurses and midwives hired are registered with the Uganda Nurses and Midwives Council by giving central and district authorities restricted access to view the HRIS to see if the applicants for professional positions are in good standing with the Council.

Figure 9.4 identifies the location of nursing schools by district, showing where students are most successful in passing the licensing examination and becoming registered, and where they are having more difficulty. For example, 18% of nurses and midwives who attended school in Kampala District and 11% of those who attended school in Kisoro District passed the exam but did not become registered by the Council. In contrast, all nurses and midwives who attended school and passed the exam in Bushenyi District became registered.

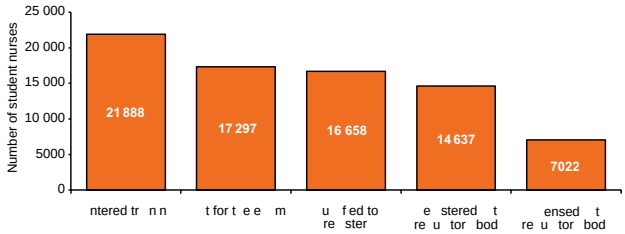
These data have important policy implications about expenditure of scarce national resources for educating health professionals that are wasted if individuals do not complete training and become registered with the appropriate regulatory body. They also raise questions about selection of students and the examination process. Without knowing how many of these students do not complete training, policy-makers and planners do not know how to budget or plan for training or deployment of health workers to meet the needs in the country. Also, these data help educators, professional councils and various ministries to identify potential problems in the early stages, prioritize where to target interventions, offer an indication on where further investigation and monitoring are needed, and point to factors that were important to observed positive outcomes from which stakeholders can learn.

Figure 9.2 Number of students entering nursing training programmes (leading to qualification as registered or enrolled nurses) in Uganda, 1980–2004



Source: Capacity Project (*1*).

Figure 9.3 Number of student nurses who entered training between 1980 and 2004, passed the professional licensing exam, and qualified, registered and became licensed with the Uganda Nurses and Midwives Council



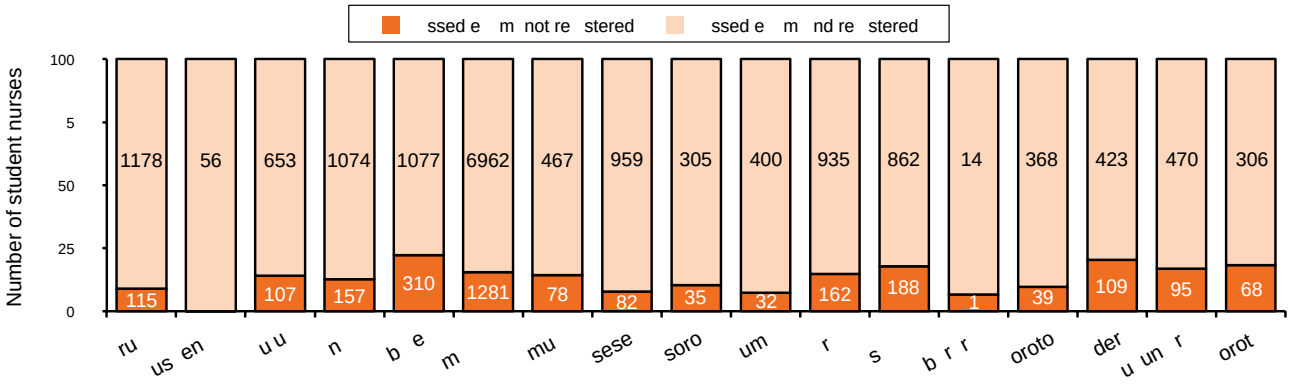
Source: Capacity Project (*1*).

Based on the results discussed above, in Uganda, a recommendation was developed to further explore the causes for the high failure rates among student nurses and midwives and propose ways to tackle the problem (*8*). An interministerial stakeholder meeting was set up to address some of the issues about examining nurses for registration with the Nurses and Midwives Council.

9.3.2 Institutionalizing a health workforce monitoring framework in Sudan

A number of strategies and initiatives have been implemented in Sudan in recent years to improve health system performance, including strategies to achieve the Millennium Development Goals and other international, regional and national goals for reducing poverty and improving population health. Accordingly, Sudan's Federal Ministry of Health made a decision

Figure 9.4 Number and percentage of student nurses who passed the professional licensing exam and registered with the Uganda Nurses and Midwives Council, by school district (entrants between 1980 and 2001)



Source: Capacity Project (*1*).

to closely monitor the institutional performance of the key departments and programmes at all levels (*9, 10*). In collaboration with the World Health Organization, the Ministry developed a comprehensive monitoring and evaluation matrix tailored to the national context for health system performance. The matrix drew on baseline information and set periodic targets for each agreed upon indicator, against which the information system would be used to monitor progress over time. Three main sections were included:

- global indicators, including those related to health system coverage and health workforce density;
- disease-specific indicators, such as those pertaining to HIV, malaria and tuberculosis;
- department- or programme-specific indicators.

In order to ensure national ownership, the Ministry of Health assumed the leadership role, particularly during the launching and institutionalization of the information system. In addition to international recognized expertise, a number of other partners and community representatives were asked to participate throughout the development and evaluation process. While the undersecretary of the Ministry of Health served as the champion of the whole process, the Department of Health Planning was commissioned to establish a new institutional monitoring and evaluation unit with full-time professional and support staff. A detailed profile was drafted for the unit, including operational terms of reference for both central and subnational teams.

Each main department and programme selected focal points to assume responsibility of the implementation of their respective monitoring and evaluation plans in accordance with the appropriate indicators, baselines and targets. In particular, the Department of Human Resources Development put in place a specific annual monitoring and evaluation plan to monitor key dynamics pertaining to HRH variables, including those related to entry, active labour force and exit. The objective was the development of a sustainable information and monitoring system for the timely and continuous updating, verification and analysis of data on health workforce dynamics. The plan drew on the national HRH 10-year strategy and other relevant initiatives. The monitoring and evaluation plan was thoroughly reviewed, discussed and endorsed by a wide range of staff from the Department of Human Resources Development and by the Ministry of Health undersecretary.

Special HRH monitoring and evaluation reports were presented at the monthly departmental performance review meetings, including progress made and transparent identification of areas needing improvement. While the reports did not tackle such global issues as retention and migration, they did monitor recruitment, deployment, transfer, exits, opportunities for pre-service and in-service training and compliance with performance-based incentive schemes. Once cleared after the departmental review, wallcharts were displayed in each unit within the Department with monthly statistical variations. Inputs of monitoring and evaluation activities related to HRH were further used for the annual Ministry-wide statistical report.

A number of practical steps to HRH information and monitoring system development and institutionalization were part of the Sudan experience, including:

- critical mass strategy: advocacy to raise awareness of the crucial value of the HRIS and obtain political commitment;
- institutional ownership and leadership: multidisciplinary team approaches under the guidance of a national leader;

- consensus on a limited set of core indicators adapted to the country context, including explicit baselines and benchmarks;
- going electronic: deployment of user-friendly software for monitoring progress;
- methodology refinement and local adaptation: allowing flexibility for refining and adapting or readapting the information system to the changing local context for the health workforce;
- training in data analysis, dissemination and use, and in basic information technology skills for national human resources development staff and monitoring and evaluation coordinators and focal points;
- transparent dissemination of information generated by the system, including periodic dissemination sessions among key stakeholders aimed at gaining inputs and generating maximum consensus building.

Selected results from the HRH information and monitoring system in Sudan are presented in Table 9.1. Critical to these results is the linking of the monitoring and evaluation analysis to problem solving and HRH strategic enhancement: there is no point in investing in a complex information system if the results are only used to monitor implementation. The system must include mechanisms to identify and rectify areas that need improvement.

9.3.3 Evaluating an HRH information and management system in Brazil

In Brazil, the HRH information and management system (*sistema de informação e gestão de recursos humanos em saúde*, or SIGRHS) was conceived in the context of health systems reform. It was designed as an instrument for the collection, processing and use of primary data relevant to planning and management of the health workforce. The system was developed to inform regional and local health managers to make better decisions related to their personnel. Initiated in 1987 by the Department of Health of the State of Rio de Janeiro and implemented by the University of the State of Rio de Janeiro's Institute of Social Medicine, the HRIS has been continuously updated, modified and evaluated in response to local demands and taking advantage of innovations in information technologies. In particular, the development of new, user-friendly software applications facilitated data entry operations at the decentralized level and allowed inclusion of both quantitative and qualitative variables on HRH management.

The HRIS includes data drawing on administrative records from different levels and types of institutions. Data collection and entry are conducted using standardized templates. The basic elements captured in the system include sociodemographic characteristics of health workers, professional qualifications and work-related variables, such as job position, employment sector and working hours. These items of information enable profiling of the health labour force, for example

Table 9.1 Selected indicators and benchmarks from the health workforce information and monitoring system in Sudan, 2006–2007

Indicator	Period	Target	Result	Gap	Compliance rate	Suggested rectification measures
1. Number of newly graduated physicians entering the service for internship on time	Q1/2007	750	750	0	100%	The deployment system has been substantially improved since utilization of the newly developed electronic system/web application (2006), with a maximum waiting time of three months.
2. Number of internship supervisory visits at three identified hospitals using the quality assurance approved checklist	Q1/2007	10	3	7	30%	Compliance rate is too low, to be discussed in next Department of Human Resources Development staff/ performance review meetings. Effort should be given to report qualitative results and not merely quantitative.
3. Number of medical specialists deployed to underserved areas	Q1–Q4, 2006	12	7	5	58%	Revisit newly developed incentive system and recommend modifications to attract more specialists to work outside the capital.

Source: Federal Ministry of Health of the Republic of the Sudan.

the distribution by age, sex and educational attainment. They can be used to assess, among other things, skills mix of the health workforce and the deployment of staff across different types of professional functions, health facilities and regions. Regular updating of the data also allows for estimating worker attrition rates. The main data source is staffing rosters and payroll for public health services. Given the confidential nature of these data, a technical team oversees the level of access, whether partial or total, to the information contained in the system for research purposes.

The use of administrative data offers many advantages over other types of standard statistical sources. Traditionally, information on HRH in Brazil came from large-scale databases, compiled by different national agencies for a range of objectives. They include the decennial population census, household sample surveys including the monthly labour force survey, and health facility surveys carried out by the Central Statistical Office (*11*). Other sources of information on the formal labour market include various registries on jobs, wages, recruitments and dismissals of the Ministry of Labour, and on specific occupations through the registration systems of professional associations, unions and councils (*12*). However, these sources tend to be fragmented and are often not readily usable for informing managerial practices and strategies at the local level, particularly in the health sector.

The process of health systems reform and decentralization, and the availability of new information technologies at the level of local health organizations, were a catalyst to the implementation of the HRIS in Brazil. In order to evaluate the success of maintenance and consolidation of the system, and the use of information as a planning and managerial tool, a survey was conducted in collaboration with the University of the State of Rio de Janeiro for appraising the implementation of the HRIS and its performance. An appraisal tool was developed drawing on a framework for evaluation of the implementation process covering three key components of accountability of health policies and programmes: administrative, political and community levels (*13, 14*). The survey was administered among various stakeholders across the country by means of site visits and semi-structured interviews. The specific objectives of the survey included:

- identification of the different types and degrees of involvement of relevant actors in the implementation and utilization of the HRIS;
- identification of the opportunities and constraints for integrating additional information in the area of HRH management, notably qualitative information;
- assessment of the level of satisfaction among health service managers regarding the utilization of the information contained in the HRIS;
- profile of the utilization of the information generated by the HRIS among other organizations both within and outside the health sector.

Table 9.2 Selected indicators and corresponding criteria used for evaluating the performance of the HRH information and management system in Brazil

Indicator	Response options for performance level		
	High	Average	Low
Coverage of implementation of the HRIS among registered servers in the public health services network	At least 90% of registered servers	Between 70 and 90% of registered servers	Less than 70% of registered servers
Completeness of information sources compiled in the HRIS	Collection of data from primary sources and complete fields	Secondary data sources primarily used with at least one review of primary sources	Incomplete data collection/ compilation
Productivity of implementation of the HRIS	Emission of first dissemination report less than three months after data collection	Emission of first dissemination report within three to six months after data collection	Emission of first dissemination report more than six months after data collection or not at all
Regularity of implementation of the HRIS	Data collection routinely updated	Data collection updated occasionally or on demand	Data collection not updated
Regularity of utilization of the HRIS	Dissemination reports issued regularly, up to four in last four months or on demand	Dissemination reports not issued regularly, but at least once in last six months	Dissemination reports not issued

Source: Pierantoni (*15*).

The performance of the HRIS was evaluated using a number of criteria, including coverage, completeness, quality, timeliness and regularity of utilization (Table 9.2) (*15*). Forty-five per cent of the surveyed sites were ranked as having a high level of performance of the HRIS, 33% average performance and the remaining 22% insufficient. While an evaluation of the technical characteristics and operation of the information system's computer software programme was not explicitly outlined, the results of the survey did gather information on usability of the instrument that guided future upgrades.

Table 9.3 presents selected findings on the institutional impact of the implementation of the HRIS in Brazil (*15*). Given the decentralized management of the health system in this context, homogeneity was not expected in the information needs pertaining to HRH, expectations for the HRIS, capacities to implement and use the system, or collected responses to its evaluation. However, the results do indicate an overall positive direction in utilization of information on the health workforce across different situations. The need for comprehensive information for the management processes of HRH and health systems outweighs conditions of even the lowest performance of the implementation of the information system itself.

More recently, as requested by the Brazilian Ministry of Health (*16*), the information system has been updated to incorporate more detailed information on education and training for health workers, including numbers of graduates of advanced health education programmes. Both a new software (*sistema de informação sobre a graduação em saúde*, or SIGRAS) and the latest version of the SIGRHS package have been made available on the Internet (*17*) (see also Box 9.2). The freely accessible, adaptable, web-based or network-based programmes should help facilitate the integration of data from local health facilities with other information on HRH production and management processes, reduce operational costs, strengthen data dissemination and use, and

Table 9.3 Selected indicators and results from the evaluation of the institutional impact of the HRH information and management system in Brazil

Indicator	Expected outcome	Response options for institutional impact		Survey results *(n=9 sites)*
		Yes	No	
Utilization of the information in the HRIS in the processes of HRH planning and management	Improvements in the processes of planning, management and capacity of HRH	The implementation of the HRIS influenced at least three of the following processes: – professional qualification; – workforce planning; – team building; – continuing education; – plans for staffing, career development and remuneration; – decentralization of HRH management.	The implementation of the HRIS did not alter the HRH management processes.	Yes=100%
Utilization of the information in the HRIS in the processes of health system management at the local level	Induction to innovations/ reformulations of management processes in decentralized health systems	The implementation of the HRIS influenced at least one of the following processes: – restructuring of local health services; – integration of information on HRH with other health system databases; – implementation of programmes for performance improvement.	The implementation of the HRIS did not alter the management of the health system.	Yes=78%

Source: Pierantoni (*15*).

expand the evidence base for informing decision-making for management change within organizations.

9.4 Summary and conclusions

Due to the growing interest in health system strengthening and its critical human resources function in particular, the need for documenting and analysing trends and results pertaining to the health workforce is becoming part of the global and national agenda in monitoring health system performance. Although the instalment and maintenance of a functioning HRIS at the national, regional and global levels is not an easy endeavour, it is doable, given the political commitment and evolving quest in many countries to generate evidence-based policies to make progress in tackling HRH-related challenges. The development and sustainability of a comprehensive HRIS to inform decision-making is a leadership, financial, educational, partnership and management issue (*18*).

Well-defined indicators and high-quality data to continuously monitor the status of the health workforce and evaluate outcomes are being increasingly sought in many countries, particularly by ministries of health. However, prospective countries are not looking for merely cutting-edge technology and technical assistance with attractive manuals and guidelines, but practical options and easy-to-use methods to monitor the complex dynamics of the health workforce. A generic and conceptually sound framework for HRIS implementation is neither useful nor sufficient. Field experience shows that a "one framework fits all" recipe is not the solution, given the unique context of the health workforce in each country.

At the same time, this chapter has revealed a number of commonalities across various country-specific experiences and lessons learnt that are crucial for the development of an operational HRIS that is viable, effectively functioning and sustainable within the routine health management system establishment.

Firstly, while other partners and local representatives should participate throughout the process, the ministry of health has to be the owner in establishing and institutionalizing the information system. Moreover, institutional readiness is one of the most crucial conditions to making an HRIS both functional and sustainable. Bringing together all HRIS stakeholders, often for the first time in the same room, ensures that information is shared and helps in identifying the data that do exist and reaching consensus for selection of appropriate indicators and benchmarks. Training and capacity building among stakeholders of the system is critical from the early planning stages, not only in data analysis and basic information technology skills, but also in data dissemination and use to inform decision-making.

Box 9.2 Implementation and use of the SIGRHS information system for HRH management in Guinea Bissau

The SIGRHS HRH information and management system was adopted and implemented by the Ministry of Public Health of Guinea Bissau as part of a partnership between the Brazilian Ministry of Health and the World Health Organization to support the use of information systems for health workforce development in Member States of the PALOP organization (Países Africanos de Língua Oficial Portuguesa).

To implement the SIGRHS software for data collection, storage and analysis in Guinea Bissau, it was necessary to adapt the system to the local specificities. A new configuration was based on the administrative organization of the country's health system, the organizational structure of the Ministry of Public Health, the identification and distribution of health facilities and services at the district level, the positions and location of health workers, and the structure of the education system for producing skilled health service providers.

It was also necessary to upload about 2400 pre-existing facility staffing return records from their previous form in a simple spreadsheet (Excel file). Incorporating these initial data into the adapted SIGRHS system enabled preliminary reports to be run and an initial profile of the health workforce to be drawn. The results showed that the health workforce in the public sector of Guinea Bissau is largely constituted by workers with lower levels of education; only 11% were reported to have university-level education. The majority of health workers (63%) were to be found in primary care facilities, 25% in secondary-level facilities and the remaining 12% in large regional-level facilities.

A number of practicalities also need to be considered. The relevance of the HRIS for review of the national HRH situation critically depends on the quality of the data used to feed it. Dimensions against which to measure data quality include the validity, reliability, integrity, precision, truthfulness and timeliness of the system (*19*). As an example, data validity can be compromised when individual records are not updated upon retirement, emigration or death. While the development of the HRIS is ongoing, a formal evaluation plan for data quality would include comparing routine administrative data used for continuous monitoring to periodic survey or census data for purposes of validation. Another issue closely related to data quality is that of privacy and confidentiality. No data that can specifically identify individuals should be made accessible for public use. Even aggregate data sharing should only come through the permission of the responsible stakeholder.

While an idealized planned progression towards a complete and mature software solution was identified in this chapter, experience suggests that in some cases less is better, and patience is paramount to leave space and time for understanding, ownership and engagement before a solution is rushed in. In particular, although there are proprietary software solutions for HRIS, the choice of free and open source software offers significant advantages for sustainability at the country level where cost-effective solutions are essential (*1*). Open source solutions decrease the costs of implementation and ongoing maintenance of the HRIS, and provide a global community for support and continuous improvement. Many governments and health systems have elected to standardize on open source technologies and build the necessary capacity to support them in order to realize the benefits.

Unfortunately, some countries remain reluctant to make data publicly available for further analysis, notably in contexts of severe HRH shortages. It is highly recommended to link results of the information system to problem solving among experts in health workforce planning and management. Sharing consistent information is important so that improved human resources strategies can be compared and used by others. Intercountry knowledge sharing as part of the HRIS strengthening process provides models that help avoid repeating mistakes and standardizes HRH information and evidence across regions and countries. As will be further discussed in Chapter 12 of this Handbook, HRH observatories are one valuable mechanism that can be used for widely disseminating information and evidence for effective practices at the national, regional and global levels.

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10 Understanding health workforce issues: a selective guide to the use of qualitative methods

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10.1 Introduction

Data and evidence are critical ingredients in the design of effective health workforce policies and strategies. Policy-makers need information on the size and distribution of the health workforce, inflows and outflows, absolute and relative earnings of health workers, and so forth. They also need to understand why particular labour market outcomes are being observed, and how different policies or reforms are likely to impact on the outcomes of interest. For example, if a country is having problems deploying staff to rural facilities, why is that the case? Would the introduction of contractual obligations for rural service, perhaps combined with financial incentives, resolve the problem, or are other approaches needed? Or, if the problem is that too few health workers opt for a career in the public sector, favouring private employment instead, then policy-makers need to understand the appeal of the private sector, and how health workers are likely to respond to different forms of government regulations to restrict such movements.

Other chapters in this Handbook have highlighted how quantitative data from administrative sources, health facility assessments and population-based sources can help meet policy-makers' needs for information and evidence. Such data can shed light on patterns and trends in the health workforce, the determinants of health worker behaviour and choices in the labour market, and the impact of health workforce policies and regulations. However, quantitative data have important limitations, in particular when it comes to issues or phenomena that are poorly understood or difficult to classify and measure. Recognizing these limitations, this chapter focuses on how qualitative methods can be used to support and complement quantitative analysis in understanding health workforce issues.

Qualitative methods include a broad array of techniques and approaches for describing and understanding social phenomena. In contrast to quantitative methods, qualitative methods eschew the focus on structure and precise measurement in favour of more open-ended approaches to examining, analysing and interpreting behaviours and phenomena. Although it is often hard to generalize from qualitative analyses, the rich information they generate can be of considerable value. Consider, for instance, an effort to understand the impacts of current or planned health labour market reforms. These impacts are likely to depend on a wide range of factors, many of which are difficult to measure (for example preferences and expectations of health workers, social and cultural conditions, and implementation arrangements). Moreover, some of the effects of reforms on outcomes such as job satisfaction, teamwork or workplace behaviour are themselves difficult to measure, and may not even be anticipated.

It is clear, then, that qualitative methods can be useful to understand a context in which policies or interventions are introduced, anticipating behavioural responses and impacts, identifying implementation issues and shedding light on how the policy is actually perceived and understood by different stakeholders. The aim of this chapter is to provide some guidance on how to design and implement qualitative studies. In doing so, it draws on a rich methodological literature and a wealth of applied work, but it does not seek to be a comprehensive guide to qualitative methods. The text is focused on practical tips and guidelines for qualitative health workforce research. For more fundamental issues, including epistemological issues, the reader is referred to the work that addresses these issues more comprehensively than is possible within the scope of this chapter (*1–11*).[1] To illustrate both methodological points and the potential value of qualitative work, the chapter draws on two studies from Ethiopia and Rwanda.

The remainder of the chapter is organized as follows. The next section describes qualitative methods and

1 For general background on methodological and interpretive issues in qualitative research, see for example Becker (*1*) Bryman (*2*), Bryman and Burgess (*3*), Denzin and Lincoln (*4*), Flick (*5*), Greene (*6*), Seale (*7*), Silverman (*8, 9*), Walker (*10*) and Wolcott (*11*).

approaches and looks into their usefulness for health worker studies. The following section discusses selected issues in the design and implementation of health worker research. The last section concludes with some suggestions on how qualitative work on health workforce issues can be expanded and strengthened in the future.

10.2 Qualitative methods: their value and potential

10.2.1 Qualitative research defined

The most frequently used definition of qualitative research is "research that is not of a quantitative nature". An alternative approach is to concentrate on what all qualitative research has in common, namely the use of data in the form of text, as this in itself has profound implications for the techniques used in both data collection and analysis (*1, 12, 13*). Another distinct characteristic of qualitative research is that the researcher tends to be heavily involved in the collection of the data. More than in quantitative research, on-the-spot judgement is needed regarding what to register, where to focus and where to go deeper. At the level of analysis there is a similar challenge, as the results depend to a certain extent on the interpretation of the data, more so than in quantitative research.

In practice, "qualitative research" applies to a wide range of diverse research techniques. In this chapter, three main methodological approaches are distinguished: (i) individual interview; (ii) focus group discussions; and (iii) ethnography or participant observation (Box 10.1). Each of the three techniques discussed here[2] has its own advantages and disadvantages, but they also have a number of strengths and weaknesses in common.

10.2.2 Strengths and weaknesses

In thinking about the strengths and weaknesses of qualitative methods, it is helpful to start by contrasting them with quantitative methods. The latter rely on structured instruments to collect quantitative data that correspond to predetermined categories and classifications. The resultant data can easily be described and summarized. Moreover, provided the data are representative of a broader population, statistical techniques can be used to make inferences about that population, and to explore multivariate relationships.

Qualitative methods, in contrast, tend to impose less structure on the data and this has a number of advantages:

- It allows for open-ended responses and interactive exploration of issues with the respondent. This can shed light on issues that are difficult to measure, such as beliefs, feelings, values and perceptions. A welcome side-effect of this approach is that it also registers the participants' vocabulary, which is often useful for designing quantitative surveys, and for communicating with stakeholders about the issues under study.
- An open-ended interaction with the respondent(s) helps create the necessary trust and rapport to explore difficult or sensitive issues, or to engage with marginalized or difficult-to-reach groups. For example, issues such as corruption and other forms of illicit behaviour are notoriously difficult to capture through surveys, but can be effectively explored – although not measured – using qualitative approaches.
- Qualitative methods can help build an understanding of behaviours and of the relationship between different variables. For example, they can be used to explore patterns of behaviour (such as the uptake

2 This chapter does not consider other qualitative techniques, such as language-based approaches (for example discourse conversation analysis), projective techniques, case studies and text analysis. Tesch (*14*) distinguishes 26 different types of qualitative approaches in social research. For an overview, see the sources listed in footnote 1 of this chapter.

Box 10.1 Three important techniques in qualitative research

Individual interview. This is a generic term to describe interviews of a qualitative nature. The interviewer has a choice to follow a structured, semi-structured or unstructured approach. A qualitative individual interview differs from a quantitative interview in that it leaves the answers open and registers them as text, whereas in quantitative surveys the response options are mostly precoded.

Focus group discussions. Group discussions where the participants are asked to discuss specific topics openly. They tend to be semi-structured or unstructured in nature.

Ethnography and participant observation. Data collection in which the researcher is immersed in a social setting for some time in order to observe and listen with a view to gaining an appreciation of the culture and processes of the group.

Table 10.1 Contrasting qualitative and quantitative approaches

Qualitative	Quantitative
Words	Numbers
Point of views of participants	Point of view of researcher
Researcher close	Researcher distant
Theory emergent	Theory testing
Unstructured	Structured
Contextual understanding	Generalization
Rich, deep data	Hard, reliable data
Meaning	Behaviour
Tends to follow an inductive approach	Tends to follow a deductive approach

Source: Adapted from Hammersley (15), Bryman (16) and Halfpenny (17).

of rural service of health workers with different socio-economic and demographic profiles) or the nature of a relationship between different measurable variables (such as education and external migration).

- Through purposive selection of either individual interviewees or focus group participants, qualitative methods can elucidate differences in views and perspectives between and within groups, and explore the reasons for these differences.

Inevitably, the merits of qualitative methods come at a cost. Clearly, one of the limitations of qualitative data is that they cannot be easily described and summarized. As a result, it is difficult to make statements about the magnitude and relative importance of phenomena addressed in qualitative work. More importantly, perhaps, respondents in qualitative work tend to be small in number and purposively selected. This means that findings cannot be meaningfully thought of as representative of or generalizable to a broader population. Another potential limitation is the relatively weak objectivity that results from the close involvement of the researcher in the collection of the data and the interactive nature of data collection. This feature of qualitative methods also means that qualitative work is difficult to replicate, either by a different researcher or in a different context. While these weaknesses of qualitative methods are at least to some extent inherent in the approach, they can be partially overcome through careful design and implementation, and through transparent documentation of methods and approaches (see section 10.3 below).

The strengths and weaknesses of qualitative methods explain the appeal of combining qualitative with quantitative research, as the two complement each other very well. Several authors have tried to capture the differentiating features of the two methods in powerful and easy-to-understand images and concepts. These features, as reported in Table 10.1, are generalizations and do not necessarily hold in every case; nevertheless they are helpful and underline that qualitative research can, for example, be very useful where theory is weak or inexistent to fine-tune hypotheses that can be tested with quantitative data or to better understand findings from quantitative research (*15–17*). Moreover, by demonstrating how stakeholders perceive and discuss a policy or phenomenon, and by identifying responses and behaviours that a policy is likely to engender, qualitative methods may support the development of questionnaires for quantitative surveys (*2, 12, 15, 18, 19*).[3]

Reflecting the strengths and weaknesses outlined above, qualitative methods have been used extensively in health systems research, including in efforts to understand health-seeking behaviour, identify community health needs, assess health-care quality and client satisfaction, and develop programmes for hard-to-reach groups (for example sex workers or people who use injecting drugs). It is not surprising, therefore, to find a substantial and rapidly growing body of qualitative work on health workforce issues.

10.2.3 Qualitative health worker research

The field of health worker research is relatively young. An important consequence of this is that there is little theoretical framework to study health worker behaviour. Existing quantitative studies, although booming in number, therefore remain largely descriptive in

3 For more on combing qualitative and quantitative approaches, see Bryman (*2*), Holland and Campbell (*12*), Hammersley (*15*) and Morgan (*18*). For resources and ongoing discussion on the differences, complementarities and tensions between the two approaches in poverty research, see Centre for International Studies (*19*).

nature and can substantially benefit from a qualitative approach. Qualitative research can for example help to understand and categorize the complex environment in which the health worker functions. It can also assist in unravelling the motivation behind certain behaviours, and it can provide inputs on how to improve the measurement of health worker performance. Researchers studying health worker behaviour are increasingly aware of these and other potential contributions of a qualitative approach, as is clear from the increasing number of studies on health workers using this approach.

Table 10.2 illustrates how qualitative research has been used in a variety of ways to address a broad set of health workforce issues, ranging from broad diagnostic exercises that have sought to explore the motivation and behaviour of health professionals in the workplace and labour market, to more focused studies of specific phenomena such as dual practice or migration. Most studies have focused on issues that are poorly understood or difficult to measure in a quantitative way. This includes, for example, health worker performance and motivation, corruption and the relationship between providers and clients of health services. The majority of studies use individual qualitative interviews or focus group discussions, or both. Participant observation has had more limited use, possibly because of the private nature of the relationship between healthcare professionals and their patients. However, a good example of what can be obtained from this method is offered by Jaffré and Olivier de Sardan (*20*), who combine participant observation with site visits, structured interviews and focus group discussions in their seminal study of doctor–patient relationships in five West African countries.

In some cases, qualitative studies are implemented as a complement to quantitative research, either to understand puzzles thrown up by the quantitative research or in preparation of quantitative research. Box 10.2 gives an illustration of how qualitative research can help to prepare quantitative analysis.

Although qualitative work on health workforce issues has generated a lot of insights already, there is plenty of scope for further work. This includes the exploration of similar issues to those highlighted in Table 10.2 in different contexts, and the use of qualitative methods to better understand a broader set of labour market issues in the health sector. This issue will be revisited in the concluding section of the chapter.

10.3 Issues in the design and implementation of a qualitative study

While the former section outlined the value and potential uses of qualitative methods in health worker research,

Box 10.2 Qualitative research to inform quantitative work: absenteeism in Ethiopia and Rwanda

To date, most of the work on absenteeism has been quantitative in nature, testing specifications derived from standard economic theory. When applied to health workers, the work is usually explorative in nature. An important reason is that the existing theoretical frameworks on absenteeism seem to be less appropriate to study human resources in the health sector, especially in developing countries.

To address this issue, two qualitative studies were implemented in Ethiopia and Rwanda, using focus group discussions sharing a similar design. These studies were labelled pre-research, as their main purpose was to provide inputs for future quantitative work. Financial support for their implementation was provided by the World Bank, the Bill & Melinda Gates Foundation and the Norwegian Government.

The studies confirmed that existing theory falls short of providing an appropriate framework for analysing absenteeism among health workers in these two countries. The focus group discussions suggest that the theoretically predicted correlates of absenteeism (wages, contracted working hours and expected cost of detection) affect absenteeism as indicated by theory, but that their relative importance seem to depend on the country context. The studies also indicate that additional factors, such as access to a second job, intrinsic motivation, job mobility and perceived health risks, play an important role in explaining absenteeism levels. This then argues for revisiting theory and empirical estimation to take this broader set of determinants into account.

Source: Adapted from Serneels, Lindelow and Lievens (*42*).

Table 10.2 Illustrations of qualitative research on health workers

Topic	Focus of studies	Approach	Reference
Coping strategies	Study of informal economic activities of health workers in Uganda, including the leakage of medicine supply, informal charging of patients, and mismanagement of revenues raised from the formal charging of patients	Combined quantitative and qualitative approach	McPake et al. (*21*)
	Assessment of extent of and reasons for drug pilfering by health staff in Mozambique and Cape Verde	Mix of open- and closed-ended questions in self-administered survey to small, purposively selected sample	Ferrinho et al. (*22*)
	Study of role of professional identity, motivation and other factors in understanding survival strategies in response to health system reforms in Uganda	Qualitative in-depth interviews and focus group discussions in four purposively selected facilities	Kayaddondo and Whyte (*23*)
	Exploration of how health workers in Cameroon cope with salary cuts, and of the impact of coping strategies on service quality	Key informant interviews and focus group discussions and interviews with service users	Israr et al. (*24*)
Dual practice	Exploration of how financial and non-financial incentives shape job preferences of doctors in Bangladesh who work both in government health services and in private practice	Quantitative survey combined with in-depth interviews for a subsample	Gruen et al. (*25*)
	Exploration of supplementary income-generating activities of public sector doctors in the Portuguese-speaking African countries, and of reasons why they have not made a complete move out of public sector	Mix of open- and closed-ended questions in self-administered survey to small, purposively selected sample	Ferrinho et al. (*26*)
	Exploration of nature of dual practice in Peru, including key factors that influence individual decisions to engage in dual practice	Semi-structured interviews with purposively selected health workers	Jumpa et al. (*27*)
Informal charging and corruption	Investigation of out-of-pocket payments for health services, formal and informal, in Georgia	In-depth interviews and focus group discussions with users and providers	Belli, Gotsadze and Shahriari (*28*)
Motivation	Exploration of a broad range of motivational determinants and outcomes in two hospitals in Jordan and two in Georgia	Contextual analysis, qualitative assessment and quantitative analysis	Franco et al. (*29*)
	Assessment of key motivating factors for health workers and managers in Viet Nam	Focus group discussions, in-depth interviews and exit interviews	Dieleman et al. (*30*)
	Assessment of the role of non-financial incentives and professional ethos in motivating health workers in Benin and Kenya	Semi-structured interviews with doctors and nurses from public, private and nongovernmental facilities in rural areas	Mathauer and Imhoff (*31*)
Deployment and retention	Exploration of barriers to recruitment and retention of nurses in New York State, United States of America	Focus group discussions	Brewer et al. (*32*)

Continues…

Table 10.2 continued from previous page…

Topic	Focus of studies	Approach	Reference
International migration	Understanding the reasons for out-migration from the health sector in Malawi	In-depth interviews and focus group discussions	Muula and Maseko (*33*)
	Understanding the motives and experiences of Indian migrant health workers to hospitals in the United Kingdom	In-depth interviews over a six-month period	Robinson and Carey (*34*)
	Experiences of migrant nurses in hospitals in the United Kingdom	In-depth interviews	Hardill and MacDonald (*35*)
	Perceptions and opinions of those involved in recruitment and migration from developing countries	In-depth interviews with hospital directors and overseas nurses	Troy, Wyness and McAuliffe (*36*)
Quality/practice patterns	Exploration of how organizational issues, professional insecurities, and other factors contribute to patient neglect and poor clinical management in South Africa	Minimally structured in-depth interviews and focus group discussions held with patients and staff	Jewkes, Abrahams and Mvo (*37*)
	Stocktaking and analysis of poor quality of care in five capital cities of West African countries	Participant observation combined with in-depth interviews, site visits and focus group discussions	Jaffré and Olivier de Sardan (*20*)
	Assessment of changes in prescription patterns and quality of care associated with introduction of user fees in Ghana	In-depth interviews and focus group discussions	Asenso-Okyere et al. (*38*)
Broad diagnostic exercises	Exploration of experiences of health workers in primary health care in Tanzania in terms of motivation, satisfaction, frustration	Focus group discussions and in-depth interviews	Manongi, Marchant and Bygbjerg (*39*)
	Exploration of performance and labour market issues for doctors and nurses in Ethiopia	Key informant interviews and focus group discussions with nurses, doctors and service users	Lindelow and Serneels (*40*)
	Exploration of performance and labour market issues for doctors and nurses in Rwanda, including a focus on career and performance in the face of HIV	Focus group discussions with providers and users of health services and with people living with HIV	Lievens and Serneels (*41*)

this section addresses the major practical challenges in design and implementation. Its focus is on interviews and discussions (terms that are used interchangeably in this chapter, abstracting from the concept whereby free interaction is allowed in each). A third technique previously described, ethnography and participant observation, is rarely applied in health workforce research and so is not elaborated here as it requires a more specific methodology and different skills. The references cited in footnote 1 of this chapter provide further comprehensive guidance on techniques and methods.

10.3.1 What type of interview?

One of the first issues that will need consideration is whether interviews will be conducted with individuals or with groups of individuals. The key difference between individual and group interviews lies in the interaction between group members. Group discussions, which typically take place in groups ranging from four to nine people, allow researchers to elicit a multitude of views on a topic and explore and contrast the opinions of different participants. They also allow the researcher to collect data on a large range of behaviours in a relatively short timespan. One of the risks with group discussions is that some individuals dominate the discussion, while other participants refrain from expressing their ideas because they are not in line with the prevailing view. This may lead to a "false" consensus.

The advantage of individual (or face-to-face) interviews is that they offer more room for clarification and expansion of the discussion with each individual. The safe and private environment is also more likely to create an atmosphere of trust and openness, which also makes it

easier to address issues that are taboo. Moreover, the researcher can link the results of the discussions with characteristics of the respondent (such as professional experience or socioeconomic background). In general, individual interviews are easier to manage than group discussions. However, it can be difficult to keep individual discussions focused, especially when they are unstructured, and there is a risk of generating a large volume of data that will require significant effort to analyse. Individual interviews also tend to be more time consuming and costly compared to group interviews.[4]

Table 10.3 provides some guidelines on when to use group versus individual interviews, also taking into account logistical and financial considerations (*43*). A frequently used third option is to combine both approaches, as is often done in health worker research (see for example the illustrations in Table 10.2).

A second choice that researchers need to make concerns the extent to which the interview or discussion will be structured. Box 10.3 presents a short description of commonly distinguished types of interviews according to their degree of structure (*2, 13, 43, 44*). In reality structured and unstructured interviews are on a continuum. The essential discriminating factor is the room allowed to respondents to express and develop their own points of view, and to the interviewer to orient the discussion. If the objective is to collect rich and deep data on topics on which little is known, the script should be less structured. This comes at a price of yielding data that are less comparable across respondents. Also, the less structured the interview, the more skill and experience is required from the interviewer, and later from the data analyst.

A special case of group interview is the focus group discussion, which is a semi-structured group discussion around a specified set of topics. Here the interview

4 When the individual interviews are with experts, they are often referred to as "expert interviews". For example, in order to understand the policy and institutional context in which health workers operate it can be useful to interview government officials at national and district level, representatives of health professional associations and nongovernmental organizations active in the health sector, and others.

Table 10.3 Group discussions or individual interviews?

Factors to consider	Use group interviews when...	Use individual interviews when...
Group interaction	Interaction of respondents may stimulate a richer response or new and valuable insights	Group interaction is likely to be limited or non-productive
Group or peer pressure	Group or peer pressure will be valuable in challenging the thinking of respondents and illuminating conflicting opinions	Group or peer pressure would inhibit responses and cloud the meaning of results
Sensitivity of subject matter	Subject matter is not so sensitive that respondents will temper responses or withhold information	Subject matter is so sensitive that respondents would be unwilling to talk openly in a group
Extent of issues to be covered versus depth of individual responses	There is a need to cover a small number of issues on a topic on which most respondents can say all that is relevant in less than 10 minutes	There is need to cover a greater number of issues on a topic that requires a greater depth of response per individual
Requirement for interview guide	Enough is known to establish a meaningful topic guide	It may be necessary to develop the interview guide by altering it after a series of initial interviews
Logistics requirement	An acceptable number of target respondents can be assembled in one location	Respondents are dispersed or not easily assembled
Cost and training	Quick turnaround is critical, and funds are limited	Quick turnaround is not critical, and budget will permit higher cost
Availability of qualified staff to conduct the interview	Focus group facilitators are able to control and manage group discussions	Interviewers are supportive and skilled listeners

Source: Adapted from Frechtling, Sharp and Westat (*43*).

Box 10.3 Types of qualitative interviews according to their degree of structure

Structured or standardized interview. This type of interview uses a script that typically contains a number of predetermined questions that are presented to the interviewee one after the other. Since all interviewees are given identical cues, their answers can be reliably aggregated, which is often the main objective of the technique. Data for quantitative analysis can also be collected, especially if the answers to the questions are precoded.

Semi-structured interview. This term covers a wide range of cases but mostly refers to interviews where the script contains a series of questions that, in contrast to structured interviews, can change sequence; the interviewer also tends to have some latitude to ask further questions in response to what are seen as significant replies. The answers are open ended and there is more emphasis on the interviewee developing arguments.

Unstructured interview. The interviewer typically has only a list of topics or issues, often called an interview guide or aide-memoire, that he or she expects to cover in the interview. The style of questioning is usually informal and the phrasing and sequencing of questions will vary from interview to interview.

Sources: Adapted from Bryman (*2*), Denscombe (*13*), Frechtling, Sharp and Westat (*43*) and Atkinson (*44*).

script is mainly used as a memory support and the main technique is to prompt and probe the participants. Prompt questions aspire to open the discussion on a topic in a neutral way, providing an input without imposing preset ideas, while probing is used to trigger deeper responses.

Writing out the complete script is good practice since it allows full transparency about the research design. Box 10.4 shows an extract of a script for focus group discussions with health workers in Ethiopia.[5] It starts with a prompt stating the potential of performance problems among health workers and then probes on the issues of motivation, time use, labour market institutions and corruption. As the script served mostly as a checklist the topics were usually discussed when they came up, but the script helped to guide the discussion and to generate deeper data (the prompts were informed by a brief preparatory literature review). Other classic probing and prompting techniques – such as remaining silent, repeating the question, repeating the last few words from a discussant, offering an example as well as asking for an example, requesting a clarification or more detail – were also used, though they are not visible in the script.

Another benefit of writing out the complete script is that it facilitates the reproduction of the interviews, which may be of interest in order to contrast findings from different contexts. For example, using a similar script and research design, health workers in Ethiopia were willing to discuss corrupt practices such as absenteeism, illicit charging, embezzlement of materials, pilfering of drugs and holding a private practice within the public sector, while in contrast, health workers in Rwanda were more reluctant to acknowledge these malpractices. However, after further probing, health workers admitted that there were corrupt practices, but that these were usually small scale, that they did not occur frequently and that they had become less common than in the past. Some illustrative quotes are reported in Box 10.5. The comparative analysis indicates that corrupt practices are less pervasive in Rwanda than in Ethiopia and the data also offer explanations why this is the case. The health system in Rwanda provides better monitoring and accountability (by involving community workers in the management of health facilities, for example), is in the process of adopting performance pay (which also stimulates reciprocal monitoring) and provides better enforcement of sanctions.

10.3.2 Participant selection

In contrast to quantitative research, where representativeness is the main concern for sample design, the main objective of participant selection in qualitative research is to include individuals that are well informed about an issue, and have a broad range of views and experiences. This contributes to qualitative interviews

5 The full script, which is available upon request, contained the following sections (with aspired time allocation in brackets in minutes): Introduction and warm up (10'); Professional training, recruitment and career paths (30'); Contracts, compensation, benefits and outside economic activities (20'); Job satisfaction, motivation, and performance (30); Impact of HIV/AIDS (10'); Coaching other people (10'); and Thanks, payment and signature (10).

Box 10.4 Extract of semi-structured interview script of qualitative health worker study in Ethiopia and Rwanda

JOB SATISFACTION, MOTIVATION AND PERFORMANCE

Time allocated: 30' Time started: ……

Prompt:

In many countries, users complain about health services. For example, there are often complaints that health workers are not very motivated, that they do not spend as much time as they should doing their job, that they are not good at doing their job, and even sometimes that they are involved in illegal activities such as stealing drugs and material and charging too much for services. How do you feel that the situation is in Ethiopia?

- Let's start with the issue of **motivation**…

  Issues to probe

  Do you think most health workers are satisfied with their job?

  Why do you think some health workers are unsatisfied in their job?

  - payment, lack of equipment

  Do you feel that there is a strong commitment to delivering good health care?

  What do you think is the most important source of motivation for health workers?

  - money and benefits
  - the activities and responsibilities of the job

  Do you think the commitment of health workers is different in different sectors (private, for-profit, not-for-profit)? Why?

  (…)

- Let's turn to **corruption and inappropriate behaviour** …

  Issues to probe

  To what extent do you feel there is a problem of corruption in the health sector?

  - use of equipment for private purposes
  - overcharging
  - stealing/leakage of drugs and other material

  Why do you think these problems arise?

  What is done in your workplace to reduce these problems?

  What sort of disciplinary measures are available and are they being used?

Source: From the authors.

being informative and generating rich data (*2, 13*). Selecting the participants for group discussions raises additional issues related to group size, the number of groups, within-group dynamics and the desired variety in participant profiles within a group.

The choice of group size depends on the extent to which one aspires to have an animated discussion versus an intimate exchange. Discussions in larger groups are often more animated, while small groups may be more conducive to discussions about sensitive topics.

Box 10.5 Selected quotes from qualitative interviews in Ethiopia and Rwanda

Corruption came and spread widely in the last ten years. Now corruption is prevalent among people at all levels of education and in all areas.

—Medical officer in a provincial town in Ethiopia

I have worked in a private pharmacy. Drugs come illegally and we know their source… they are taken from public facilities.

—Health-care assistant in a provincial town in Ethiopia

Low-paid staff might be involved in small bribes… There is some humanity in this and assisting it is okay because people working in other service institutions such as water supply have the benefit of charging for free services.

—Physician in Addis Ababa, Ethiopia

It happened that patients paid more than was reported in the register but we identified most of these cases. I also know that some have been sacked because there was fraud in the payment register.

—Auxiliary health worker in Kigali, Rwanda

I have seen a patient give 1000 francs to a nurse. The nurse was frightened, which shows that it is not regular practice.

—Health service client in Kigali, Rwanda

Health workers do no longer sell drugs taken from the health centre. This is something from the past. Perhaps in rural areas, but not here in the city.

—Health service client in Kigali, Rwanda

Source: From the authors.

For reasons of comparability and transparency it is advisable to use groups of similar size throughout the study.

The number of groups should be such that all participants that have well-informed and different views on the subject are included. Alternatively, groups can be added until responses can be fairly well predicted. However, this may not be realistic since the number of focus groups is often fixed during the study design. Another issue is within-group homogeneity. Status homogeneity is for example a common concern, as the interaction between participants of a very different social status may be less productive. In the case of health workers it seems advisable to have separate groups for different cadres. This point is of particular importance for research that addresses sensitive issues such as absenteeism, pilfering or other illicit behaviour. Workers that are in a hierarchical relationship are likely to be uncomfortable about openly sharing their views (for example nurses with doctors).

A final question is how within-group dynamics can be assured and how much variety of opinion is wanted within a group. To ensure constructive group dynamics, participants should, as a rule, not know each other. However, the opposite has been argued when there is a taboo regarding the topic under discussion, making an open discussion between participants that do not know each other uncomfortable. Kitzinger (*45*), for example, studying HIV, deliberately selected people who knew each other in order to have a discussion that was "as natural as possible". A potential problem with this approach is that assumptions commonly shared between participants are often not made explicit (*18*).

When the aim of the research is to explore an issue, the richest data come from discussions where different points of view are confronted. A good way to ensure variety of opinion among the participants is to pay special attention to the selection of the participants. For a study of health worker performance and career choice, for instance, it may be useful to consider such potential influences as gender, age, family status (having children or not), sector of work (public, private for-profit, faith-based) and work activities (for example having two or more jobs). Box 10.6 reproduces the selection sheet for nurses and midwives used in Ethiopia. Similar sheets were compiled for doctors, assistant nurses and users of health services.

The same approach can be used for individual interviews. Once the criteria and characteristics for selection are determined, the participants are selected using these criteria. In this case the richness of the data comes from contrasting during the analysis the opinions of the individuals with a different background.

10.3.3 Study design and data collection: how to enhance validity and reliability

The ways in which data are collected and analysed affect the study findings. There is now a rich literature on how best to deal with issues of validity and reliability

Box 10.6 Selection criteria for focus groups with eight participants on the performance and career choice of nurses and midwives in Ethiopia

Selection criteria:

- Five nurses; all should have two years or more of nursing education after having completed secondary schooling; at least two male, at least two female
- Three midwifes; at least one male, at least one female
- At least two of the females should be mothers
- At least two of the males should be fathers
- At least two participants who combine work in the private sector with work in the public health sector
- At least two participants should be working exclusively for the private for-profit sector
- At least one participant should be working for the private not-for-profit sector
- At least one participant should be working exclusively for the public sector (not engaged in private health sector work at all)
- None of the participants should be very shy (to participate in a group discussion like this)
- The participants should not know each other and should not be working at the same facility

Source: From the authors.

(*46–49*).[6] Here the focus is on some hands-on issues to consider when planning a qualitative study with health workers.

- **Position of the researcher.** The involvement of the researcher in the collection and analysis of data is a core feature of qualitative research. The sex, age and ethnic origins of the interviewer are known to influence the replies of the interviewees (*13*). This may have far-reaching consequences for the validity of the study. In applied health worker studies the researchers themselves are often part of the health system they survey. Ministry officials and health workers are frequently in charge of the implementation, if not the entire design and management, of the research project. This may bias the results. A similar concern may arise if researchers are perceived as representatives of donor agencies that are involved in the sector. Since the bias stemming from this "interviewer effect" is difficult to repair it must be anticipated and the composition of the research team, or the roles taken up by the researchers in the team, must be reconsidered if needed.
- **Permission.** Health workforce studies usually rely on interviewing both clinical and administrative health workers. Typically, health workers will want to be assured that the employer has authorized the study, especially when interviews take place during working hours. A letter from the ministry of health will in most cases be a necessary element of authorization, although it may not be enough – especially when the employer is a private provider.
- **Venue, timing and duration.** The venue, timing and duration of the interview should be as convenient as possible for the interviewees. The place of interview should encourage a private atmosphere, where the interview is not disturbed. The workplace – often a health facility or the ministry of health – may be an appropriate place, except when sensitive issues such as absenteeism or corruption are part of the interview, or when health workers are asked for an opinion on matters where their viewpoint may diverge from those of their employers. The acoustic qualities of the venue are important if the interview is recorded. For example, rain on iron rooftops or traffic from a busy road can create loud background noise, making recordings inaudible.
- **Compensation.** When the costs related to participating in the interview are not sufficiently covered,

6 Validity can be seen as the concern with the integrity of the conclusion generated from research, while reliability refers to the degree to which a measure is stable (for more information see Guba and Lincoln (*46*), LeCompte and Goetz (*47*), Lincoln and Guba (*48*) and Mason (*49*)). Both validity and reliability can be affected by a number of factors, not least by the objectives of the study. More worldly issues, such as the available budget and the motivation and control of the funding body, also play a role.

Box 10.7 Extract from the introduction to focus group participants in Rwanda

Good afternoon. First of all we would like to thank you very much for your willingness to cooperate in this group discussion. The aim of the discussion is to get a better idea of the human resources in the health sector in Rwanda and to investigate what the problems and opportunities are for health workers. The discussion today is part of a larger study that looks at a human resources policy for health workers in Rwanda. The study is financed by the World Bank and approved by the Ministry of Health. If you wish, we can read you the letter of approval by the Secretary-General.

The immediate objective of our meeting is to hear from health workers themselves how they look at different aspects relating to their work. We would like to have an open and honest discussion with you about different aspects of working in the health sector. We are here to listen to you and learn from you.

The discussion will go as follows. [*Name*] and I will lead the discussion. We prepared a number of topics on which we will ask your opinion.

It is very important that you feel no restraints to speak your mind. Be as open, direct and sincere as you can. The statements you make should be based on real-life experiences and observations. It is important to us to know how the situation really is and not how the situation ought to be. Do say if you feel you don't agree with what someone else is saying.

Importantly, we would like to stress that your personal contributions and views will not be shared with anyone outside this room. To guarantee the anonymity of participation in this discussion, we will not take your name down. We will also have a number of other discussions, so your view will be balanced out with what others say.

Also note that the discussion will be recorded. This is because we do not want to miss anything of what you say. However, nothing of what you say will ever be made public with any of your names attached. The results will only be written down as the report of a discussion with "a selected group of health workers".

Lastly, the discussion is estimated to last approximately two hours and you will receive a compensation for your travel, time and cooperation at the end of the discussion.

Are there any questions or remarks?

Source: From the authors.

there is a risk that participants may not show up or may not be participative. Too much compensation, on the other hand, may induce strategic behaviour, such as trying to please the interviewer with the responses. As a minimum, the cost of transport to get to the interview should be reimbursed. For additional payments it is advisable to seek guidance from local practitioners. For example, against a backdrop of perceived insufficient salaries, many health workers are accustomed to receiving financial incentives for taking part in seminars, training and research. Alternatively, financial incentives can be substituted or complemented by non-financial rewards such as food, drinks or gifts. These may also contribute towards relaxing the atmosphere and offering a drink at the beginning of the interview can help to bridge the waiting time until all participants have arrived. Whatever is decided, it is important to inform the participants about the modalities before the interview takes place.

- **Confidentiality.** Anonymity and confidentiality are important because they may have an impact on the openness of the respondents. If participants suspect that their answers can be traced back to their person in the final study results, they are less likely to speak their mind. Therefore, warranting confidentiality and anonymity is usually key to the collection of quality data. As an illustration, Box 10.7 reprints an extract of a script containing the introduction for a focus group discussion with health workers in Rwanda. The reimbursement modalities for travel expenses and the financial reward for taking part in the study had been dealt with prior to the interview

by a third person specifically dealing with participant selection.

- **Interview skills**. As the researcher takes active part in the production and analysis of the qualitative data, the more so the less structured the interview script, the quality of a study is greatly determined by the experience, skill and insight of the moderator. Apart from mastering discussion management techniques, familiarity with the topic under study is a necessary condition for generating high-quality data (see for example Hurley (*50*)).

10.3.4 Data recording and analysis

The most common options when it comes to recording data are note taking and audio recording. Notes can be taken during or after the interview, with the latter being less intrusive. However, since the data then depend entirely on the researcher's memory, which is typically subject to bias and partial recall, audio recording (with the agreement of the participants) is the most commonly used technique.[7] An alternative approach is to record the interview on video. Although this technique may provoke unease with the participants at the beginning, the negative impact on openness and sincerity often disappears once the discussion is under way. An advantage of video recording is that it allows linking the responses to individual characteristics. Data embedded in images can also be creatively used, for example to determine the degree of patient-centeredness of a medical practitioner. Both video and audio recording allow that the raw data can be made available to other researchers. However, this raises the question whether researchers can maintain their commitment to anonymity and confidential treatment of the data. The increasing possibilities to copy and transfer digital data files require that safeguards over and above conventional measures must be put in place, such as protecting files with passwords and requesting colleague researchers to provide written guarantees of participants' anonymity. The base policy to safeguard confidentiality is to make the data anonymous by using unique numerical identifiers that refer to a separate database containing personal information so that data analysts have no automatic access to participants' identities.

Once the data are video or audio recorded, the interviews are transcribed literally[8] and, if necessary, translated.[9] This written version of the interview is needed for in-depth analysis, and can be used for software-supported analysis, which will be discussed in more detail below. Whether the analysis is done manually or with the help of specialized software, the basic approach is the same.

In a first step the analyst identifies key themes in the transcripts, focusing on issues that are mentioned frequently or consistently, that receive particular emphasis or for which views expressed in the interviews diverge in a systematic way. This is typically done by writing codes (referring to themes) next to the transcribed text and comparing them visually. The researcher compares groups of coded text by leafing through the transcripts and then brings together themes in main themes and subthemes. The textual data are subsequently structured in matrices, with a different column for each focus group or individual, and rows for the different themes and subthemes. When assisted by a word processing programme the matrices can be created by moving the text from the transcripts using cut and paste. The advantage of the matrix approach is that it facilitates comparison across as well as within groups or individuals, while avoiding excessive structure. It also allows emergence of issues and opinions as expressed by the participants, without too much interpretation from the researcher(s). Box 10.8 contains an extract from a matrix-based analysis of data collected through focus group discussions in Ethiopia. The matrix contains quotes from three different occupational groups relating to their views on the public sector.

If the data are analysed with the help of specialized software, the first step is to provide the data from each interview with an identifying composite label (for example "Urban doctors Ethiopia" corresponding to the heading of the last column in the matrix presented in Box 10.8). The next step is to attribute at least one, but typically more than one, code to each coherent part of text, or entire quote (these codes correspond to the themes and subthemes in the matrix approach).

7 Even in the case of audio recording the researcher often takes notes during the interview, either to help guide the discussion or to capture additional information – for example, embedded in the body language and facial expression of the interviewees.

8 Today's digital recorders produce high-quality sound files that can be played on a computer, facilitating the transcription process. It is still most reliable to transcribe the interviews manually, as existing software packages that transfer speech to text perform best when tuned to one voice, and do not seem sufficiently accurate to transcribe group discussions or even individual interviews. Software packages are only available in a limited number of languages, and there also remain problems with recognizing specialized vocabulary.

9 Because there is a real risk that parts of the data get lost or altered in the process of translation, accuracy is important. This can for example be enhanced by back-translating the text in order to expose deviations from the original.

Box 10.8 Matrix-based analysis of data from focus group discussions in Ethiopia

	Health-care assistants	Nurses and midwives	Physicians and paramedical practitioners
Perceptions about the public sector	The main difference between the public and private is the payment and the ability of patients to pay for the necessary medical services. The working condition is not safe, medical equipments and supplies are lacking. There are times when staff is obliged to sterilize gloves for reuse while it is disposed off in the private facilities. Medical supplies in the government are very inadequate. (…)	I work in the public. The payment does not compensate enough for the job we are working. In the private facilities, the payment is good and the workload is not much. The problem in the private, if owners get an alternative they will fire you and bring in the other. In the public services, we provide service for the mass of the population. There are a lot of things lacking. For workers, the salary is not satisfactory. I work in the private sector, the payment is good. The benefit package such as pension, health insurance and job security are good reasons for working in the public facilities. (…)	The present challenge for the public sector is that the staff has no incentives, lack opportunity for career development, etc. The payment in the public does not compensate well for the physicians' work. I would not say that all are equally affected by workload. My experience is that workload was not that much a problem. I do not agree that in public facilities there is very high workload. In the private sector, one can have a maximum of three surgeries per day. The problem is that one has to come in time and go out in time; there is good payment. In addition to that, the number of private institutions to practice in is limited. Some might not want to confront being jobless. There is no refined relationship between the owner of facilities and the rest of the profession due to lack of experience. (…)

Source: From the authors.

The advantage of a software-based analysis is immediately clear, as it allows for more flexibility in the use of codes. For example, it makes it easy to attach several codes to the same quote, but also to revise any hierarchical structure of the codes. The way codes are conceived partly depends on whether the research is exploratory, in which case open coding is used, or whether it wants to test a theory, in which case the researcher predominantly uses preconceived codes. As in the manual approach, the codes are reorganized throughout the analysis as insights in the data shape up. The next phase in the research is then to identify patterns between the coded data. Software-based analysis is more flexible in that the coding is made easier, and once the coding is finalized, the data can be retrieved or combined in different ways using the codes. It also allows for a more advanced degree of analysis by looking at patterns in the data. Because a quote can receive multiple codes, one can look at the association between codes, or to what extent some issues are raised together. A possible disadvantage is the start-up cost related to learning the software. The use of software for the analysis may therefore be less attractive for stand-alone small-scale projects. Box 10.9 provides a practical example of a software-based analysis.

Box 10.9 Recording, transcription, coding and analysis: an illustration from a health worker study in Rwanda

Ten focus group discussions were conducted in the health worker study in Rwanda. They were digitally recorded, generating one sound file per discussion. The files were transcribed, resulting in written accounts of between 10 and 15 pages each. If the discussion had been in Kinyarwanda, it was translated into French. The analysis was carried out using the qualitative data analysis software, *QSR NVivo 2.0*. Its main advantage lies in ease of data coding and its functions enabling the visualization of different data cross-sections. It does not enable, however, the production of an overview of the data in a matrix structure.

First, all transcripts were coded: a code was attributed to each piece of data (quote). A total of 35 codes were used, reflecting the broad interest of the study. Examples of codes included *vocation, rural versus urban, health sector exit, job satisfaction, remuneration, absenteeism, corruption.* A quote could receive different codes if referring to different topics at the same time, thus allowing examination of associations between quotes. In total, 1203 quotes have been examined.

Source: From the authors.

To address the issues of reliability and validity of the resulting analysis, the following actions can be taken:

- As qualitative research is essentially concerned with the viewpoints of the participants, the validity of the study results can be increased by presenting the results to the study participants and integrating their feedback into the research output.
- Writing up the underlying study assumptions and contextual information helps readers and potential users to assess the extent to which the research results may be comparable to another context.
- Internal reliability – or the degree to which other researchers would come to the same conclusions – can be enhanced by including an audit that examines the data collection and analysis procedures and identifies potential sources of bias. A more intensive approach is to have the same qualitative data coded by different researchers, especially in the case of free coding, and compare the obtained results.

10.3.5 Reporting

Because qualitative research deals with data in the form of text, it can be a challenge to present the results in a way that is easy to digest. It is tempting to provide too many quotes in the final report and the golden rule is therefore for the researcher to adopt only a small proportion of the quotes he or she would *like* to include. What may help is to compile a "summary of quotes" document after the analysis but before reporting. This can contain up to 10 quotes per theme, and may help to select the most appropriate quotes to be used in the final report and presentation. Quotes are typically selected for their salience and because they reflect an important theme in the discussion. More quotes do not necessarily convince the reader more. In the final report key quotes are either embedded in the text, or put in boxes separate from the main text.

Another important issue in reporting qualitative research is to dedicate some space to the description of the techniques used. Being transparent and explicit about the study method by including scripts and participant selection sheets, flagging problems with implementation and describing how the analysis was carried out all increase the readers' confidence in the results; they also make a replication of the study in another context possible.

10.4 Summary and conclusions

This chapter has argued that qualitative techniques can play an important role in improving our understanding of health workforce challenges and policies. Qualitative techniques are particularly well suited to building an understanding of a complex environment in order to generate and fine-tune hypotheses (that can be tested by quantitative research), and to identify and address measurement issues. These strengths are reflected in a growing body of qualitative research on health workers. Many studies combine different qualitative methods: the most commonly used approaches are individual interviews and group discussions, while a third approach, participant observation, is an option but tends to be used less frequently. Many also serve as a complement to a quantitative study, either to better understand puzzles thrown up by quantitative research or in preparation of a quantitative survey.

The implementation of qualitative research is fraught with a number of methodological and practical challenges. An important aim of the chapter has therefore been to provide practical guidance on how to design and implement qualitative work. An important message in this regard is that obtaining high-quality data requires careful preparation and implementation of the study. Even though qualitative methods have inherent weaknesses – most importantly the weak objectivity following from the involvement of the researcher in the production and interpretation of the data – these can to a significant degree be contained in the design of the study. Reporting the applied method in a transparent way (for example including scripts, participant selection and method of analysis) increases the credibility of study results, and is something that is still neglected in many studies; it also allows replication of the studies in a different context. A second message is not to consider qualitative research in isolation. Combining different methodologies strengthens the validity of the study results, and the high degree of complementarity between qualitative and quantitative methods calls for combining the two approaches.

The value of future qualitative research on human resources for health will be judged by how much it helps to redirect policies. For example, human resource policies in the health sector have typically emphasized a labour planning approach – relying on the assumption that health workers are competent, motivated to serve the public, but passive in their career choices. Currently, health workers are increasingly considered, like other professionals, as purposely reacting to incentives from their environment, and trying to balance their own happiness and that of their family with a concern for patients. Research on health workers therefore increasingly incorporates a labour market approach, using more concepts and ideas from labour and personnel economics, as illustrated by recent studies on job satisfaction (*51*), women's labour market participation (*52*) and organizational design and decision-making (*53*), and the growing interest in the economics discipline in use of qualitative methods (see for example Bewley (*54*)). Given the limited knowledge on health worker labour markets, and given their complex institutional setting, qualitative research techniques are bound to be predominantly used in the early stages of this new avenue in health workforce research. Qualitative research that is sustained by careful design and robust methods will be a powerful tool to support the development of these and other strands of innovative health workforce research.

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11 Analysis and synthesis of information on human resources for health from multiple sources: selected case studies

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11.1 Introduction

Having timely and reliable measurements of the health workforce is becoming increasingly important to decision-makers, programme managers, development partners and other stakeholders, as a cornerstone to monitoring and evaluation of health systems performance. Yet monitoring human resources for health (HRH) can be challenging and complex. Variances in the estimated stock, skills mix and other characteristics of HRH may occur, depending on the data source and the adjustment method used to correct for data deficiencies (if any). Ideally, the data should be derived from a comprehensive, harmonized health information system of all persons trained or working in the promotion, protection or improvement of population health, along with nature of skills obtained or used. However, the data sources used to populate such systems tend to be fragmented and incomplete, which can lead to bias in any measurements derived from them. Unfortunately, the methodologies for measuring health workforce dynamics lag far behind the demand for information and evidence.

As reviewed in Chapter 3 of this Handbook, a number of sources can potentially produce data relevant for HRH analysis, including population and establishment censuses and surveys, administrative records and qualitative studies. Using a combination of different sources can provide better-quality measurements of health workforce characteristics and give a much more rounded picture (*1*). It is good practice to reconcile data from different sources rather than to rely on only one source of information. Dependence on single sources increases the risk of making decisions based on statistics that are incomplete or biased (*2*).

A strategy of triangulation – or cross-examination and synthesis of the available data on a central theme across different sources and using different methodologies – can be used to assess and reconcile potential variances in coverage, classification and reporting of information. This approach can be effective in supporting policy and programme decision-making when there are multiple data sources (as is often the case in HRH analysis). Whereas single research studies seek to maximize scientific rigour through internal validity, triangulation seeks to make the best public health decisions based on the available information. The optimal use of pre-existing data sources by means of triangulation allows for a rapid understanding of the situation and facilitates timely, evidence-based decisions.

In this chapter, three case studies are presented on the uses of triangulation for HRH analysis with illustrative applications in selected low- and middle-income countries. Both the data and methodological dimensions of approaches to triangulation are discussed. Case studies from Mexico, India and Zambia are used to review the potential for extracting relevant data for measuring a specific indicator of HRH metrics from different information sources, examine how triangulation can be used to gauge the reliability of the available information and investigate how new information can be teased out by triangulating data across different types of sources.

11.2 Identification of potential information sources and their use to estimate indicators of health labour market participation in Mexico

The health workforce is a heterogeneous group, with the activities of health workers ranging widely, depending on how they are incorporated into the labour market. Measuring health labour dynamics can be complex, but there are also practical opportunities for generating precise measurements from standard statistical sources. In contrast with the general population, the health workforce is generally a highly qualified group of workers for whom the level and field of education tends to be closely correlated with the nature of their jobs. The development of evidence-based HRH policies requires ongoing assessment of any potential

imbalances between formal education attained by health workers and their current occupational status and work activities (*3*).

In Mexico, different sources can be used to assess the number of health professionals and their working situation. They include the Population and Housing Census (*Censo General de Población y Vivienda*) and the National Survey on Employment (*Encuesta Nacional de Empleo*). Censuses are conducted every 10 years by the Central Statistical Office (*4*). The 2000 census covered a number of topics related to education and labour market activities (Table 11.1). In addition, a midterm count gathers information from a representative sample of the population between censuses. However, the latest (2005) count did not include questions on field of education or labour activity, and so did not produce the required information for health workforce analysis. While the previous (1995) count collected some relevant information, certain questionnaire wording differences compared to the census hindered comparability in measurement of some indicators across these two sources. An important constraint was the inability to track field of education over time.

As in many countries, labour force surveys are carried out regularly in Mexico, representing a good option for obtaining regular updates on the working status of health personnel (*5*). The Mexican employment survey has been carried out quarterly since 1988, collecting information on, for example, sociodemographic characteristics of the population (including level and field of education), labour force activity (participation, employment status, occupation, industrial sector) and working conditions (income, benefits, hours worked).

The availability of questions in the census and employment survey on education and labour activity enables an estimate to be made from both sources of the number of physicians, nurses and other health professional groups across the country, and their employment status. Among those currently employed, it is possible to assess the type of activity they perform and whether it is related to the academic field in which they were educated. The available data also offer estimates on the number of people with a health-related education who are not active in the formal labour force (for example domestic labour, retired, poor health).

Such information is valuable for measuring labour wastage of HRH, which refers to qualified human resources who, though of eligible age for labour force participation, are in inadequate employment situations because they are not working or because they carry

Table 11.1 Questions on education and labour activity included in the national population census and intercensal counts, Mexico, 1995–2005

Source Indicator	Population and Housing Count, 1995	XII Population and Housing Census, 2000	Population and Housing Count, 2005
Educational attainment	Highest year/grade of formal education completed by the respondent. Choice of nine response options.	Highest year/grade of formal education completed by the respondent. Choice of eight response options.	Highest year/grade of formal education completed by the respondent. Choice of 10 response options.
Field of education	n.a.	Name of course of study (for respondents with higher levels of educational attainment). Open question.	n.a.
Labour activity	Labour force participation during the previous week. Choice of nine response options.	Labour force participation during the previous week. Choice of eight response options.	n.a.
Occupation	Occupational or job title. Open question.	Occupational or job title. Open question.	n.a.
	Nature of work activities or tasks. Open question.	Nature of work activities or tasks. Open question.	n.a.
Branch of economic activity	Place of work by type. Choice of eight response options.	Place of work by type. Open question.	n.a.
	Main economic activity at place of work. Open question.	Main economic activity at place of work. Open question.	n.a.

n.a. Not available (no information collected).

Source: Instituto Nacional de Estadística, Geografía e Informática (*4*).

out activities that do not correspond to their training (*6*). From a health systems strengthening perspective, failure of qualified persons to put into practice the specific skills stemming from their education implies wastage of a social, public or private investment that does not yield a benefit for the population, or for the workers themselves. Those trained in health services provision who remain outside it due to various reasons (inadequate market absorption capacity, personal motivation) fall into various categories:

- Underemployed: individuals that have completed their formal education and are currently employed but perform activities not related to their training. This includes trained health professionals working outside the health services, signifying a mismatch of occupational skills. The concept is consistent with the International Labour Organization's definition of underemployment as encompassing individuals whose "employment is inadequate, in relation to specified norms or alternative employment, account being taken of [their] occupational skill" (*7*).[1]
- Unemployed: individuals that actively place pressure on the labour market in searching for a job or waiting for the outcome of a job application (during a referenced period of time, such as the week prior to data collection). The definition may also extend to those looking for work outside the formal economic sector.
- Inactive-eligible: individuals not currently seeking employment but who would be eligible for work by virtue of their skills, age and ability. This encompasses those who have chosen to withdraw from the labour market as a personal option (in the short or long term), including those dedicated to domestic labour.
- Inactive-ineligible: individuals unavailable or unable to work, for example due to retirement, studies, work-limiting disability or other reason.

1 An alternative to the skill-related approach to assessing underemployment is in relation to a time criterion, such as in the case of health professionals employed in health services having worked less than a threshold related to working time (for example less than what is considered as full-time work in a country).

Table 11.2 shows selected findings from two different sources on indicators of health labour wastage in Mexico (*8*). Microdata, or data collected from individual respondents, are used from the last population census and from the national employment survey round corresponding to the same period (third quarter of the year 2000). The indicators relate to the physician and nursing workforces, calculated using the same definitions

Table 11.2 Stock and distribution of the physician and nursing workforce by labour force status, based on census and survey data, Mexico, 2000

Data/Source Indicator	Census		Employment survey	
	Number	%	Number	%
Physicians				
Employed	142 923	70	189 930	74
Underemployed	26 733	13	28 457	11
Unemployed	10 892	5	7 036	3
Domestic labour	7 895	4	14 556	6
Not available for work	16 335	8	17 509	7
Total	**204 778**	**100**	**257 488**	**100**
Nursing professionals				
Employed	57 834	55	62 406	64
Underemployed	16 128	15	7 666	8
Unemployed	7 143	7	1 254	1
Domestic labour	16 971	16	19 530	20
Not available for work	6 659	6	7 124	7
Total	**104 735**	**100**	**97 980**	**100**

Note: Underemployed includes those who have completed university-level training in medicine or nursing but perform work activities not related to their education. Not available for work includes those who are retired, studying or have a work-limiting disability. Percentages may not sum to 100% due to rounding.

Source: Instituto Nacional de Estadística, Geografía e Informática (*8*).

from both data sources. Despite the similar methodology used, important differences are found in the total number of physicians (results from the survey being some 20% higher than those from the census), but the labour force indicators (in percentage terms) are generally consistent across both sources.

Regarding nursing professionals, in contrast to the case of physicians, estimates of the total stock are lower from the survey source than from the census (7% lower), and the indicators of labour force participation show a greater asymmetry. For example, the difference in the employment rate among nurses is 9 percentage points across sources, and for the underemployment and unemployment rates some 6 percentage points each.

It is possible that differences in sampling, training of field enumerators and supervisors, coding of self-reports of respondents' occupation descriptions, data entry and processing operations, or other methodological considerations may lie behind observed discrepancies in the estimated indicators of labour force activity among health professionals from the two different data sources in Mexico.

It is also clear from this case study that standard statistical sources can be a useful tool for HRH analysis in many countries. In the Mexican context, the available data allow quantification of the essentially qualitative concept of health labour wastage, which in turn assists in raising awareness among decision-makers of the magnitude of HRH challenges and guiding policy recommendations (*6*). Despite perceived barriers to access to a skilled health worker among some segments of the population, the data demonstrate that there simultaneously exists within the country a large number of trained providers who are not working in health services delivery. While the present analysis was limited to physicians and nurses, it could certainly be extended to other health professional and technician groups, and eventually to other countries where the questionnaire wordings from such sources are similar.

Data evaluation, and possibly adjustment to compensate for data deficiencies, is crucial to validate HRH information sources to support policy and planning. The cross-examination checks presented here are informative, but do not provide a basis for formal evaluation or adjustment of the reported numbers. Repeating this exercise across successive censuses or over multiple countries is likely to lead to improvements in estimation and evaluation procedures. In Mexico, options for time-trend analysis were limited due to differences in the data collection tools between the census and intercensal counts, which limited the possibility of calculating relevant indicators from the latter. Countries are encouraged to compile and publish the available information from all sources even if at first glance the data may seem of questionable quality. This could help prospects, which might otherwise be lost, for developing techniques for evaluating and adjusting such data and learning from experience.

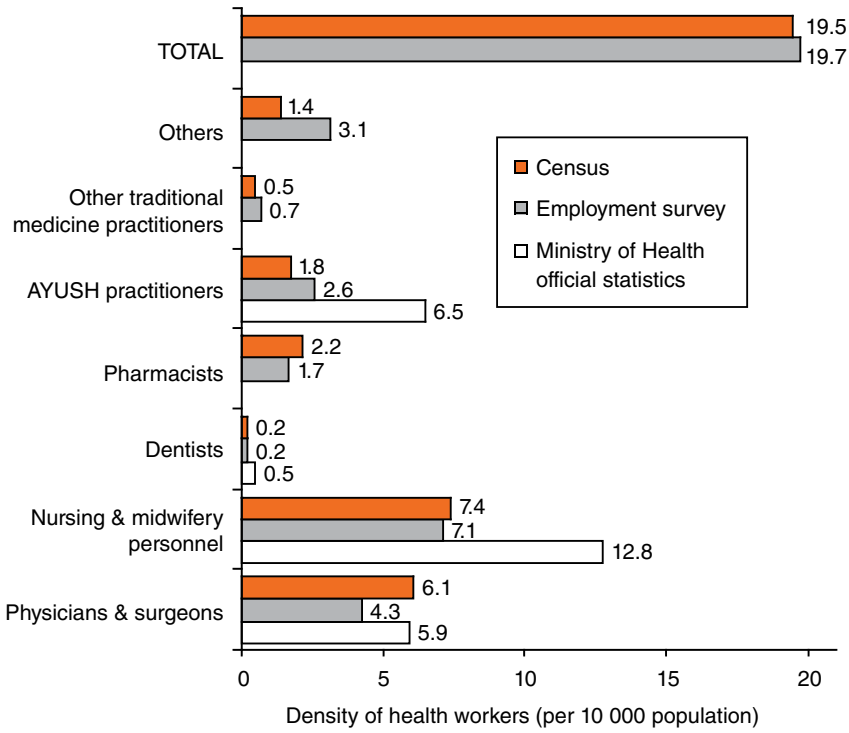
11.3 Using multiple sources of information to produce best estimates of India's health workforce

In most low- and middle-income countries, HRH estimates reported by ministries of health and allied agencies need strengthening in terms of comprehensiveness, reliability and timeliness. In India, routine information on the national health workforce suffers from several limitations. Reports from state professional regulatory bodies – which form the basis of official health workforce statistics – tend to be inaccurate as a result of non-adjustment for health workers leaving the workforce due to death, migration or retirement, or of double-counting of workers registered in more than one state. Further, not all states follow the same registering procedure, which raises issues of comparability; for example, the Delhi Medical Council requires practising physicians to re-register every five years, a process that is not followed in other states. Finally, certain categories of health workers (such as biomedical researchers, physiotherapists and laboratory technologists) are not recorded in official statistics, thereby making it difficult to estimate the overall size and composition of the health workforce (*9, 10*).

As previously discussed, a variety of data sources available in most countries can be used to provide useful information on HRH metrics. In this analysis, estimates of the numbers of health workers from both official sources and (population-based) standard statistical sources are cross-examined:

- Official statistics on the numbers of registered physicians and nurses were obtained from the medical and nursing councils of India (based on compiled reports from their state counterparts, covering both the public and private sectors); other statistics on HRH were drawn from various Ministry of Health reports (*11–13*).
- Tallies of the health workforce for various cadres were drawn from the 2001 Census of India, which collected information on the self-reported occupation of all individuals in the country (*14*). The present analysis uses a census microdata sample of 20% of rural and 50% of urban enumeration blocks in all districts, representing a sample size of about

Figure 11.1 Density of the health workforce by cadre, according to data source, India 2005



Sources: Indian Nursing Council (*11*), Medical Council of India (*12*), Central Bureau of Health Intelligence (*13*), Census of India 2001 (*14*), National Sample Survey Organization 2004–2005 (*15*).

300 million, and weighted to represent the total population.

- Estimates of the health workforce for various cadres were also obtained from the 2004–2005 round of a quinquennial survey on employment and unemployment, implemented by the National Sample Survey Organisation (*15*). The nationally representative household survey recorded the principal self-reported economic activity of employed individuals.

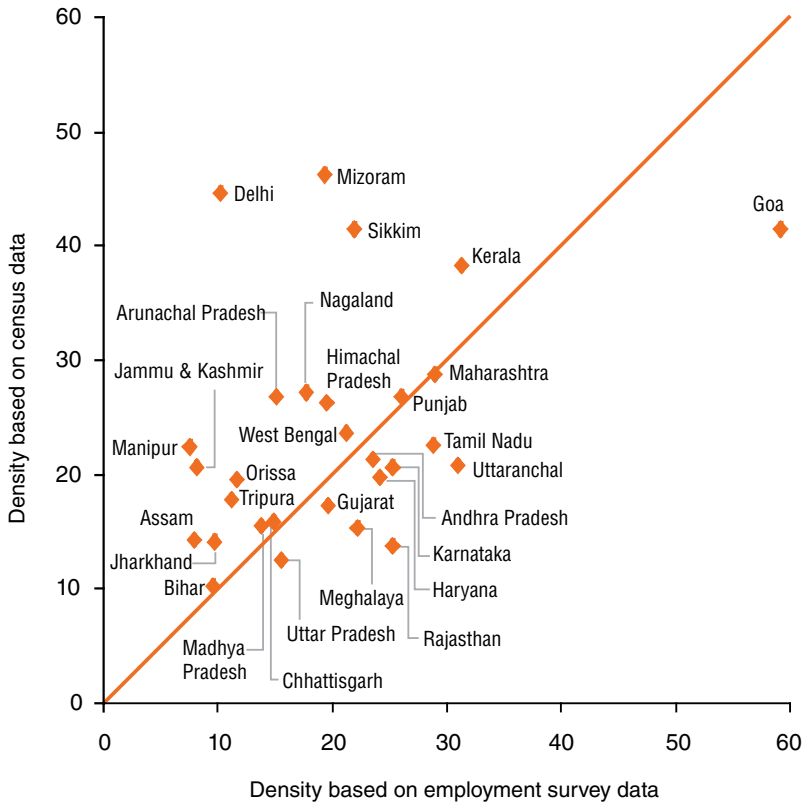
Certain adjustments were made to make the employment survey and census estimates comparable. While the census estimates were recorded in March 2001, the survey was conducted between July 2004 and June 2005. On the assumption that growth in the health workforce follows that of the general population, the census estimates were inflated by 8% to reflect demographic growth between 2001 and 2005.

Health workers were identified in the census and employment survey samples using the National Classification of Occupations (*16*). The census used the latest 2004 version of the classification (also known as NCO-04), whereas the survey used the earlier 1968 codes (NCO-68). In the estimates presented here, NCO-68 codes were converted to NCO-04 with little loss of information. To further improve comparability between the two, certain health worker categories were either split or merged together. For example, because the function of nurses and midwives is often similar they were merged into a single category. In a limited number of cases where occupational information was missing, some employed individuals were recognized as health workers based on their branch of economic activity or their educational qualifications.

The final set of health worker categories for which estimates were produced comprised physicians and surgeons (allopathic medical practitioners), nursing and midwifery personnel, dentists, pharmacists, AYUSH practitioners (ayurvedic, yoga, unani, sidha, homeopathy), other traditional medicine practitioners, and others (dieticians, opticians, dental assistants, physiotherapists, medial assistants and technicians, other hospital staff).

As seen in Figure 11.1, official Ministry of Health estimates are generally higher than those of the census and survey sources and, significantly, there is better agreement between the latter two. Measures were most similar for the physician and dentist workforces across all three sources. In total, the census and employment survey estimates suggest that there are some 2.1 million health workers in India, which translates into a density of approximately 20 health workers per 10 000 population. Comparative statistics were not available on the total number of health workers from administrative sources. Also excluded from these estimates are the roughly 1.5 million community health workers, for whom a distinct occupational code is not included in the current classification (although it is possible that some of these workers are assimilated under nursing and midwifery personnel).

Figure 11.2 Density of the health workforce (per 10 000 population) based on census versus survey data, by state, India 2005



Sources: Census of India 2001 (*14*), National Sample Survey Organization 2004–2005 (*15*).

Further analysis of the census and survey data reveals considerable variation in the density of the health workforce (all cadres combined) across the states in India (Figure 11.2). For a majority of states, the census estimates are higher than those obtained from the employment survey. The latter's small sample size prevents robust disaggregated estimates at the state level.

Estimates of the heath workforce drawing on census and employment survey data have several advantages. They are based on population counts and hence avoid the problem of double-counting, cover a wide range of health occupations, are available for all areas of the country and have fewer comparability issues because they are based on standard occupational codes. However, these information sources also have certain limitations. Notably, they cannot provide health workforce estimates on an ongoing basis, as the Indian employment survey is repeated only once every five years and the census every 10 years.

Overall, the census appears to be the best available source for health workforce estimates. The large size of the microdata sample used here – covering every district in the country and, within each district, both urban and rural areas – allows for robust estimates across health worker categories and by state. In the Indian example, the census estimates have been shown to have good correspondence with those obtained from the survey source, at the aggregate level, indicating good reliability.

11.4 Triangulation of data from two different sources for monitoring health worker absenteeism and ghost workers in Zambia

Health worker absenteeism fuels inefficiencies and inequities in many health labour markets in the developing world. As with other dimensions of the health workforce crisis, relevant data and information are needed for governments and partners to be able to address and monitor the problem. Often underused, health facility assessments offer an ideal mechanism for obtaining and producing information and evidence on various forms of worker absenteeism. Measuring this indicator of labour dynamics requires the collection of only limited additional data, and the subsequent triangulation of the new facility-based data with information from routine administrative registries (*17*).

Health worker absenteeism comes in several forms. A distinction should be made between: (i) absenteeism

of health workers registered and generally present at the facility but absent at a particular point in time (henceforth referred to as absenteeism); and (ii) health workers absent from the workforce altogether, not found on facility staffing lists, but nevertheless listed on official payroll records (henceforth referred to as ghost workers). The former may include scheduled absence for official duty or personal reasons (i.e. not currently present due, for example, to part-time work status, attendance at training or meetings, secondment, vacation, maternity or parental leave), unscheduled absence (for example sickness or other emergency circumstance), dual employment (i.e. current work practice in another location) or unauthorized or unexplained leave. The latter includes exit from the facility-based workforce (but not from the payroll) due to death, long-term illness or even fraud. In some contexts, ghost workers reflect a strategy among health personnel to overcome unsatisfactory remuneration or working conditions.

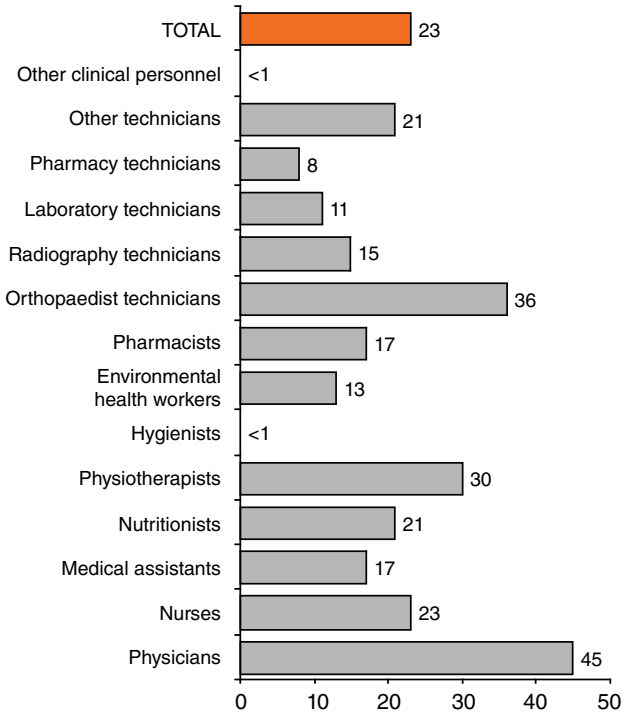
The fundamental requirement for obtaining reliable information on absenteeism on ghost workers is the collection of primary data by means of facility-based assessments, specifically on health workers registered at the facility level (i.e. on staff inventory lists), those meant to be working at the time of data collection (on duty rosters) and those actually present at the time of data collection (those headcounted). Timely data from administrative sources are also required on health workers listed on (public or private) payroll records. The respective indicators are calculated as follows:

- absenteeism = facility-based health workers reported on duty rosters minus those actually headcounted;
- ghost workers = number of health workers listed on central payroll records minus those registered at the facility level.

For basic snapshots on absenteeism and ghost workers, the minimal data requirements on facility-based workers for all three components (inventory lists, duty rosters and headcounts) are name, cadre, unique identification number and salary source. Without knowledge of name and cadre, absentees cannot be identified. Without the identification number, double-counting of workers having jobs at more than one facility cannot be prevented. Salary source is crucial for triangulating facility data with administrative payroll data to estimate the extent of ghost workers in the health system. At the level of the facility, information is also needed on ownership, or operating authority of the establishment.

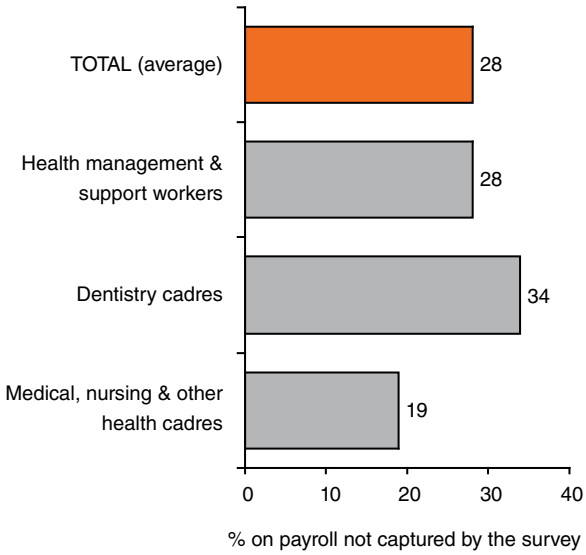
An enumeration of health facilities in Zambia obtained data on health workers who were listed to be on duty at the time of the facility visit (i.e. on the duty roster) and those actually present (i.e. headcounted or accounted for), producing a snapshot in time on absenteeism (Figure 11.3) (see also Chapter 7 for an illustrative example from Kenya). Findings on the estimated proportion of ghost workers in health facilities in Zambia can be seen in Figure 11.4.

Figure 11.3 Percentage of facility-based health workers on the duty roster but not accounted for on the day of the assessment, by cadre, Zambia 2006



Source: Herbst and Gijsbrechts (*17*).

Figure 11.4 Percentage of health workers recorded on the Ministry of Health payroll but not registered at the facility level, Zambia 2006



Source: Herbst and Gijsbrechts (*17*).

Despite efforts to adjust the facility-level data against payroll data for enhanced comparability, non-negligible information gaps on salary source of health workers may have compromised measurement accuracy (*17*). Computation of indicators on ghost workers requires triangulation of data on health workers by salary source – as opposed to sector of employment – with payroll records. Although in Zambia the vast majority of health workers found in public sector facilities are indeed on the public sector payroll (an assumption made during analysis), this is not necessarily typical.

The production of useful information on health worker absenteeism (at a given moment in time) and ghost workers is only possible if the underlying data from which this is derived are not only adequately collected and triangulated (using well-designed tools and analytical techniques), but also accurately reflect the day-to-day scenario on the ground. To minimize potential biases, it is important to take into account certain considerations, notably the timing of data collection at the facility level: snapshots of absenteeism may vary depending on whether data collection occurs at the beginning or end of a workday, as levels of absenteeism are often higher in the afternoons. Announcing data collection in advance to those with managerial decision-making authority may also skew the picture on absenteeism in some scenarios. Facility managers may either want to ensure staff presence since high levels of absenteeism could be seen to reflect badly on managerial performance – or, conversely, they may want to expose absentees as evidence to support future human resources planning and negotiations.

It is not certain which combination of reasons for observed worker absences at a moment in time explains the results from the data triangulation exercise for Zambia. The method entailed comparisons of staff present, listed or on the payroll on the day of the survey. However, the facility assessment did not collect detailed information that would help improve understanding of the dynamics of absenteeism, such as duration of absence or its underlying basis (for example, expected versus non-expected). Improving routine HRH management information systems, including daily updates of staffing schedules at the facility level, would allow better elucidation of staff behaviours and workforce efficiencies on an ongoing basis.

11.5 Summary and conclusions

This chapter has presented selected case studies on approaches to triangulation, or cross-examination of multiple information sources for in-depth HRH analysis. Triangulation represents a cost-effective strategy for using diverse datasets to explore a single issue. In monitoring and evaluation of health workforce policies and programmes, using one source or method is rarely sufficient. Frameworks have been formulated that can support efforts to coherently combine statistics from different sources and for different units (*18*). Different kinds of data, methods and approaches will often yield somewhat different results. Exploring these inconsistencies can be an important means of better understanding the multifaceted and complex nature of health labour market dynamics. Areas where the data triangulation produces similar or converging results will increase confidence in preliminary findings.

The technique can also help articulate recommendations for strengthening future evaluation efforts. This chapter has highlighted the strengths and limitations of using some combination of population censuses, employment surveys, health facility assessments and routine administrative records for HRH assessment. Ensuring a strategic agenda for data collection, processing, analysis and use – including common (and detailed) occupational classification, unique identifiers for practising health workers, ongoing update of administrative registries to account for worker absences and attrition, consistency over time in the design of data collection instruments, and systematic dissemination of findings – opens up new possibilities for HRH analysis to support timely recommendations for evidence-based decision-making.

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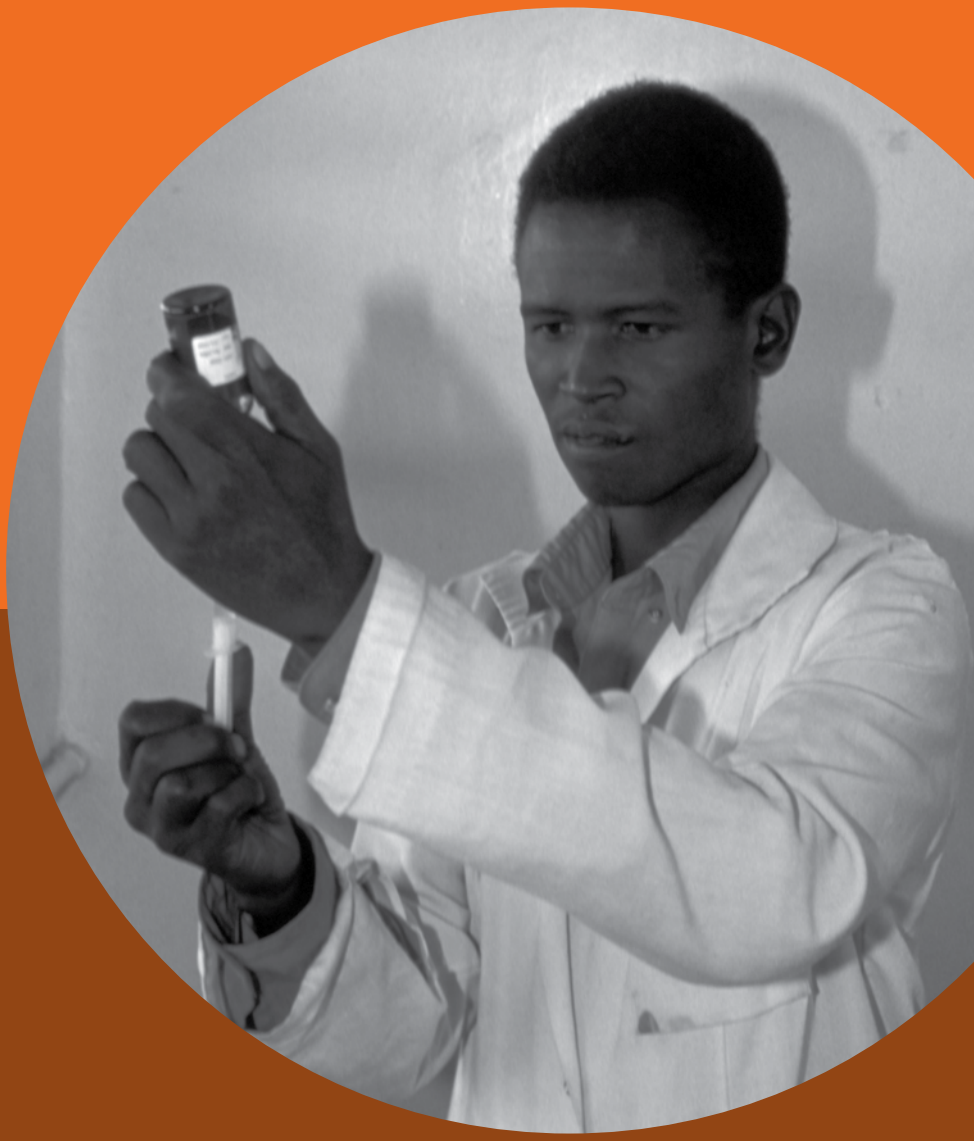
Part IV:
DATA DISSEMINATION AND USE



12 Getting information and evidence into policy-making and practice: strategies and mechanisms

GÜLIN GEDIK, ULYSSES PANISSET, MARIO R DAL POZ, FELIX RIGOLI

12.1 Introduction

In a rapidly changing world, the need to address huge deficits in the human resources for health (HRH) development agenda has sparked growing interest and concern at global, regional and country level. In order to act rapidly, effectively and efficiently to address these deficits, policy- and decision-makers require updated and readily available information and evidence based on solid data.

A major difficulty experienced by decision-makers in addressing HRH challenges is the complex diversity and simultaneity of pressing key issues such as imbalances in global and national distribution and production of health workers, progressive increase in international migration, sociopolitical restrictions on public sector operations (including freeze on public sector recruitment due to structural adjustment programmes), the need to scale up priority health interventions, impacts of HIV on the health workforce and addressing worker motivation and retention. Many of these challenges are long-term processes with cumulative effects on workforce shortages and imbalances. Resulting human resources problems can manifest in different ways, such as labour disruptions (for example strikes) because of low morale among health workers, or even hospital closure due to inability to meet minimum staffing norms. The possible solutions can only be identified through examination of the roots of these problems, though these may not be apparent at first glance.

Countries have made efforts to develop HRH policies and implementation plans within the context of health sector reforms with varied levels of success. In general, policies may be elaborated and implemented with several inputs and factors, such as political and financial constraints, tacit knowledge and professional experience. In the absence of reliable and validated data, it has been difficult to establish evidence-based policies, that is, policies informed through the use of health indicators and research results to formulate, implement, monitor and evaluate strategic action. In addition, the policy imperatives of global and regional initiatives and other strategies to strengthen health systems in countries (such as those described in Chapter 1) call for robust monitoring and evaluation mechanisms to assess the extent to which countries are making progress or lagging behind. To make well-informed decisions about HRH, decision-makers and other stakeholders, including the private sector and civil society, need the best available evidence about what works or looks promising.

The significant challenge of scaling up and improving performance of HRH and health services delivery in a relatively short time, and integrating and coordinating decision-making in health systems with other sectors of government and society, requires new ways of thinking and organizing policy-making. There have been several studies in the past decade examining the processes, which have attempted to address the gap between what is known about effective health systems interventions and the evidence used in decision-making. The issue of how to access evidence synthesis and adapt it for application to the local context is a problem common to all countries at different levels of social and economic development, and needs addressing through international cooperation (*1*).

Senior policy-makers in low- and middle-income countries have stressed that access to high-quality information and evidence that is timely and relevant is critical to their ability to make evidence-informed decisions. Although necessary, evidence alone is certainly not sufficient, given that health interventions are affected by a wide range of contextual, political, cultural and sociological factors that shape the decision-making process (*2*). There is a significant knowledge gap in our understanding of the mechanisms, structures and factors that policy-makers experience. To overcome this gap, identification of these barriers and facilitating factors in each context is required, through better research on how evidence-informed policy-making

can integrate context, values and politics in pursuit of improved health of populations (*3*).

The debate over evidence in public health has often focused on "the linear use of research evidence in a programmatic rather than policy context" – and has not taken account of the capacity to implement the policy (*4*). The capacity to take into consideration political factors and act on evidence is fundamental to the application of an evidence-informed policy, but is lacking in most initiatives to date. Active participation of policy-makers and other stakeholders in the identification of problems and systematization of evidence is vital, but rare (*5*). A more integrated policy process – where agenda setting, policy formulation, implementation and feedback are closely related to each other – is required to make sure that the use of the best scientific evidence is effectively implemented in different contexts (*6*).

Earlier chapters of this Handbook highlighted what needs to be monitored, what types of information are required, what are the possible sources of data and information, and how they can be collected and processed. This chapter looks at how this information and research results can be collated, disseminated, shared and used to facilitate policy dialogue and implementation. The following sections take stock of various initiatives in place to build effective health workforce information and evidence generation and dissemination mechanisms at subnational, national, regional and international levels, and how to improve the use of scientific evidence in policy formulation and monitoring and evaluation of its implementation.

12.2 Strategies to get evidence into policy and practice

The term "knowledge translation" (or wording alternatives that basically encompass the same concept, such as "capacity building", "knowledge management" and "linkage and exchange") is increasingly used to describe a series of activities undertaken to generate knowledge targeting user needs, to disseminate this knowledge, to build decision-makers' capacity for its uptake and to adapt and track its application in specific contexts (*7*). In the field of health, it has been described as a dynamic and iterative process that includes synthesis, dissemination, exchange and ethically sound application of knowledge to provide more effective health services and products, strengthen health systems and improve population health (*8*).

The traditional separation between researchers, policy-makers, research funders, programme managers, health practitioners and health service users has been identified as one of the main obstacles for effective knowledge transfer and the use of research in decision-making processes. One of the fundamental factors identified in approaches that recognize the complexity of health systems policy-making and action is the need to improve interaction between different stakeholders in the decision-making process (*9*). This is essential to produce feasible policies that can be implemented according to a specific context. Such a stakeholder-oriented model has been called an "interactive model" (*4*) – the ongoing process to "adopt, adapt, and act" on knowledge, using research to inform policy while simultaneously weighting the politics of different interests, motivations and values.

A systematic review of studies evaluating policy-makers' perceptions of their use of evidence identified the following facilitating factors: (i) frequent two-way personal contact between researchers and policy-makers; (ii) an estimation that the research produced is timely, relevant and of sound quality; and (iii) the presentation of results including summaries with clear policy recommendations**.** The most commonly identified barriers were absence of interaction, timeliness, relevance and credibility; lack of translation to the user; and mutual distrust between researchers and policy-makers (*10*).

Utilization of research evidence requires active promotion of these facilitating factors and overcoming barriers in innovative ways to take account of the complexity of the policy-making process. The creation of an enabling, interactive, learning environment with different stakeholders is critical (*1, 11, 12*). Three main strategies have been proposed to promote the application of information and evidence to policy- and decision-making:

- strategies to promote researcher "push", concentrating on diffusion to a broad audience – including dissemination of findings through concise policy briefs and syntheses of existing evidence;
- strategies to promote policy-maker "pull", focused on the needs of users, thereby creating an appetite for research results – including capacity development for policy-makers in commissioning research and development of rapid response mechanisms;
- strategies to promote linkage and exchange, or building and maintaining relationships in order to exchange knowledge and ideas – including joint mechanisms to set priorities for health and health workforce policies, and forums and workshops for exchange between researchers, policy-makers and civil society representatives regarding the evidence base and its application to specific policies (*7, 13*).

Policy- and decision-making require research results focused on problem solving and addressing demand for specific policy issues. Thus, the definition of the

research question based on a problem identified by the decision-maker (pull) facilitates the research-to-policy link. Sponsors and financers of health research are increasingly realizing that their calls for proposals to study the intricacies of health systems must rely on the demand of policy- and decision-makers, as opposed to the more traditional researcher-oriented definition of research projects. Ensuring sustained interactions between researchers and policy-makers appears to make a difference in supporting evidence-informed decision-making processes (*14*).

Besides the need for direct interaction with policy-makers, HRH research also entails an interdisciplinary approach to tackle the multiple aspects related to human resources in health systems. This poses a challenge on developing innovative methodologies and networking, integrating mechanisms that bring to HRH research the expertise in financing, legislation and regulation, health systems management, behavioural sciences and other key areas for the better understanding of HRH dynamics.

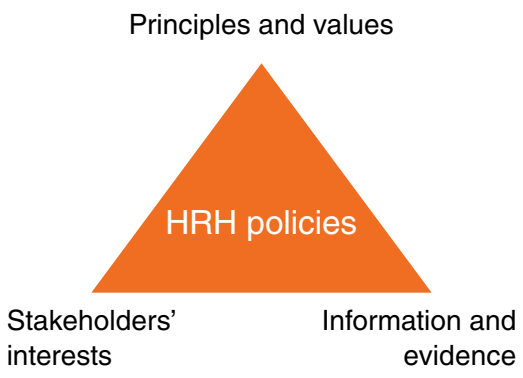
An additional aspect of HRH research is that most of the available studies focus on developed countries (*15*). It has been estimated that only 5% of published articles on health policy and systems research focus on low- and middle-income countries (*16*). Researchers looking into HRH issues for low- and middle-income countries frequently run into difficulties with availability of quality (quantitative and qualitative) data and definition of appropriate performance indicators required as raw material on which research can be shaped (*17*).

The issue of context specificity between and within countries also constitutes a major challenge. People working towards strengthening of the health system in a given jurisdiction do so in very specific political, socioeconomic and cultural environments. Particularly in HRH policy issues – in which financial, political, legal and cultural factors are of great significance – it is extremely difficult to draw generalized conclusions from a study conducted in one country, within a specific context and at a specific point in time. Furthermore, subnational or local-level characteristics can differ markedly within a given country, especially in situations of decentralized health systems. In other words, one size definitively does not fit all, demanding the development of mechanisms for contextualization of research evidence.

As health systems interventions are social experiments with an impact on large parts of the population, people affected by policies are inevitably key stakeholders (*18–20*). Researchers and policy-makers must not only know and understand the constraints and opportunities of the actors involved in this process, they must also develop a stakeholder-oriented work environment (*21*). Interactive approaches, ones that create and strengthen a learning environment with constant exchange or linkages of ideas and experiences among a varied set of stakeholders, are essential for promoting the appropriate use of research evidence (*22*). The process may be driven at the beginning by decision-makers and other users (for example health services practitioners), with researchers acting as resources (*23*). Simultaneously, it may facilitate the implementation of the policy, as inputs from different users will improve the capacity to identify factors enabling implementation (Figure 12.1) (*24*).

Thus, it is critical to identify, promote, establish and strengthen effective mechanisms for supporting the development, implementation and monitoring and evaluation of HRH policies. The mechanisms should ensure not only the collection of data or generation of evidence, but also dissemination and utilization for policy and managerial decisions. Viable HRH policies can be developed, committed and implemented if they are based on information and evidence, principles and values, and respond to the various stakeholders' interests. Any policy dialogue, therefore, needs to use mechanisms that ensure stakeholders' participation is taken into account, but modulated with the inflow of information. Health workforce policies formulated only by stakeholders' consensus risk being interest driven (for example, doctors creating the policy for the medical workforce); conversely, policies made behind the doors of a government cabinet based purely on principles or values risk being unrealistic or dogmatic (for example, forcing health professionals to work in deprived areas without thinking about incentives for their performance

Figure 12.1 Basis for HRH policies



Source: Adapted from Muir Gray (*24*).

and retention). Information flows can balance these otherwise partial points of view.

To this end, several different but complementary approaches could be followed:

- strengthening health workforce information systems to generate the data needed for monitoring and evaluation of HRH policies and programmes;
- building research capacities to produce and disseminate information and evidence for the formulation of policy options among decision-makers and other stakeholders;
- facilitating knowledge translation platforms for information and evidence sharing among all key stakeholders;
- establishing and strengthening cooperative mechanisms and processes, such as health workforce observatories, with the aim of integrating HRH information and evidence (including analyses of best practices) with policy development and implementation.

Other chapters in this Handbook tended to focus on the first two approaches; the rest of this chapter looks into examples of the latter two. In particular, knowledge translation platforms (for example discussion forums or virtual networks) are valuable for facilitating ongoing interactions between researchers and policy-makers and helping transform scientific evidence into policy and practice (*25*). An example of a successful knowledge translation platform for health systems and policies focusing on low- and middle-income countries is given in Box 12.1 (*26–28*).

Health workforce observatories offer opportunities for facilitating planning, monitoring and evaluation of HRH policy implementation by means of fostering mechanisms for timely access to and use of relevant data and information. The next section concentrates on this approach, with examples from regional and country level.

12.3 A mechanism to harness the HRH agenda: health workforce observatories

Health workforce observatories are being increasingly recognized as a potentially valuable mechanism to improve the information and knowledge base on the HRH situation and to facilitate policy development and monitoring. Although they have evolved in different ways in different contexts, they share a fundamental feature: a cooperative network initiative among countries and partners to produce and share information and knowledge necessary for improving human resources policy decisions.

12.3.1 Development and contributions of health sector observatories

Since the 1970s, various types of cooperative mechanisms – with the label "observatory" or other – have been established in countries at different levels of social and economic development, focusing on different public health themes. These have included observatories charged with aiding local health and social care policy decision-making in France through the production of useful information, and the public health observatories in the United Kingdom, which were considered to have broken new ground in the provision of health intelligence by not only providing information but also context and perspective (*29*).

At the regional level, the implementation of widespread health-care reforms and increasing recognition of the need for better monitoring in the late 1990s witnessed the emergence of observatories on health systems and human resources, notably the European Observatory on Health Systems and Policies (*30*) and the Observatory of Human Resources in Health Sector Reforms (among countries of Latin America and the Caribbean) (*31*).

When the European Observatory on Health Systems and Policies was initiated, it was described as a new partnership aiming to bridge the gap between academia and policy-makers. The rationale was explained by one of the observatory's directors as follows:

> There is some information about what reforms work and where they work. But it is not readily accessible or easy to interpret. Information is mostly in academic journals and much of it is unpublished. The expertise of the observatory is to collate information, analyse it, structure it, and present findings clearly to those responsible for making and implementing health policy.
>
> *Source:* Figueras (*32*).

In the region of the Americas, stimulated by efforts of the Pan American Health Organization (PAHO) to monitor ongoing health sector reforms and their impacts on health labour, an initiative was launched in 1999 bringing together 23 countries under an umbrella network of HRH observatories. This resulted in the development of a community of professionals engaged in health workforce policies. The regional observatory has been defined as "a cooperative initiative among the countries of the region aimed at producing information and knowledge in order to improve human resource policy decisions as well as contributing to human resources development within the health sector on the basis of sharing experiences among countries" (*33*). Thus the observatories are intended to be not just information

Box 12.1 Evidence-Informed Policy Network: EVIPNet

In response to a call "to establish mechanisms to transfer knowledge in support of evidence-based public health and health-care delivery systems, and evidence-based health-related policies", in 2005 the World Health Organization launched the collaborative Evidence-Informed Policy Network (EVIPNet) (*26*).

EVIPNet addresses the integration of two fundamental enabling factors in the process of evidence-informed policy-making: best practices to promote interaction among stakeholders that generate and use evidence; and capacity to implement research in a local context (*27*). Focusing on low- and middle-income countries, EVIPNet promotes partnerships at the country level between policy-makers, researchers and civil society in order to facilitate both policy development and policy implementation through the use of the best scientific evidence available.

EVIPNet comprises a series of linked (but distinct) networks that bring together national teams, which are coordinated at regional and global levels. Africa, Asia and the Americas each host regional networks, which together work in some 25 countries. At the regional level, EVIPNet is supported by WHO regional offices and by small secretariats responsible for promoting regional coordination. A global steering group facilitates exchange between regions and supports international-level activities. The work is guided by a group of international experts in the evidence-to-policy field, which provides strategic guidance, organizes technical review of EVIPNet proposals, develops innovative methodologies and provides direct technical support to country teams where necessary. A project priority is to identify best practices in developing capacity of both policy-makers and researchers in working with scientific evidence-to-policy links, while engaging citizens and advocacy groups to sustain demand for evidence-informed health policy.

Since its inception, EVIPNet has worked collaboratively with the Regional East African Community Health Policy Initiative, an institutional mechanism whose mission is to access, synthesize, package and communicate evidence required for health policy and practice and for influencing policy-relevant research agendas for improved health equity (*28*). Similar initiatives are emerging in other countries, focusing on supporting governments to use research evidence for health policy decisions – although the specific scope of activities, nature of collaborative efforts and research evaluation methods are unique across contexts. For example, country teams may organize workshops to build technical capacity; several promote the inclusion of journalists as observers and advocates. Thus EVIPNet has contributed to creating a supportive political environment for delivery of evidence-informed policies.

Recently, country teams have began to produce policy briefs based on systematic reviews of research, offering policy options that include governance, delivery and financial arrangements adapted to specific country or district contexts and the reality of existing resources. For instance, in February 2008, EVIPNet Africa country teams produced policy briefs to address current policy challenges related to malaria treatment services in their respective countries.

disseminators, but also proactive actors in policy-making. For example, regular (biennial) regional meetings provide a forum for interactive discussion, sharing and strategic planning.

More recently, with increasing global attention and resource mobilization to address the health workforce crisis in Africa, the Africa Health Workforce Observatory (*34*) has evolved as part of the action agenda. With its secretariat housed by the World Health Organization (WHO), its mission is to "support actions that address HRH challenges by promoting, developing and sustaining a solid knowledge base for HRH information at all levels: subnational, national, intercountry and regional" (*35*) (Box 12.2, page 166).

Similarly, with support from WHO, the Eastern Mediterranean Region Observatory on Human Resources for Health grew out of an existing regional observatory on health systems with the purpose "to assist Member States in using a proactive approach and sharing the best and most innovative options to tackle HRH-related challenges" (*36*). Its outputs in the public domain include updated profiles on the health workforce situation within and across countries, analyses of correlations between significant health workforce

determinants, and operational and policy linkages to national and regional HRH benchmarks and targets.

Although the functions of and triggering force for the emergence of these various observatories differ slightly, depending on specific contexts and needs, each works to bridge the gap between evidence and policies. The common objectives can be summarized as: to produce information and knowledge necessary to improve human resources policy decisions, planning and implementation; to share country experiences in human resources development; and to facilitate policy dialogue. Recent significant contributions attributable to regional HRH observatories have included:

- the creation and dissemination of databases of cross-nationally comparable statistics on various indicators of health workforce metrics – for example, the public interface for the *African atlas of the health workforce* is maintained on the regional observatory web site (*37*);
- the generation of regional and country profiles of the HRH situation and trends for overview analysis and benchmarking;
- the undertaking of intercountry and national studies on specific policy-relevant health workforce topics – for example, joint activities across regional observatories for capacity assessment of HRH units in national ministries of health (in the WHO regions of Africa, the Americas and the Eastern Mediterranean) and for mapping the health management workforce (in the African and Eastern Mediterranean regions).

12.3.2 National health workforce observatories

While regional observatories may play an essential role in terms of organization and coordination, national HRH observatories lie at the core of achieving the desired objectives discussed above. They operate to synergize efforts and consolidate resources at the country level, contributing to a commonly agreed workplan among all stakeholders to respond to country needs.

National observatories involve networks of all partners in health workforce development in the country. Routine responsibilities of network members often entail monitoring and documenting implementation of HRH policies and strategies. While members may each operate under their own identities, tasks are divided in a coordinated manner and the results of the work are shared in a systematic way. Observatory networks typically involve representatives at various levels: government (ministry of health, ministry of education, ministry of finance, public service commission, national statistics office); academic and training institutions; health professional regulatory bodies; health workers' unions and associations; major private and nongovernmental organizations providing health services; civil society (for example health services consumer and client groups); and development partners.

National health workforce observatories can serve as mechanisms to promote collaborative engagement among stakeholders and enhance their roles and contributions to HRH development. However, just as regional observatories evolved in different ways, so too may national observatories have different priorities, structures, memberships and ways of working, as driven by country contexts and interests. Table 12.1 provides an illustrative example of potential stakeholders and their roles in the context of the Sudanese national observatory (*38*).

At the same time, some common principles and features among operating national HRH observatories can be identified:

- They build on existing structures and mechanisms, such as national technical multisectoral and partner working groups, avoiding duplication of efforts and parallel structures.
- Organizational flexibility accommodates diverse sociopolitical contexts (although the actual models of organization vary from country to country, according to existing institutional arrangements and leadership).
- Coordination functions are assumed through either a small secretariat or focal point.
- Active involvement of the ministry of health, especially in a leading role, is essential.
- They can contribute to strengthening capacities and empowerment of the HRH units of ministries of health and other stakeholders.

In line with these principles, Boxes 12.3, 12.4 and 12.5 offer examples across different operational frameworks for HRH observatories (*39–42*). The stimulation of joint work and products among participating stakeholders can contribute to continuation of advocacy and commitment for observatories, and therefore to their sustainability. An outstanding question remains regarding whether the national observatory should be integrated as part of the health ministry's HRH unit (such as in the case of Brazil), or as an autonomous interinstitutional group with guidance from the national authority. There are advantages to both options, but also risks – in the former case, close proximity to the political directives may inhibit widespread stakeholder participation; in the latter, the information generated may not be relevant for policy and planning.

Overall, experiences from different contexts have shown that HRH observatories can be an effective mechanism

Table 12.1 Main stakeholders and their role in support of the national HRH observatory in Sudan

Stakeholder	Current role[a]	Potential role
Federal Ministry of Health	Annual health statistics report Administrative records of the ministry's HRH department Mappings and surveys on the health workforce	Improving scope and quality of official statistical reporting Periodical reports from HRH department Maintaining a centralized database on health workers
Ministry of Higher Education	Annual report on medical schools (staff and students)	Inclusion of other health training institutions Improving scope and quality of the report Health workforce production and education policies
Ministry of Labour	No obvious role	Records and reports on health-related jobs Records of scholarships for health personnel Labour market dynamics
Sudan Medical Council	Registry of doctors, dentists and pharmacists	Periodically updated registry (relicensing) Capacity building
Council for Allied Health Professions	Registry of nurses and paramedical staff	Periodically updated registry (relicensing) Capacity building
Sudan Medical Specialization Board	Records of registered doctors enrolled for specialized training	Annual report on intake and graduation
Sudan Health and Social Professions Trade Union	No role	Records of membership (regularly updated)
Sudan Doctors Union	No role	Records of membership Records of doctors abroad Capacity building Negotiation
Army Medical Corps	No obvious role	Records and reports on health workers affiliated to the armed forces
Police Health Services Department	No obvious role	Records and reports on health workers affiliated to police services
Secretariat for Sudanese Working Abroad	Records of some categories of migrant Sudanese health personnel	Records of all categories of migrant health workers Annual analytical report on health workers abroad
Health Insurance Fund	No obvious role	Records of health workers affiliated to the National Health Insurance Fund Annual report on characteristics of health workers Quality of practice
National Centre for Information	No role	Facilitation of access to data and information across different government agencies Support for analysis and other technical aspects of data collection and use
Ministry of Health/ Government of Southern Sudan	Records of health workers in the country's southern region	Comprehensive records on all health workers Annual report on characteristics of health workers Health workforce development policies Facilitation of dialogue Coordination
WHO Country Office for Sudan	Technical support to the Federal Ministry of Health	Support for health workforce assessments Support and technical assistance in the area of information and communication technology Regional networking and exchange of experience

a. Current role as assessed in early 2007.

Source: Badr (*38*).

to improve information and knowledge flows in support of evidence-based decision-making to address health workforce challenges in countries. As illustration, Table 12.2 reviews a selection of studies undertaken in the context of the Brazilian observatory network and their role in influencing national HRH policies.

Box 12.2 Africa Health Workforce Observatory

Among a series of recent initiatives to monitor and address the HRH crisis in Africa, home to critical shortages and imbalances of health personnel, was the establishment the Africa Health Workforce Observatory (*34*).

The observatory was started with a small secretariat based in the WHO Regional Office for Africa. A range of activities aimed to improve HRH data, information and evidence across the region. The main tasks and functions include information dissemination, facilitating networking for sharing of experiences, intercountry studies to contribute to national policy-making processes and support for additional national-level activities.

The work of the regional secretariat is guided by a steering group comprising representatives of the observatory's key partners, including the regional economic communities of the African Union, the New Partnership for Africa's Development, academic and training institutions, international organizations (WHO, World Bank, European Commission) and bilateral agencies (for example the United States Agency for International Development).

A core priority of the regional observatory is to support the establishment and strengthening of national HRH observatories. The Ethiopia Health Workforce Observatory was the first launched at the national level, followed by those in Ghana and the United Republic of Tanzania. Others are also in the process of being establishing in a number of countries, often with additional support from subregional groupings such as the East, Central and Southern African Health Community or the West African Health Organization. The national health workforce observatories work to bring together stakeholders for policy dialogue on HRH issues at the country level.

Box 12.3 Brazil Human Resources for Health Observatory

In Brazil, the national Human Resources for Health Observatory *(Observatório de Recursos Humanos en Saúde do Brasil)* comprises a network of some two dozen workstations that has been gradually developed across universities and state-level health departments. The work is led by a secretariat based in the Federal Ministry of Health in partnership with the WHO Country Office for Brazil, which provided financial and technical support.

The workstations focus on the following:

- HRH research oriented to specific topics and requests proposed by the Ministry of Health;
- sharing and disseminating the results of such research as a public good through different channels, but most notably via the observatory's web portal (39);
- joint activities and products, including regular meetings and newsletters;
- facilitating the entry of new members into the network;
- cooperating with other centres in Brazil and in other countries of the Latin America and Caribbean region in the promotion of the HRH research agenda.

Over the years, the different workstations have produced a number of thematic research reports, some of which have been compiled into a series of books. The network has also created several tools and instruments available in the public domain for HRH practitioners, such as methodologies for contracting public health workers, software for analysing health services labour markets and databases of health professions training institutions.

Box 12.4 Ghana Health Workforce Observatory

The Ghana Health Workforce Observatory started as an HRH technical team in 2005. With support from key stakeholders involved in health workforce planning, monitoring, training and management, the technical team developed a five-year plan to guide HRH development policies and strategies in the country (*40*). The team was eventually expanded and transformed into an observatory. Bringing on board many other national and international partners, it was established as part of the larger regional Africa Health Workforce Observatory (see Box 12.2). The Ghana observatory and its official web site were launched by the Deputy Minister of Health in December 2007 (*41*).

The Ghana observatory is composed of an advisory body, a technical committee and a secretariat with representation from the Ministry of Health and other government ministries and agencies, universities and other stakeholder institutions. Its objectives are to:

- strengthen the stewardship and regulation capacity of the Ministry of Health and its agencies;
- support and promote evidence-informed HRH policy-making;
- strengthen the knowledge base and use of data and information in HRH for policy and decision-making;
- increase capacity in evaluating and monitoring the human resource situation and trends in the health sector;
- provide a forum and a network for sharing experience among HRH data producers and users.

Since its inauguration the observatory has convened several events, including an HRH round-table conference in June 2008 that sought to instigate action on the five-year strategic plan and also identify gaps in the existing document. The role of the observatory would be to serve as machinery for the implementation of decisions agreed upon during this first (and any subsequent) stakeholder conference.

Source: Contributed by James Antwi, Deputy Director, Human Resources for Health Development, Ministry of Health, Ghana.

Table 12.2 Influences of selected achievements of the Brazilian Human Resources for Health Observatory on policy processes

Resulting policy decisions	Health workforce study or analysis
Incentives for health workers in rural areas	Profile of HRH stock and distribution: snapshot and cohort studies
Creation of a joint high-level working group with the Ministry of Health and Ministry of Education	Trends in education and training for health professions (expansion, mix)
Long-distance training programmes	Assessment of managerial skills of district (municipal) health teams
Policy dialogue and governmental proposal for regulatory norms (decree/law)	Contractual arrangements of the national health system in the public sector (federal and state levels)
Expansion of education and training programmes for selected health professions (including nursing and certain medical specialization programmes)	Assessment of workforce skills mix, with attention to selected health professions (e.g. team composition of dental workforce, including dentists, auxiliary dentists and dental hygiene technicians)
Permanent negotiation round table Regulation of new health professions	Professional practices and interests (e.g. conflicts in scopes of practice)

Box 12.5 Andean Human Resources for Health Observatory Network

The Andean Human Resources for Health Observatory Network *(Rede ObservaRH Edmundo Granda)*[a] was developed under the auspices of the Observatories of Human Resources for Health of the Americas and with the support of a technical cooperation agreement between PAHO and the Brazilian Government. The network gathers partners from national HRH observatories from six countries: Bolivia, Chile, Colombia, Ecuador, Peru and Venezuela. Its function is to support local actions among participating national teams, with specific activities depending on the internal capacity of each country (*42*).

What is the Andean Human Resources for Health Observatory Network?

The observatory network is a cooperative mechanism encompassing the countries of the Andean subregion. Its purpose is the exchange and joint generation of updated information, experiences and knowledge to make decisions related to the development of human resources in health as a strategic factor of the national health systems.

What are its objectives?

The objectives of the observatory network include:

- dissemination of strategic information that reflects the environment, advances and processes in HRH issues for the Andean countries;
- generation of a space for communication among stakeholders in HRH issues in member countries;
- presentation of different perspectives in the analysis of HRH challenges by the various interested parties, including universities, research units, governmental institutions, representative organizations (schools, unions), health services providers and health services users;
- Provision of timely and relevant information for HRH policy-makers;
- Follow-up on commitments for the fulfilment of regional goals for HRH development.

What does it cover?

- research and systematized experiences in matters of HRH;
- official data and statistics on human resources in the health sector;
- connections among participating workstations in the Andean observatory network, the Brazilian observatory network, and the regional network for the Americas based at PAHO headquarters.

How does it work?

The Andean Human Resources for Health Observatory Network:

- has a multicentric character, with each country assuming responsibility for the national contents;
- is anchored by a dynamic subregional node that is in continuous communication with the participating countries;
- has information management mechanisms in place at various levels (regional, country and institutional) for the intake, processing, updating and validation of HRH information;
- offers a common web-based platform for country administrators to post their national information.

a. The naming of the observatory network after Edmundo Granda (1946–2008) was agreed upon in memory of the distinguished Ecuadorian professor for his invaluable contributions to the field of public health, particularly HRH issues.

Source: Contributed by Mónica Padilla, Advisor, Human Resources for Health, Andean Subregion, PAHO.

12.4 Opportunities and directions

The development and sustainability of long-term, comprehensive HRH policies and plans is a common challenge for all countries to ensure the health workforce is prepared to meet current and future health system objectives and population health needs with equitable and adequate coverage. In many countries, this entails strengthening institutional capacity for defining appropriate policies and revising them periodically, which itself is dependent upon close cooperation among a wide range of stakeholders in the policy dialogue from the inception stages. This includes not only the ministry of health but also other sectors: finance department, public service commission, educational bodies, health professional regulatory bodies and associations, programme managers (in the public, parapublic and private sectors), development partners and health services users' groups. In order to achieve balance across the different perspectives, and being mindful that each country has specific challenges and contexts for workforce development, a common framework needs to be identified where collaborative efforts can be focused. To this end, this chapter has examined various strategies and mechanisms to ground HRH policies and strategies in scientific information and evidence.

The sustainable provision of timely, reliable and relevant data, information and evidence to improve HRH policies requires mechanisms to facilitate dissemination, access and use in policy-making processes. Different knowledge transfer platforms (such as EVIPNet) and cooperative mechanisms (health workforce observatories) can offer the opportunity for global and national health institutions to take advantage of the latest innovative and sound tools to support decision-making. Their value lies in the forums they extend to facilitate sharing of information and experiences and promotion of collaborations at the national, regional and international levels.

In particular, health workforce observatories can be a good mechanism to facilitate the steering and negotiating processes of cooperative partnerships. They can contribute to the strengthening of working relations and development of joint agendas among stakeholders. Their informational products help bring new evidence on the health workforce situation to a broader audience, often in a standardized way to foster better understanding and dialogue for comparisons and benchmarking. Perhaps most crucially, they can effectively raise the priority of HRH issues in the health development agenda; for example, through its working groups and mobilization efforts, the Observatories of Human Resources for Health of the Americas network has been credited as central in shaping the agenda for long-term, intentional and coordinated efforts for HRH development at the international, national, regional and subregional levels (*43*).

A number of critical success factors in moving forward with health workforce observatories and enhancing their benefits have been identified (*44*). They include:

- championing HRH issues in the country (including high-level political commitment and leadership);
- engaging all key stakeholders in joint planning and nurturing joint work;
- ensuring effective coordination;
- building awareness and capacity in HRH issues;
- developing approaches from different experiences;
- harmonizing standards, definitions and indicators for HRH profiling and analysis;
- supporting networks of HRH researchers;
- institutionalizing coordination mechanisms (mandate and legitimacy);
- creating a communication mechanism for tracing the available information for public use (for example a web site);
- mobilizing resources (technical and financial).

In summary, health workforce observatories and other knowledge transfer platforms present dynamic and evolving networks, which can only stand to benefit from increasing numbers of participating countries and institutions. Securing the initial commitment is often a challenge in establishing such mechanisms, but maintaining interest and commitment (often while coping with political changes and shifting donor priorities) is another critical concern. This requires regular dissemination of products that have proven to be useful, active sharing and exchange of information and knowledge, and continuous advocacy activities. The last-mentioned should including a strong, actionable communications strategy – aimed at policy-makers, managers, researchers and other relevant stakeholders inclusively – to advocate recognition of health workers as the foundation of health systems and implementation of effective strategies to directly address HRH bottlenecks, barriers and funding gaps at all levels.

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The **United States Agency for International Development (USAID)** provides support in developing countries to ensure that health systems are effective, efficient and equitable. An important component of USAID's strategy is to strengthen the ability of health workers to provide quality health care, notably by supporting initiatives for addressing workforce development and quality improvement. USAID works through cooperative agreements, contracts and partnerships with international organizations and other donor agencies to implement and maximize the effectiveness of its global health activities.

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Handbook on Monitoring and Evaluation of Human Resources for Health

with special applications for low- and middle-income countries

A skilled health worker can make the difference between life and death. It is our job to assure our citizens that health workers will be deployed when and where they are needed to save lives and that they possess skills that are adequate wherever they work, in public, private or not-for-profit establishments. This new Handbook is welcomed, as it gives us the tools we need to actively monitor and better manage the workforce. The core and common methods described here will help us all to enhance public confidence in the health system and enable the health workforce to be at the right place at the right time to make a difference, both for each of us as individuals and for our communities.

Sally K. Stansfield
Executive Secretary
Health Metrics Network

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