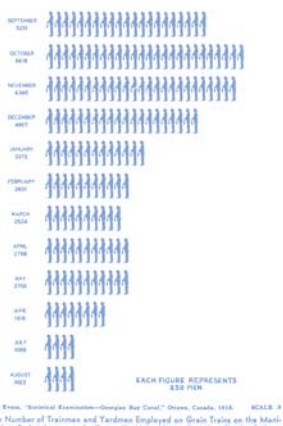


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Abbreviations and acronyms

CAR	Cumulative attrition rate
GDP	Gross domestic product
HRH	Human resources for health
UNDP	United Nations Development Programme
USAID	United States Agency for International Development
WHO	World Health Organization
WISN	Workload indicators of staffing needs
WPRO/RTC	Western Pacific Regional Office / Regional Training Centre
WWPT	Western-Pacific Workforce Projection Tool

Models and tools for health workforce planning and projections

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Introduction

For a number of reasons many countries lack the human resources needed to deliver essential health interventions, including limited production capacity, emigration of health workers, poor mix of skills and demographic imbalances. It is increasingly recognized that the effective mobilization of the health workforce is the single most important obstacle to improving the performance of health systems and achieving key health objectives, particularly in low- and middle-income countries. In addition, most countries – developed and developing – face significant public financing constraints for health service provision at a time when levels of public demand and expectation are rising.

The formulation of national human resources for health (HRH) policies and strategies requires evidence-based planning to rationalize decisions. A range of tools and resources exists to assist countries in developing a national HRH strategic plan (Capacity Project, 2008a; Nyoni et al., 2006; World Health Organization, 2008a, Birch, S et al., 2007). Such plans normally include short- and long-term targets and cost estimates for scaling up education and training for health workers, reducing workforce imbalances, strengthening the performance of staff, improving staff retention and adapting to any major health sector reforms (e.g. decentralization), while also being harmonized with broader strategies for social and economic development (e.g. the national poverty reduction strategy paper). They should also address the human resources development needs of priority health programmes and aim to integrate these into a primary health care framework, based on epidemiological evidence. A critical component is the identification of a set of explicit benchmarks and indicators and the means for their measurement. It is important to start by gathering accurate and comprehensive data about the HRH situation and health priorities, and projecting these over the next 5 to 20 years. The results of the projections should be used to inform the development of an action plan and a corresponding monitoring framework. A number of guidance materials are available to steer the process of identifying and adopting an appropriate monitoring and evaluation framework at <http://www.who.int/hrh/tools/en/index.html>.

Many ministries of health make projections, or at least short-term forecasts, of their future human resource requirements.¹ However, they are frequently made without specific reference to current or projected health service plans or education capacity within a given country. Few developing countries that are faced with health worker shortages have developed detailed HRH policies and strategic plans to guide investments in education and health, in order to build the required human

infrastructure of their health systems (Adano, 2006). Planning often consists of incremental changes in staffing on a year-to-year basis, using static standards and norms, combined with short-term (tactical) adjustments to services and staffing in response to emerging health crises. Frequently this results in a ministry of health that operates without a sustained or informed direction, and a workforce that is unresponsive to the specific health needs of the population it serves. HRH approaches may also be driven by the needs of targeted programmes or projects, for example those responding to the Millennium Development Goals. Such approaches tend to reinforce existing imbalances in the geographical and professional skills distribution across health facilities, and are often not based on an analysis of primary care and human resources needs.

Underlying all of this is a common misconception of what planning for the future is all about. When projections are made of future health workforce requirements and supply, they are based, firstly, on past and planned production and movements of the workforce and, only secondly, on predictions of how the national situation, health needs and delivery of services will change in the future. In making such projections, however, planners in the health ministry or other stakeholder agencies are faced with substantial uncertainties including:

- the nature of changes in the country situation (demographic, epidemiological, economic, etc.);
- the capacity (both current and projected) for implementing the proposed interventions;
- conflicting priorities between various government departments/ministries; and
- leadership turnover, as well as actions of government, civil society and other stakeholders that can impact on health systems development.

It is therefore critical that plans include mechanisms for adjustment according to changing ongoing circumstances. Making projections is a policy-making necessity, but is also one that must be accompanied by regular re-evaluation and adjustment. The primary purpose of projections is not to set distant targets, but rather to identify what actions need to be taken in the near future to ensure movement towards achieving longer-term objectives.

The objective of this paper is to take stock of the available methods and tools for health workforce planning and projections, and to describe the processes and resources needed to undertake such an exercise. Including this introduction, the paper is divided into four sections. In the next section, an overview of workforce projection models and their applications is presented. Then the operationalization of selected models is described in some detail. Lastly, the pathways by which projection results can be optimized to inform decision-making for policies and programmes are discussed.

¹ Workforce projections can be defined as estimates of what will happen in the future using calculations based on assumptions. Workforce requirements can be defined as the numbers and types of staff needed (in relation to demand or needs).

This review is not meant to be exhaustive, but illustrative of the tools and resources available and commonly used in countries, with special attention to computer-based tools available in the public domain. Some of the common challenges in securing essential data are also discussed, as are selected empirical findings from various countries and contexts. While many of the tools presented here have been designed with the expectation of being applied in low- and middle-income countries, the case studies also draw on examples from countries with developed market economies, in order to optimize the sharing of country experiences and learning best practices.

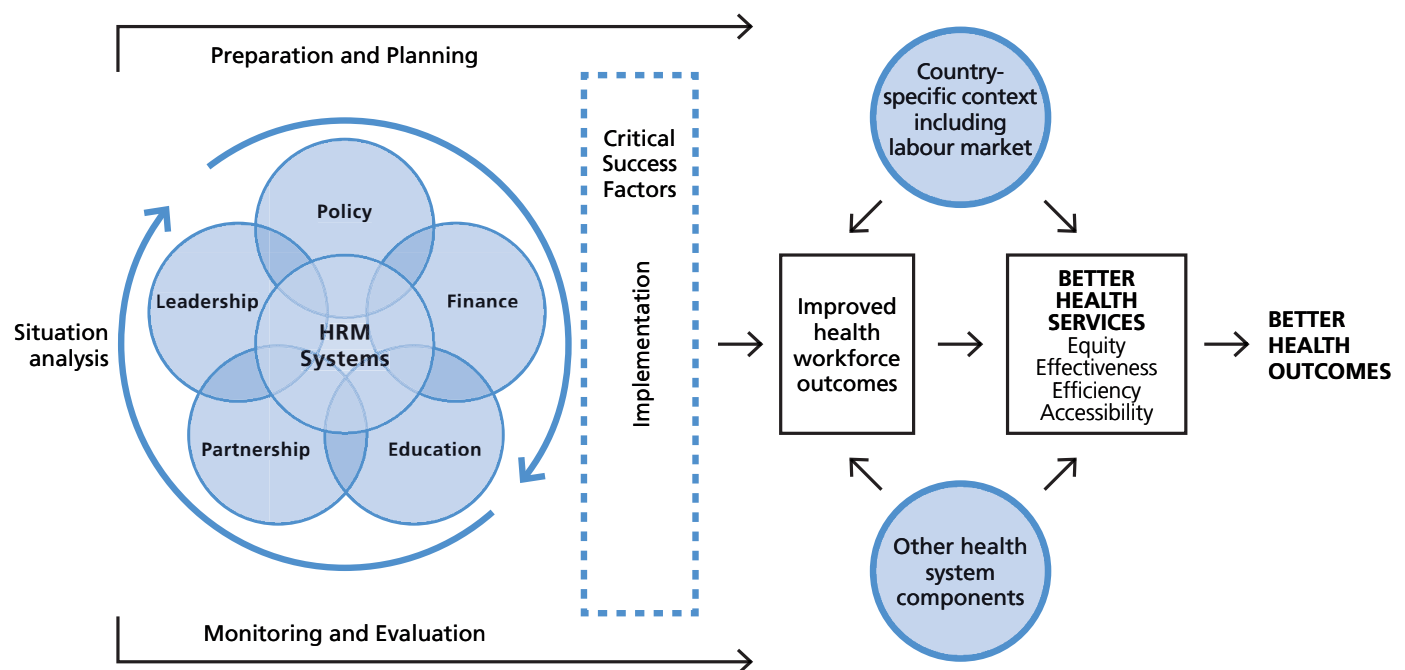
Comprehensive approach in health workforce planning

In an era of health development through partnerships and with renewed emphasis on primary health care, workforce development plans need to be increasingly formulated through a collaborative process. Ministries of health now need to plan health workforces for pluralist health systems and this cannot be done without including other sectors. For this approach to apply in a methodical way, WHO and several partners have developed the HRH Action Framework (see Figure 1).

It is designed to assist governments and health managers develop and implement strategies to achieve an effective and sustainable health workforce. The HRH Action Framework is a global effort to bring a shared approach and resources to bear on complex HRH issues at the country level. It reflects general agreement among global and country stakeholders on a comprehensive approach to HRH (Dal Poz et al., 2006).

The HRH Action Framework includes six action fields (human resource management (HRM) systems, leadership, partnership, finance, education and policy) and the action cycle which illustrates the steps/phases to take in applying the HRH Action Framework (situational analysis, planning, implementation and monitoring and evaluation (M&E)). To ensure a comprehensive approach to a given HRH challenge, all action fields and phases of the action cycle should be addressed, paying particular attention to a set of critical success factors (see <http://www.capacityproject.org/framework/> for guidance on involving various sectors during the development of a human resources development plan and indication of background materials for each area).

Figure 1. HRH ACTION FRAMEWORK



2

Overview of workforce projection models

The starting point for development of any HRH plan is a workforce situation analysis, which incorporates the major factors that may influence its size and shape in the future. This provides a base from which decision-makers and managers can explore the implications of internal and external changes on the need for and supply of human resources in the health system.

2.1 Linking workforce plans and projections

The purpose of workforce projections is to rationalize policy options based on a financially feasible picture of the future in which the expected supply of HRH matches the requirements for staff within the overall health service plans. Figure 2 provides an outline for identifying the elements through which this supply-requirements balance can be achieved.

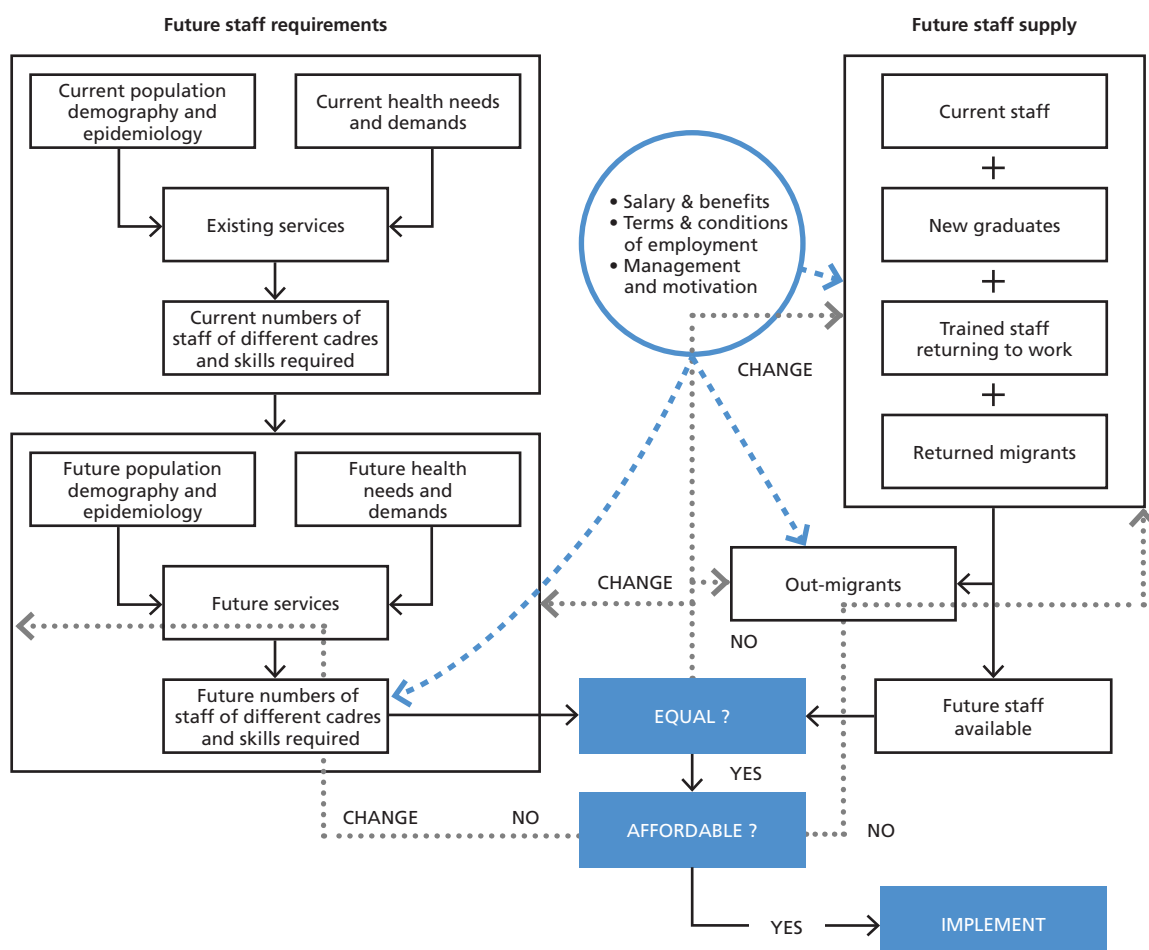
The process of simulation is the major tool for assessing the potential impact of various changes on future HRH metrics.

Typical questions that may need to be addressed as part of simulations include:

- What are the implications for staffing numbers and mix if salaries and benefits are increased with no budget change?
- What are the training and staffing implications of substituting one category of health worker in favour of another to alleviate particular shortages? What is the political feasibility of doing this type of substitution?
- What will be the impact of an expanding private health sector on the training and recruitment of new and existing staff in the public sector?

Health workforce models used as the basis for making projections focus on different aspects of HRH dynamics, including requirement projections, supply projections, workload and work activities, as well as staff development and movement. A variety of projection models have been developed and applied to support ministries of health and other stakeholders in their HRH planning.

Figure 2. OUTLINE CONCEPT FOR LINKING HEALTH WORKFORCE REQUIREMENTS AND SUPPLY PROJECTIONS



The appeal of using such models is their potential for exploring options about the future. Depending on the underlying assumptions, computational models can be distinguished by whether they are deterministic or stochastic. Deterministic models assume that an outcome is certain; in other words, they always deliver the same result for the same input values. These are, by far, the most commonly used for HRH projections for a number of reasons, including:

- they provide an unambiguous result that is easy to understand;
- they can be developed using commonly available computer software ; and
- they generally do not require advanced information technology programming skills (other than what would normally be expected of someone working in data processing and analysis).

Stochastic (or non-deterministic) models allow for the introduction of random changes and provide some means of introducing uncertainty during the planning process. This type of model delivers different results each time it is run and, over the course of multiple runs, will reveal the most likely outcomes and the most robust array of inputs. These models create more complex programming and analysis challenges. Examples in the literature of the use of stochastic models for HRH projections include Joyce et al., 2006; Song et al., 1994.

Regardless of the type employed, the use of models is an essential feature of making projections, and provides a mechanism for defining the nature of the issues to be addressed and testing and communicating possible solutions. In Section 3, the more commonly used deterministic models are assessed.

2.2 The determinants of workforce requirements and supply

countries of various levels of development have differing capacities for assembling and analysing the data required to assess the impact of changes in these variables over time. Differences in capacity will be reflected in the type of approach taken to project future workforce requirements.

The approaches commonly used to project future health workforce requirements include:

- (i) The workforce-to-population ratio method: This is a simple projection of future numbers of required health workers on the basis of proposed thresholds for workforce density (e.g. physicians per 10 000 population). This approach is least demanding in terms of data, but does little to explicitly address other key variables, aside from population growth, that can be expected to affect the type and scale of future health services provision and the associated workforce. This approach is based on the assumption that there is homogeneity at the levels of the numerator (all physicians are equally productive and will remain so) and of the denominator (all populations have similar needs, which will remain constant). Such assumption is clearly risky.
- (ii) The health needs method: This is a more in-depth approach that explores likely changes in population needs for health services, based on changes in patterns of disease, disabilities and injuries and the numbers and kinds of services required to respond to these outcomes. This approach entails collecting and analysing a range of demographic, sociocultural and epidemiological data.
- (iii) The service demands method: This approach draws on observed health services utilization rates for different population groups, applies these rates to the future population profile to determine the scope and nature of expected demands for services, and converts these into

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