preparing the

chapter three

health workforce

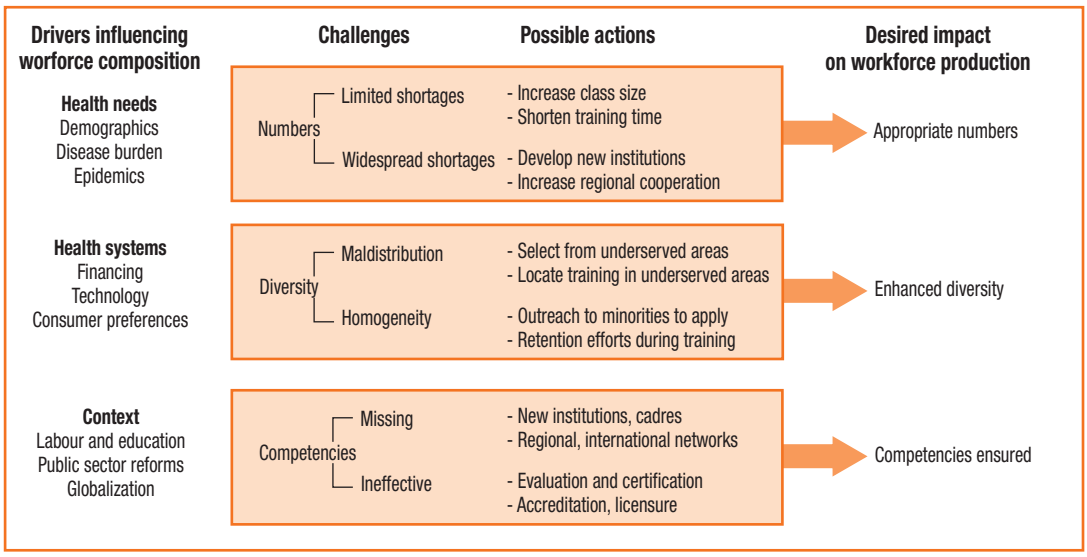
in this chapter

The previous chapter provided an overview of the enormous challenges facing the health workforce. Chapter 3 and the following two chapters deal with many of these challenges, using the framework of strategies to train, sustain and retain the workforce. This chapter is about preparation: getting it right at the beginning; giving the right training to the right people to create an effective workforce for the delivery of health care. It focuses on the entry of health workers into the workforce and on the health training institutions – schools, universities and training colleges – which provide them with the knowledge and competencies for the jobs they will be required to do.

WORKFORCE ENTRY: THE RIGHT MIX

Preparing the health workforce to work towards attainment of its health objectives represents one of the most important challenges and opportunities for health systems. Going beyond the traditional notion of skill mix, this chapter extends the concept of mix to include: how many people are trained (*numbers*); the degree to which they reflect the sociocultural and demographic characteristics of the population (*diversity*); and what tasks the different levels of health workers are trained to do and are capable of performing (*competencies*). Maintaining a reasonable balance in terms of numbers, diversity and competencies of the health workforce requires a thorough understanding of the driving forces and challenges that shape health and education systems as well as labour markets, as depicted in Figure 3.1. This understanding, however imperfect, can be used as a guide to policies and possible actions related to training and recruitment.

Figure 3.1 Getting the mix right: challenges to health workforce production

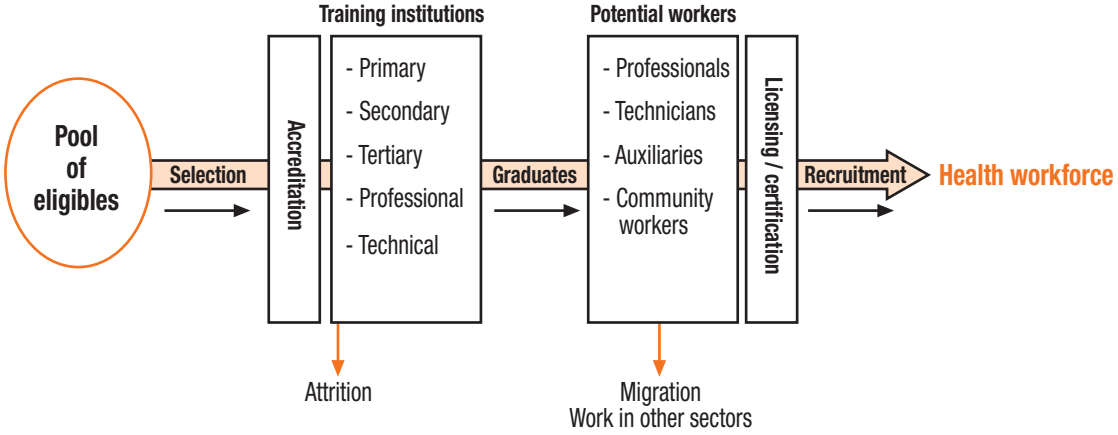


Source: *(1)*.

The "pipeline" for recruitment

The process that leads to health workers' entry into the workforce can be seen as one by which individuals progress through educational institutions and graduate with specific skills or degrees that facilitate their recruitment by employers to the health workforce (see Figure 3.2). This "pipeline" spans primary, secondary and tertiary education institutions and health services facilities that produce a range of workers from auxiliaries to technicians and professionals. Along the pipeline, criteria for entry to training institutions, attrition while training, and the markets for recruitment determine how many and what types of individuals move forward to become health workers. A focus on health training institutions and the markets for recruitment yields insights on how to manage entries to the health workforce in line with performance objectives.

Figure 3.2 Pipeline to generate and recruit the health workforce



TRAINING: THE RIGHT INSTITUTIONS TO PRODUCE THE RIGHT WORKERS

The 20th century produced sweeping changes to the health training institutional landscape. Flexner's seminal report in 1910 instilled a scientific approach to medical education that led to the closure of more than half the medical schools in the United States and strengthened public confidence that all doctors would meet similar standards of knowledge, skills and competencies *(2)*. Less than a decade later, demand for the training of field workers for public health campaigns was part of the rationale for the building of schools of public health in China, the United States, Yugoslavia and many other countries *(3)*. As part of a comprehensive plan for the development of essential health services, the Bhore report's recommendations led to an overhaul of India's health training institutions *(4)*. Other major reforms with widespread impact have emphasized new types of workers such as China's "barefoot doctors" *(5, 6)* or new ways of training health workers emphasizing problem solving *(7)*.

The 21st century is bringing new challenges, with many observers expressing concern that the institutional landscape is neither responding to current problems nor preparing for what lies ahead (see Box 3.1). Worldwide, increasing prevalence of chronic diseases, unanticipated disease outbreaks, and the race to meet the Millennium Development Goals (MDGs), place enormous expectations and responsibility on the role of health training institutions, as discussed in Chapter 2. A clearer understanding of the institutional landscape is required, combined with greater support for change, so that health training institutions are more effective in responding to these challenges *(9)*. Health training institutions undertake six key functions: stewardship or institutional governance; provision of educational services; selection and

Box 3.1 Is the future of academic medicine in jeopardy?

"Academic medicine" is often defined as a triad of research, clinical service, and medical education. It might also be defined as the capacity to study, discover, evaluate, teach, and improve health systems. But many commentators and reports worry that academic medicine is in crisis around the world. The lack of basic infrastructure in lower income countries means that it is floundering, if not absent. Even in high income countries, government investments may be wasted if structural changes, such as creating better and more flexible career paths, are not made. Academic medicine seems to be failing to realize its potential and leadership responsibility, at a time when the disease burden and poverty are increasing.

In response to these concerns, in 2003 the *BMJ*, the *Lancet*, and 40 other partners launched the **International Campaign to Revitalize Academic Medicine** (ICRAM), a global initiative to debate the future of academic medicine which focuses on two issues:

- **Redefining core values of academic medicine.** Even though many institutions state that they promote the goals of scientific excellence, innovation, and patient-oriented care, no consensus on a global vision for academic medicine exists. What impact does introducing commercial activity and corporate models into medical education have? Most medical students and trainees appear to hold strong views on the importance of values such as altruism, collaboration, and shared learning, and on the role of academic medical institutions to provide ethical leadership.
- **Developing a strategy to reform medical training and enhance diversity.** Overcoming significant disincentives for pursuing a career in academic medicine, across regions and settings, is a key point for action. Evidence suggests that even though the intellectual rewards are appealing, the lack of pay parity with clinical colleagues and the uncertainty of funding for research are major drawbacks. Others include absence of a clear career path, the lack of flexible training opportunities, and insufficient mentoring, which further detract from a supportive work environment. These factors are even more salient for women. Despite the fact that mentoring is associated with career advancement and satisfaction, publication in peer-reviewed journals and success with grant applications, it is almost non-existent in academic medical training.

Source: *(8)*.

Table 3.1 Functions of health educational institutions to generate the health workforce

Governance	Managing the stock and quality of institutions across education and health sectors
Educational services	Orienting curriculum content and process towards professional competencies
Selecting staff	Deploying good quality, well supported and motivated teaching staff or trainers
Financing	Ensuring adequate levels, fair financing for student access and efficient coordination of sources
Infrastructure and technology	Developing training sites and learning materials to accommodate diverse student needs
Information and knowledge	Generating information to inform policy and evaluate health workforce production

employment of staff members; financing of training; development and maintenance of infrastructure and technology; and generation of information and knowledge. These functions are described in Table 3.1. Together, they make up the system to support the generation of the health workforce and are explored in more detail in the following sections.

Governance

The specific priorities related to the number, range and quality of health training institutions are: the disciplinary mix of institutions, accreditation to maintain standards, management of the applicant pool, and retention of students through to graduation.

Getting the right balance of schools and graduates

Globally, educational establishments training health workers are heavily tipped towards the production of physicians and nurses: 1691 and 5492, respectively, in contrast to 914 schools of pharmacy, 773 schools of dentistry and 375 schools of public health. The WHO Eastern Mediterranean and South-East Asia regions have remarkably fewer schools of public health (not counting departments within other schools) than other regions (see Table 3.2). In too many countries, unfortunately, data on institutions are lacking or, if available, are not part of a comprehensive strategy

Table 3.2 Health professional training institutions, by WHO region

WHO region	Medical	Nursing and midwifery	Dental	Public health	Pharmacy
Africa	66	288	34	50	57
Americas	441	947	252	112	272
South-East Asia	295	1145	133	12	118
Europe	412	1338	247	81	219
Eastern Mediterranean	137	225	35	8	46
Western Pacific	340	1549	72	112	202
Total	**1691**	**5492**	**773**	**375**	**914**

Source: Mercer H, Dal Poz MR. *Global health professional training capacity* (background paper for *The world health report 2006*; http://www.who.int/hrh/documents/en/).

for the health workforce *(10)*. To be able to respond to shortages or surpluses by implementing such actions as altering class sizes or opening or closing institutions, it is first necessary to evaluate the current capacity to train different types of workers, the relationship between pre-service and in-service training, and the politics of changing the situation. The costs of inaugurating new training institutions may appear high in the short term, yet will need to be compared with the rate of returning foreign-trained graduates.

Strategy 3.1 Encourage training across the health care spectrum

Widespread shortages of public health and management cadres need to be tackled urgently through new approaches to leadership and feasible strategies. In South-East Asia, a public health initiative is serving as a catalyst for greater regional institutional capacity: in Bangladesh, the innovative nongovernmental organization BRAC has opened a school of public health to foster leadership in improving the health of

Box 3.2 The public health movement in South-East Asia: regional initiatives and new schools

Countries in South-East Asia have less than 5% of the world's schools of public health, but almost a third of the world's population. Thus, increasing public health training for the health professions is urgently needed in these countries. National, regional and international stakeholders are aligning resources and political will to make this happen with new and innovative approaches to creating schools of public health.

The South-East Asia Public Health Initiative was launched in 2004 with the aim of strengthening public health planning with five goals:

- position public health high on regional and national agendas;
- strengthen public health education;
- enhance technical cooperation on the development of national public health training institutions;
- establish a public health education institutions' network;
- facilitate the definition of an appropriate package of essential public health functions in countries.

In Dhaka, Bangladesh, the BRAC University James P Grant School of Public Health aims to train a cadre of professionals who will improve the health outcomes of populations in disadvantaged areas of the world.

- Its first 25 students are mostly from low income countries – Afghanistan, Bangladesh, India, Kenya, Nepal, Pakistan, the Philippines and Uganda – but also from the United States, and graduated in January 2006.
- Students learn through fieldwork centred around the public health problems of Bangladeshi communities.
- Graduates are expected to become leading public health practitioners, managers, researchers, educators and policy-makers, and the school will run an active placement service.
- Students and teaching staff benefit from a close collaboration with Bangladesh's Centre for Health and Population Research (ICDDR,B). Staff members are drawn from Bangladesh, the region and internationally, which adds to a stimulating environment, as do the prestigious academic partners from around the world.

In India, the newly created Public Health Foundation is mobilizing resources to establish five schools of public health spread across the country in Ahmedabad, Chennai, Hyderabad, New Delhi and Kolkata. The foundation reflects a public–private partnership based on the principles of strengthening existing institutions and enabling multiple stakeholders to work together. These new schools will offer:

- structured, multidisciplinary educational programmes combining standards of excellence comparable to the best institutions in the world and course content relevant to India's needs;
- shorter and longer term training of health and allied professionals drawn from people already engaged in occupations relevant to public health – employed in government, academic institutions or nongovernmental organizations – and people not currently employed who want to pursue a career in public health, such as potential health policy analysts and health managers;
- research on the prioritized health problems of India, including knowledge generation and knowledge translation components.

Sources: *(11, 12)*.

poor and disadvantaged population groups. In India, a new partnership between the Ministry of Health and key players from academia and the private sector, are planning to establish five schools of public health to address national public health priorities (see Box 3.2).

Accreditation: promoting competence and trust

Accreditation is an essential mechanism not only for assessing institutional performance but, more fundamentally, for securing public trust (see Chapter 6). Conducted primarily by ministries of education or delegated councils, accreditation requires facilities to generate evidence in support of performance objectives related to training. A recent survey of medical schools *(13)* shows that accreditation programmes are unevenly spread – they exist in three quarters of Eastern Mediterranean countries, just under half of the countries in South-East Asia, and only about a third of African countries. Furthermore, private medical schools are less likely than publicly funded ones to undergo accreditation procedures, a worrying fact in light of their growing role in educating the workforce (see Box 3.3). In relatively poor countries where efforts to scale up the health workforce using workers with less formal training are widespread, ingenuity is required to expand rapidly the effective capacity of training centres, including skills to carry out accreditation and the modest financial resources to sustain it. Efforts are also needed to extend accreditation and quality improvement beyond schools of medicine or nursing to include other faculties such as schools of public health *(19)*.

> “*Ingenuity is required to expand training centres' capacity*”

Managing admissions to enhance diversity

Entrance to most training programmes for health professions requires a secondary education. Many countries suffer from inadequate financing at this level, however, and struggle with high secondary school drop-out rates and low enrolment, especially among poorer groups. These factors severely limit the pool of people who can enter education programmes for health careers. The profiles of students entering health professions rarely reflect national profiles of social, linguistic and ethnic diversity, as students are disproportionately admitted from the higher social classes and dominant ethnic groups in society *(20, 21)*.

Box 3.3 Rapid growth in private education of health professionals

Private universities offering training for health professionals are rapidly increasing in low and middle income countries, reflecting a wider phenomenon of increasing private provision of technical and vocational education.

Recent data from around the world are indicative of this trend:

- In the WHO Eastern Mediterranean Region, between 1980 and 2005, private training institutions increased from 10% to almost 60% of all training institutions.
- In South America, between 1992 and 2000, Argentina, Chile and Peru experienced 60–70% increases in the number of medical schools, which is mainly a reflection of the growth in the private sector.
- In Karnataka State, India, 15 of 19 medical colleges are private.
- In the Philippines: in 2004, 307 of 332 nursing schools, were private institutions.
- In Côte d'Ivoire, 60% of all technical students are enrolled in private schools.
- In the Democratic Republic of the Congo between 2001 and 2003 the number of medical and nursing graduates doubled, largely as a result of a private sector-led increase in the training of health workers.

Sources: *(14–18)*.

Strategy 3.2 Develop admissions policies to reflect diversities

The growing diversity of patient populations, combined with a growing awareness of the importance of sociocultural and linguistic issues in providing care *(22, 23)*, has brought new attention to imbalances in the admissions processes. Along with admission quotas, other approaches to increase diversity include outreach to those who might not consider health professional training to be an option *(24)*; specialized programmes for under-represented students in secondary schools *(25)*; and expanded selection criteria to offer admission to students with personal attributes that make them well suited to providing health services *(26)*.

Retaining students through to graduation

It is not enough to have the right mix of people entering the educational pipeline – institutions must also carry these trainees to the end of their instruction *(27)*. Very little information from low and middle income countries is available about student attrition rates or the factors that contribute to attrition across institutions, types of training programmes and the sociodemographic profiles of students. The limited evidence available points to as much as 20–30% of the student body not completing courses because of poor academic performance, financial constraints and other personal circumstances including health problems and inadequate housing *(28, 29)*. Retention of nursing students in the United Kingdom and the United States is enhanced through a broad range of activities including academic advice, tutoring for non-native speakers, affordable child care, financial aid, career counselling and guaranteed placement upon successful completion of studies *(30–32)*. Mechanisms designed to boost student retention through to graduation should consider existing policies related to admissions criteria and selection procedures.

Educational services

The knowledge and skills of different kinds of health workers are determined by what they learn, so the organization and administration of the curriculum can be an important catalyst for change and innovation in health systems. Including a new course in a curriculum provides legitimacy to a subject or approach that can spawn changes leading to new disciplines, departments, schools and types of health workers, with huge impact on the practice of health care. Over the last 40 years, for example, clinical epidemiology has moved from the margins of medicine to lead the evidence-based transformation of health and health care *(33)*.

Strategy 3.3 Ensure quality and responsive curricula

In preparing the workforce, the curriculum is expected to meet standards that are often defined as core competencies. For example, all cardiologists must be able to read an electrocardiogram, while all public health specialists must understand an odds ratio. Beyond guaranteeing this core, the curriculum must also be responsive to the changing state of knowledge in health and the needs and demands emerging from health systems, including consumers' expectations. For example, growing recognition of powerful social forces that determine health and access to services has given rise to new courses on social status, globalization, public health ethics and cultural competency *(34–41)*.

Aligning what is being taught to what is appropriate – given the needs of specific constituencies or populations – demands careful attention. A standard curriculum

for nurses reflecting the realities of health care in a tertiary care setting may not develop the requisite competencies to respond to the needs of indigenous populations in remote areas. Likewise, the core competencies for a Masters in Public Health (MPH) in Europe may be expected to differ from what is required of an MPH in Africa. A recent study found that less than half of all training institutions in several African countries covered immunization adequately *(42)*, despite declining national immunization coverage rates. Many recommendations for change in curricula emerging from consensus panels and commissions are insufficiently sensitive to the challenge of implementation. New courses cannot find their way into the programme if faculty skills, key learning materials or institutional supports are not available.

Curricular decisions require more than just simple changes on paper, as their implications may challenge professional boundaries, hierarchies, responsibilities, and remunerated services. Changes in content – which constitute one dimension of orienting skills, numbers and diversity more generally – require broad participation not only by faculty members but also by professional organizations, regulatory bodies and patient groups *(43, 44)*. Engagement of these groups with their different interests may limit the scope and speed of decisions *(45)* but is essential to the legitimacy of curriculum change. The nature of curricular development is usually to acquire new content without being able to shed the old *(46)*. This one-way movement has led to overloaded curricula, often resulting in dilution of their focus and insufficient depth in the treatment of the subjects they cover.

> *"The workforce refrain in this report – train, sustain and retain – extends to teachers"*

Acquiring competencies to learn

In recognition of the rapid growth and rate of change of knowledge, and the dynamics of the workplace, there is increasing acceptance that training programmes cannot teach people everything they will need to know. The ability to acquire new skills and knowledge that prepare for lifelong learning is itself a core competency that curricula must nurture. In response, educational processes have been moving away from didactic teaching and towards student-centred and problem-based learning, with greater emphasis on "know how" rather than "know all" *(47)*. Students and their teachers express satisfaction with this shift, and faculty members enjoy teaching using problem-based learning *(48, 49)*.

Early exposure to clinical practice or public health service promotes competence by teaching students how to integrate and apply knowledge in practice settings, learn from role models, and experience interdisciplinary and team approaches to the provision of health services *(50, 51)*. Recent evaluations of this method, referred to as practice-based or apprentice learning, have demonstrated an increase in empathy towards people with illnesses, greater self-confidence and professional identity among students, and effective learning from the tacit knowledge of experienced practitioners *(52–54)*. An example of patient-focused practice in a school of pharmacy is given in Box 3.4.

Workforce of teachers

The workforce refrain of this report – train, sustain and retain – extends to teachers and faculty members in health professional education institutions. A lack of flexible training opportunities, insufficient mentoring, and career advancement difficulties for women when the "feminization" of medicine is increasing are among the key findings of the international campaign described in Box 3.1. Although published evidence is

scarce, the challenges faced by other trainers of health workers are not unlike those in academic medical faculties.

Typically, academic training centres have a three-part mission: teaching, research and service delivery. These three aspects should ideally receive equal attention and institutional resources, with staff being encouraged to contribute to each. The reality is that incentives are often heavily weighted in favour of research and service delivery, to the detriment of teaching.

In parallel, the imperative to generate income to support overhead costs through service delivery or research leaves education and teaching as the poor relations *(59)*. In South-East Asia, the trend towards following money is steering teaching towards more lucrative areas of specialty medicine, potentially decreasing the capacity of the health workforce to respond to basic public health needs *(60)*.

Understanding what motivates teachers and supporting them in ways that help increase motivation is important. A study in Australia, for example, found that clinical supervisors rated personal satisfaction as the main motivating factor to teach, followed by the opportunity to attract students to their own area of specialty *(61)*. Personal acknowledgment by the school through faculty appointments, subsidized continuing education, and access to information were other incentives to pursue

Box 3.4 Practice-based teaching, problem-based learning, and patient-focused practice all go together

It is crucial to encourage health professionals to undertake lifelong learning and develop relevant workplace competencies that can adapt to diverse challenges and populations. New trends in education aim to improve the health of the public by implementing this idea in training methods; this involves integrating three approaches and yields greater improvements in skills, attitudes and behaviours of health professionals than programmes that do not employ this integration *(55)*.

Practice-based teaching aims to:
- bridge the gap between academia and practice;
- benefit students, schools, agencies and communities;
- involve and develop critical thinking and problem-solving skills;
- be interdisciplinary, multidisciplinary and multidimensional;
- develop learning partnerships among academic staff, practitioners and students, to educate teachers, practitioners and researchers;
- incorporate experiential education, including critical reflection, observation and learning by doing *(56)*.

Problem-based learning complements practice-based teaching through:
- identifying the problem;
- exploring pre-existing knowledge;
- generating hypotheses and possible mechanisms;
- identifying learning issues and objectives;
- self study and group learning;
- re-evaluation and application of new knowledge to the problem;
- assessment and reflection on learning *(57)*.

Patient-focused practice:
- integrates teaching and learning with clinical practice;
- shares experiences of illness, disease and recovery with patients;
- understands varying needs for care;
- observes and participates in the ways in which different service providers work together to meet the needs of patients.

Training pharmacy students: the Clinical Partners Programme at the Ohio State University College of Pharmacy provides an active learning environment, offers a patient-focused model based on pharmaceutical care principles, and is an arena for applied research in pharmacy practice. Integration with clinical practice is undertaken at an early stage and sustained, with students attached to specific patients – called "longitudinal patients" – whom they follow through all stages of care. The programme offers multiple services and competency development, including anticoagulation management, diabetes self-management, cholesterol management, hepatitis C education, herbal product and dietary supplement consultations, medication management, smoking cessation, and wellness *(58)*.

teaching. In contrast, reluctance to teach was based on lack of rewards, perceived emphasis on research for promotions with little value placed on teaching, lack of teaching skills, the competitive agendas of clinical service and research, perceived inappropriateness of curriculum design, and heavy administrative load resulting from large classes.

Despite these disincentives, a strong commitment to teaching and mentoring has been observed among health professionals in many countries *(62)*. Twinning arrangements and long-term partnerships between academic medical centres in high income countries with universities and health facilities in low income countries, such as on HIV/AIDS care, have the potential to strengthen faculty development and enrich curricula and teaching materials *(63–66)*. Similarly, the appearance of networks of health training institutions – with virtual links – promises additional opportunities to share teaching resources *(67)*. An international foundation with the specific aim of supporting the development of an academic medical faculty is described in Box 3.5. Sharing experience of these and similar innovative arrangements gives the opportunity of evaluating what does and does not work.

Strategy 3.4 Encourage and support teaching excellence

The critical role of teaching staff in preparing the health workforce justifies a much more comprehensive strategy to support teaching excellence. Key components might include: more credible career tracks for teaching; career advancement for women faculty members, particularly in academic medicine; good material and technical support; reasonable remuneration; constructive feedback and evaluation; access to mentoring; training opportunities to improve teaching; and awards for teaching as well as innovation in curriculum content.

Financing

At present there are no normative guidelines on the amount of money that should be invested in generating the health workforce. Although there are scattered studies on the costs of training specific types of health workers *(68)*, in most countries there are no comprehensive data on the amounts countries and development agencies invest in pre-service and in-service training of the health workforce. Despite this evidence gap, it is clear that the level of financing and the way in which it is disbursed to health training institutions have important implications for the size, skills and diversity of the health workforce.

Box 3.5 Faculty development programmes: training trainers in professional health education

One goal of the **Foundation for Advancement of International Medical Education and Research** (FAIMER) is to create a global network of medical educators to develop and exchange information and ideas to improve education. It offers a two-year, part-time fellowship programme designed for international medical school educators. The first year consists of two residential sessions in the USA, and an intersession curriculum innovation project at the participant's home institution. The second year, completed from the Fellow's home country, involves mentoring an entering Fellow and active engagement in an Internet discussion group. The programme is designed to teach education methods and leadership skills, as well as to develop strong professional bonds with other medical educators around the world. FAIMER's educational programmes currently focus on serving medical educators and institutions in South Asia, sub-Saharan Africa and South America. The goal is to establish regional networks of educators who can develop such programmes locally. For more information, see http://www.ecfmg.org/faimer.

Box 3.6 From in-service to pre-service training: Integrated Management of Childhood Illness (IMCI)

Integrated Management of Childhood Illness (IMCI) was developed in the mid-1990s by WHO and other partners as a prevention and treatment strategy to ensure the health and well-being of children aged under five years around the world. The IMCI strategy consists of improving the case management skills of health workers, health systems generally, and family and community health practices *(71)*. It supports the training of physicians, nurses and other health workers to provide integrated care *(72)*.

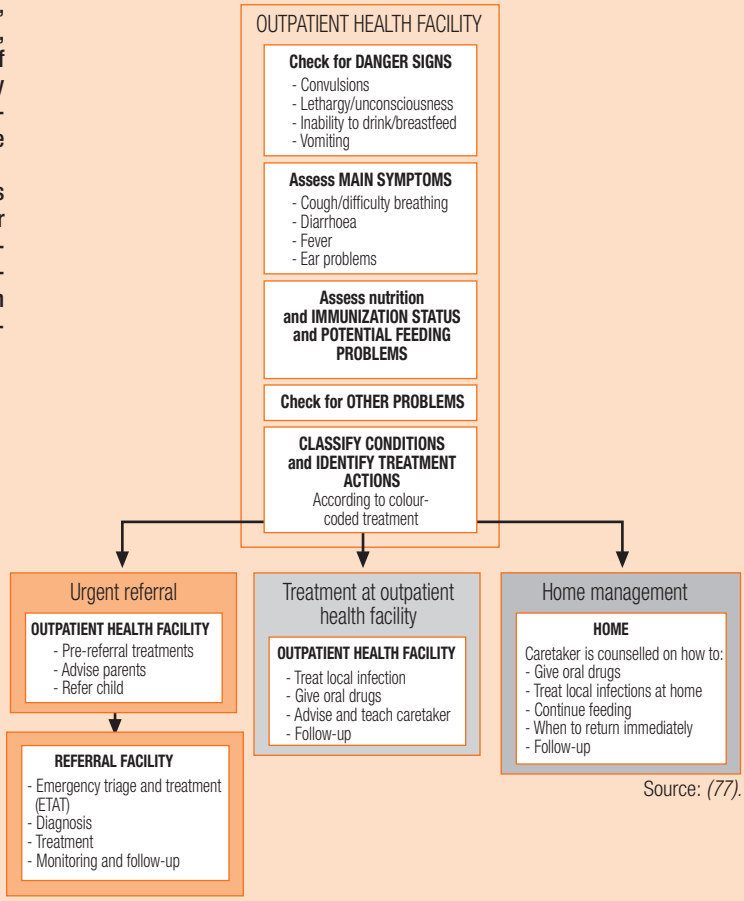
In-service training broadens existing health workers' skill sets primarily via an 11-day clinical training block with lectures, active teaching methods and accompanying practical aids all ideally catered to the specific type of health professional and the extent of their previous training.

Pre-service training is a more recent addition to IMCI, and aims to introduce these same core skills much earlier to health workers, as a core training module within health education curricula.

Benefits of pre-service over in-service training. The benefits of diverting more limited funds from *in-service* to *pre-service* training programmes are numerous, based on the shared experiences of health education institutions in all six WHO regions: Bolivia, Ecuador, Egypt, Ethiopia, Indonesia, Moldova, Morocco, Nepal, the Philippines, United Republic of Tanzania, Uzbekistan, Viet Nam and many other countries are involved in this exercise *(73–76)*. Key lessons learnt include the following:

- Funding for *in-service* IMCI training is difficult to secure from national and/or district health budgets, and the standard 11-day training presents substantial personnel time diverted from patient care, particularly for resource-constrained health facilities.
- Given limited trainers – as in-service trainers are more expensive yet often have high rates of turnover and attrition – *pre-service* training might lower costs and increase returns to investment by leveraging both limited training resources and captive student audiences.
- Even if instituted only for medical students, *pre-service* training would infuse future doctors with core IMCI principles to integrate eventually into their own practices, that of their peers and that of other cadres of health workers, since doctors are often responsible for training nurses, paramedics, and other auxiliary health workers.
- The *IMCI model chapter for textbooks* (see figure), developed by WHO and UNICEF *(77)*, facilitates the process of introducing IMCI content into locally authored and edited health training textbooks.

The Integrated Case Management Process



Source: *(77)*.

Drawing on the pipeline model of the ways in which health workers are recruited (Figure 3.2), the pool of applicants for health training is contingent more broadly on the level of financing of education. In poorer countries, very low enrolment rates for secondary and tertiary school attendance reflect inadequate financing of education *(69)* and may limit the overall size and socioeconomic diversity of the applicant pool, or compromise preparedness. In these contexts, improved financing of primary and secondary education is essential to increase the supply of health workers *(70)*.

The significant training costs associated with scaling up the health workforce, identified in Chapter 1, suggest that major increases in the funding of health training are critically needed in countries with severe health worker shortages. Higher levels of financing are required to increase training capacity (more institutions or expanded enrolment) and to improve quality with better infrastructure and highly motivated teachers. Redirecting some resources currently spent on in-service training to pre-service training would tap an important source of financing for resource-strapped establishments. Innovative efforts to integrate training for priority programmes into the curricula of health training institutions are demonstrating that this works (see Box 3.6). Achieving large increases in levels of financing and better coordination across sectors requires political commitment, donor support and negotiation with finance, education and other ministries (see Chapter 7).

Attaining the desired diversity of the workforce is linked, in part, to the way health training is financed. Private sector health training institutions are increasing in number worldwide (see Box 3.3). The decline in public sector subsidies of health training institutions raises concerns that students who are less well-off may avoid considering health care as an occupation, cluster in programmes where the training is less costly, take on paid work while training (at the expense of the acquisition of skills and knowledge), or find their career choices limited by indebtedness. Provision of fee exemptions, scholarships and loans are among the mechanisms to preserve access to training *(78)*.

Infrastructure and technology

The construction, repair and maintenance of buildings, special laboratories and other field sites, along with the acquisition of learning materials, are among the infrastructure requirements of health training institutions. Insufficiencies in infrastructure may place a significant constraint on the numbers of students who can be taught effectively and limit expansion of training, even for basic services *(79)*. A recent survey of psychiatric training infrastructure in 120 countries found that about 70 countries had grossly inadequate facilities *(80)*. Given the expense involved in building and maintaining health training institutions for very small countries such as small island states, regional training facilities offer a more affordable option to build up national capacities and leadership (see Box 3.7).

The physical location of training facilities can influence considerably the diversity profile of staff and students. Health training institutions are most often located in urban areas, and recognition of this urban bias has led to increasing efforts to build them in rural areas or create effective virtual links using information communication technologies *(81, 82)*.

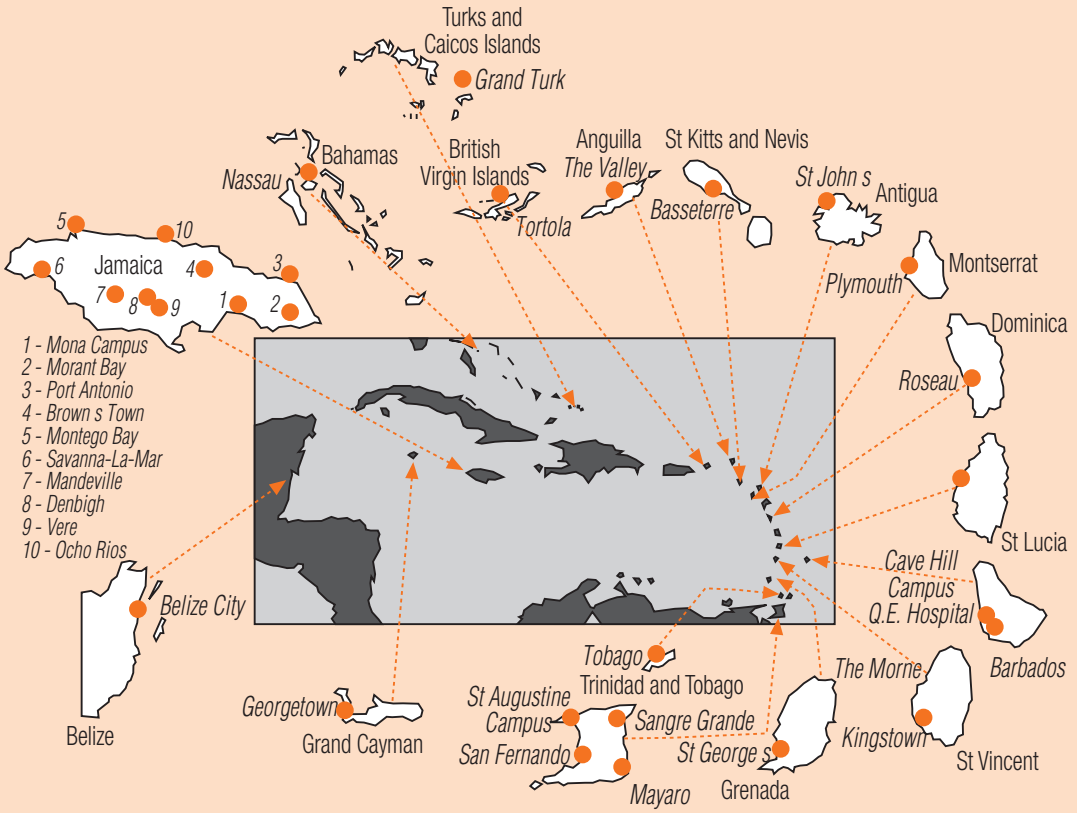
Box 3.7 Regionalization of training for health professionals: University of the South Pacific and the University of the West Indies

By working together, small island nations provide better access to education and training, build their own capacity and national leadership, promote values appropriate for the region, and become globally competitive. Regional institutions spanning large geographical areas need well-developed distance learning programmes, with flexible schedules to accommodate students needs. Advanced communication technologies are also required to reach students. Two successful examples of regional collaboration and integration in education offer a potential model for the education of health professionals in other areas of the world.

University of the South Pacific (USP). Established in 1968, USP spreads across 33 million square kilometres of ocean, an area more than three times the size of Europe. The university is jointly owned by the governments of 12 island countries: the Cook Islands, Fiji, Kiribati, the Marshall Islands, Nauru, Niue, Samoa, the Solomon Islands, Tokelau, Tonga, Tuvalu and Vanuatu. It has campuses in all the 12 member countries and the main campus, Laucala, is in Fiji. Although there is no faculty for health sciences, there are faculties for arts and law; business and economics; islands and oceans; and science and technology.

University of the West Indies (UWI). Established in 1948 as a College of the University of London, UWI is a regional training institution that gained full university status in 1962, with a current student population of 11 000. One of four different faculties, Medical Sciences offers a wide range of undergraduate, graduate and postgraduate programmes. Critical to the success of the university is the fact that graduates all return to their respective countries and work in the health sector as care providers, managers or policy-makers. One prime minister and four ministers of health in the region are graduates of the Faculty of Medical Sciences.

Sixteen countries support and benefit from the University of the West Indies



Strategy 3.5 Find innovative ways to access teaching expertise and materials

Access to textbooks and other quality teaching materials represents an important challenge and can be tackled in a number of ways. The PALTEX programme in Latin American and Caribbean countries screens for quality and offers volume discounts for a wide range of textbooks and basic diagnostic tools to over 600 institutions *(83)*. Information and communication technologies are being used in remote and resource-poor settings to access expertise in the faculty and diffuse training materials more effectively. The Health InterNetwork Access to Research Initiative (HINARI), set up by WHO with the committed involvement of major publishers, enables academic and research institutions, government offices and teaching hospitals, particularly in low income countries, to gain access to one of the world's largest collections of biomedical and health literature. Over 3200 full-text journals and other resources are now available free to health institutions in 69 countries, and for very low cost in a further 44 countries *(84)*.

Information for policy-making

Countering the dearth of information about the provision of educational and training services, students, programmes and graduates is a major priority. Analysis of the literature databases over the last 30 years reveals that the overwhelming focus of enquiry has been on education evaluation, teaching methods and the curriculum (see Box 3.8). Few of the countries with the most acute health worker shortages routinely collect and report data on the number of graduates, or even the number of training facilities for health professionals *(87)*. Even fewer countries break this information down subnationally in terms of the reach of different institutions, or by various socioeconomic attributes of students and graduates. Although important for description and comparison with normative standards, from a planning perspective numbers alone are just a start.

Strategy 3.6 Evaluate institutional performance, policy options and actions

To inform policy and decision-making related to health worker training, information about current and prospective performance is required. For example, an analysis from the Canadian province of Nova Scotia indicates that demand for physician services will grow faster than supply over the next 15 years if current policies on training remain unchanged *(88)*. To evaluate the performance of health training institutions, a national strategy to strengthen workforce data generation and synthesis is needed. These national data should be coupled with cross-national information on the costs and effectiveness of different ways of training and recruiting health workers, such as through observatories on human resources for health (see Chapters 6 and 7).

RETHINKING RECRUITMENT: GATEWAY TO THE WORKFORCE

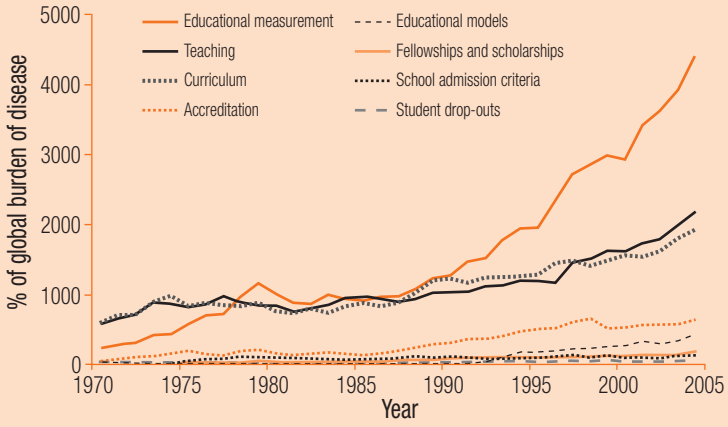
Recruitment represents entry into the formal health workforce. It is thus a critical function whose performance has to be managed at the levels of both the system and individual employers. Five performance outcomes are relevant to assess recruitment: numbers, competencies, background (diversity), location, and time.

Box 3.8 The evidence base to enhance performance of health educational institutions

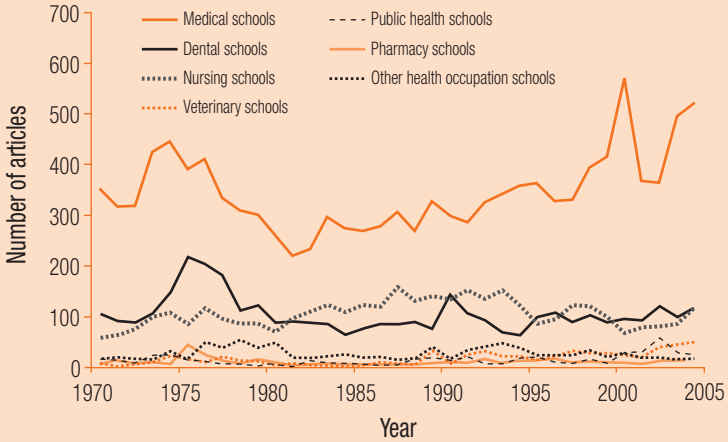
Figure (a) below shows that roughly 90% of all research articles on topics addressing health workforce training, indexed in PubMed between 1970 and 2004, focused on educational measurement, teaching methods or curriculum issues. The level of research on other topics that may provide important insights on enhancing skills, diversity and numbers – such as fellowships and scholarships, school admissions and student drop-outs – has remained marginal. More research on appropriate topics should be conducted in low income countries *(85)* and included within research syntheses.

The range of health educational institutions represented in research is too narrow. Figure (b) below shows that of all research articles indexed in PubMed on health professional schools for the same period, 55% concerned medical schools, 17% nursing schools and only 2% public health schools. Despite huge shortages in the health workforce across different classes of workers, each year research addressing health educational institutions remains heavily skewed towards medical schools, without significant increases in the number of articles addressing dental, nursing, veterinarian, public health, pharmacy or other health occupation schools. Similar findings are noted from the analysis of regional databases of scientific literature *(86)*.

(a) Research articles on topics addressing health workforce training[1]



(b) Research articles on health professional schools[1]



[1]As indexed in PubMed, 1970–2004.

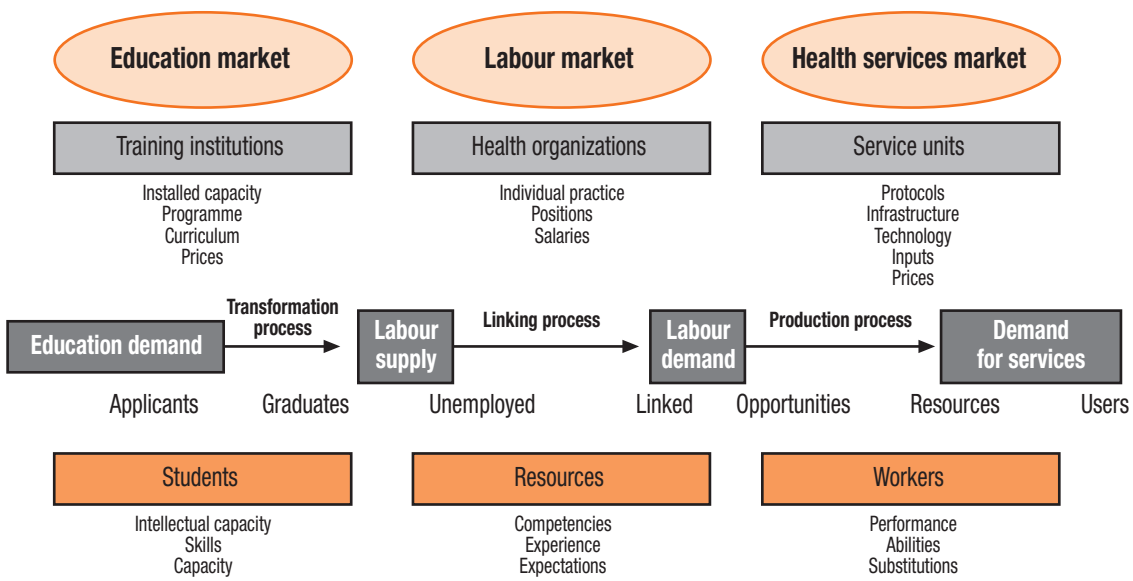
- ***Numbers*** recruited should reflect not only current needs and demands but also the extent of underemployment or low productivity (see Chapter 4) and attrition (see Chapter 5).
- ***Competencies***, the skills and experience of recruits, should reflect both the products of the educational pipeline and non-technical qualities (e.g. compassion and motivation) required for effective health services delivery.
- The ***background*** of health workers recruited and their positioning in the right ***location*** must be compatible with the sociocultural and linguistic profiles of the population being served.
- Recruitment must be ***time*** sensitive as in the case of the rapid mobilization of workers to deal with responses to humanitarian emergencies and disease outbreaks.

Imperfect labour markets

To a large degree, recruitment performance outcomes reflect the context of the broader labour market. Employers, on the demand side of the market, delineate the types and conditions of employment, while the workers, on the supply side, contribute their skills and their individual preferences about how and where to work. Market equilibrium is reached once labour demand equals supply of workers. Market equilibrium can coexist, however, with urban over-supply and rural scarcity of health workers as well as underserved population subgroups.

A more complex picture is illustrated in Figure 3.3: that labour supply reflects the outcome of demand for education, whereas labour demand reflects the outcome of demand for health services mediated through employers and financing mechanisms.

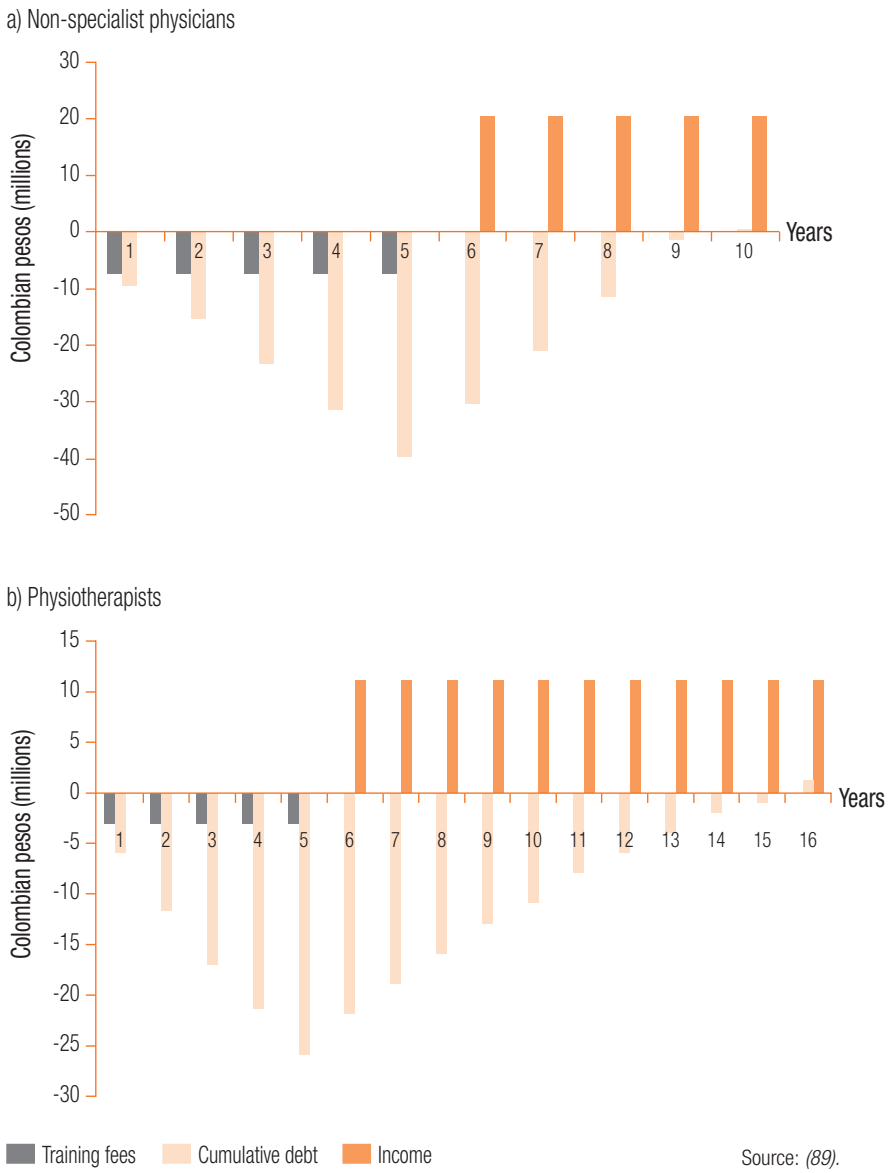
Figure 3.3 Relationship of education, labour and health services markets with human resources



Source: *(1)*.

This more realistic situation reflects values, priorities, constraints and competition across different sectors, institutional actors and individuals. Prospective students often consider how quickly they are able to pay off educational debts and work in a desirable location. Based on a study from Colombia, the minimum working time needed to pay off debt incurred during pre-service training is shown in Figure 3.4 for two different health workers *(1)*. At the same time, many governments pursue numbers-based recruitment strategies reflecting broader reforms, such as overall downsizing of the public sector or structural adjustment, rather than specific health priorities *(89)*. Standardized government wage and work conditions, which rarely accommodate health worker needs, also limit the public sector to hire and retain

Figure 3.4 Projected time to recuperate student investments in education, Colombia, 2000



Source: *(89)*.

workers in the health labour market.

In low income countries where trained health service providers are scarce, the public sector often competes to recruit workers with the private sector, international nongovernmental organizations and other donors, and multilateral entities offering attractive local or international employment packages. Dr Elizabeth Madraa, manager of Uganda's AIDS Control Programme, laments, "We keep training them and they go to NGOs or abroad, where they can get better money; then we have to train [more people] again." *(90)*. Recruitment agencies, contracted by large employers, further fuel this exodus. These imperfections necessitate strong leadership and actions that push forward health goals. The magnitude of health workforce migration and the unregulated practices of recruitment agencies have resulted, for example, in a growing number of ethical recruitment guidelines (see Chapter 5).

Strategy 3.7 Improve recruitment performance

Actions on several fronts can enhance recruitment performance. These relate to increasing information, striving towards greater efficiency, managing incentives for self-employed workers and increasing equity in the coverage of health services, and are expanded below.

Information. Recruitment needs, demands and performance are often not articulated well through the existing planning processes or survey instruments. Furthermore, poor recruitment capacity impedes efforts to scale up activities, respond rapidly or develop new cadres. Essential data inputs for recruitment management include vacancy rates and trends, gaps or surpluses in worker supply relative to regional demand, and performance metrics such as time taken to hire individuals or fill vacant posts. Gauging workers' perceptions of employers (see Chapter 4 on magnet institutions) provides the basis for recruiters to respond more appropriately to prospective employees' concerns.

> "Actions on several fronts can enhance recruitment performance"

Efficiency. The consequences of institutional inefficiency abound: sluggish bureaucracies encourage prospective recruits to withhold applications, quit prior to starting work or simply succumb to the low morale pervading many public health services; failure to define or establish posts for rural health workers has led new recruits to saturate urban areas *(91)*; and non-transparent, politically motivated appointments supplant the best recruits. To improve recruitment efficiency, bureaucracies must hire qualified human resources personnel who must be supported to manage recruitment according to best practices. Merit-based recruitment is a good example of best practice that is strongly correlated with the quality and integrity of government institutions. Complex issues such as the appropriate degree of centralization or decentralization of recruitment procedures, as in government-run health services, require context-specific analysis of costs, benefits and the political realities concerning the overall management of government-run health services across central, district and local levels *(92–94)*.

Management of self-recruitment. In many settings, health workers are not formally recruited by an employer but set up their own practice, i.e. are self-employed. Licensure, certification and registration of health workers as well as professional associations can help to manage and ensure competence of the self-employed health workforce. If these regulatory capacities are lacking or weak, then public trust may be eroded (see Chapter 6). In Bangladesh, for example, the risk of neonatal mortality was found to be six times higher when mothers consulted self-employed health

workers with no recognized qualifications, rather than health workers possessing recognized qualifications *(95)*. Where government reimburses self-employed health workers it can exercise influence over their numbers and locations as an important mechanism to achieve better balance between types of workers (for example generalists or specialists), where they work, and whom they serve.

Recruitment to areas of need. Recruitment represents an ideal opportunity to place workers where they are needed. Around the world, affluent urban areas are magnets for health workers, leaving urban slums and remote rural areas relatively underserved. Compulsory service or bonding arrangements following publicly subsidized education are widespread but are rarely evaluated *(96)*. There is growing evidence to suggest that local recruitment is a strong predictor of long-term staff retention *(97)*, thus highlighting the importance of training opportunities for people from rural and remote communities. Identifying respected members of such communities who are suitable for training and acceptable to the population, as in Pakistan (see Box 3.9), meets health service needs, training objectives, and diversity selection.

CONCLUSION

This chapter has reviewed issues associated with generating and recruiting the health workforce. The policy questions that have been discussed here – related to training, health workers' competencies, and labour markets – lead naturally to questions about the management of the existing health workers, the subject of Chapter 4.

Box 3.9 Pakistan's Lady Health Workers: selection and development of new cadres

Created in 1994 to improve health care access in rural communities and urban slums, Pakistan's National Programme for Family Planning and Primary Health Care has relied heavily on the performance of its 80 000 Lady Health Workers who provide basic health care to nearly 70% of the country's population *(98)*. The stringent selection criteria used include the requirement that they come from the community they will serve, be at least 18 years old, have successfully completed a middle school education and be recommended by the residents of their community as a good candidate. Married women are given preference. They receive 15 months of training (three months full time, 12 months part time), and study basics of primary health care and hygiene, community organization, interpersonal communication, data collection and health management information systems. Once installed, they report to a supervisor weekly.

Training is aligned to practice: they treat minor ailments and make referrals for more serious conditions, record the community's vital statistics, conduct basic health education, provide contraception to couples and serve as a liaison between their communities and the formal health system, helping coordinate such services as immunization and anaemia control, and provide antenatal and postnatal care to mothers. Recent research shows a clear connection between the presence of Lady Health Workers and improved community health *(99–100)*. Independent evaluations note that after Lady Health Worker cadres were introduced, substantial increases were documented in childhood vaccination rates, child growth monitoring, use of contraception and antenatal services, provision of iron tablets to pregnant women and in lowering rates of childhood diarrhoea *(101)*.

Key lessons:

- It is important to develop strategies to meet health workforce objectives with a spectrum of health workers.
- Combining appropriate recruitment, simplification of tasks, training and supervision can lead to efficient and effective new cadres.

REFERENCES

1. Ruiz F, Camacho S, Jurado C, Matallana M, O'Meara G, Eslava J et al. *Human resources in health in Colombia: balance, competencies and perspectives.* Bogotá, Ministry of Health, Cendex, Pontificia Universidad Javeriana, and Fundación Cultural de Artes Gráficas, Javegraf, 2001.
2. Flexner A. *Medical education in the United States and Canada. A report to the Carnegie Foundation for the Advancement of Teaching*. New York, NY, Carnegie Foundation, 1910 (Bulletin No. 4).
3. *Welch-Rose report on schools of public health*. New York, NY, Rockefeller Foundation, 1915.
4. *Report of the Health Survey and Development Committee*. Delhi, Government of India, Manager of Publications, 1946 (Chairman: Bhore).
5. Chang K. Health work serving the peasants. *Chinese Medical Journal*, 1966, 85:143–144.
6. The orientation of the revolution in medical education as seen in the growth of "barefoot doctors": report of an investigation from Shanghai. *China's Medicine*, 1968, 10:574–581.
7. Neufeld VR, Woodward CA, MacLeod SM. The McMaster MD program: a case study of renewal in medical education. *Academic Medicine*, 1989, 64:423–432.
8. International campaign to revitalise academic medicine (ICRAM) (www.bmj.com/academicmedicine, accessed 13 February 2006).
9. Kachur DK, Krajic K. Structures and trends in health profession education in Europe. In: Dubois C-A, McKee M, Nolte E, eds. *Human resources for health in Europe*. Brussels, European Observatory on Health Systems and Policies, 2005:79-97
10. Huddart J, Picazo OF, Duale S. *The health sector human resource crisis in Africa: an issues paper*. Washington, DC, United States Agency for International Development, Bureau for Africa, Office of Sustainable Development, 2003.
11. *South-East Asia public health initiative 2004–2008*. New Delhi, World Health Organization Regional Office for South-East Asia, 2004 (document SEA-HSD-278).
12. Reddy SK. Establishing schools of public health in India. In: Matlin S, ed. *Global forum update on research for health*. London, Pro-Brook, 2005:149–153.
13. *Survey of medical education accreditation capacity at national level, as part of the Strategic Partnership to Improve Medical Education*. Copenhagen, World Health Organization and World Federation for Medical Education, 2004.
14. Bansai RK. Private medical education takes off in India. *Lancet*, 2003, 361:1748–1749.
15. Kingma M. *Nurses on the move: migration and the global health care economy*. Ithica, NY, ILR Press, 2006.
16. Homedes N, Ugalde A. Human resources: the Cinderella of health sector reform in Latin America. *Human Resources for Health*, 2005, 3:1.
17. Van Lerberghe W, Essengue MS, Lokonga J-P. Les stratégies de réforme du secteur de la santé en RDC [Reform strategies for the health sector in the DRC]. Geneva, World Health Organization, 2005.
18. Verspoor A, Mattimire A, Watt P. A chance to learn: knowledge and finance for education in sub-Saharan Africa. Washington, DC, The World Bank, 2001 (http://www.worldbank.org).
19. Bury JA, Gliber M. *Quality improvement and accreditation of training programmes in public health*. Lyon, Fondation Mérieux and Association of Schools of Public Health in the European Region, 2001.
20. McLachlan JC. Outreach is better than selection for increasing diversity. *Medical Education*, 2005, 39:872–875.
21. *Recreating health professional practice for a new century – The fourth report of the PEW Health Professions Commission.* San Francisco, CA, The Pew Health Professions Commission, 1998.
22. Heaton T, Forste R, Hoffman J, Flake D. Cross-national variation in family influences on child health. *Social Science and Medicine*, 2005, 60:97–108.
23. Day RD, Gavazzi S, Acock A. Compelling family processes. In: Thornton A, ed. *The well-being of children and families: research and data needs*. Ann Arbor, MI, The University of Michigan Press, 2001:103–126.
24. Ara T (chair), Affirmative Action Committee. *Education in the professions: affirmative action and diversity in professions education*. San Diego, CA, American Educational Research Association, 2004.

25. Fincher RM, Sykes-Brown W, Allen-Noble R. Health science learning academy: a successful "pipeline" educational program for high school students. *Academic Medicine*, 2002, 77:737–738.
26. Howe A, Campion P, Searle J, Smith H. New perspectives–approaches to medical education at four new UK medical schools. *British Medical Journal*, 2004, 329:327-31.
27. Simpson KH, Budd K. Medical student attrition: a 10-year survey in one medical school. *Medical Education*, 1996, 30:172–178.
28. *Human resources for health, strategic plan, 2006–2010.* Lusaka, Ministry of Health of the Republic of Zambia, 2005.
29. Huda N, Agha S. Attrition in medical college: experience at Ziauddin Medical University in Pakistan. *Education for Health*, 2004, 17:232–235.
30. Holt M. Student retention practices in Associate Degree, entry-level dental hygiene programs. *Journal of Dental Hygiene*, 2005, 79:1–13.
31. Continuing concern at student nurse attrition rates in Northern Ireland [press release]. Royal College of Nursing (http://www.rcn.org.uk/news/display.php?ID=1136, accessed 7 February 2006).
32. Jalili-Grenier F, Chase M. Retention of nursing students with English as a second language. *Journal of Advanced Nursing*, 1997, 25:199–203.
33. Daly J. *Evidence-based medicine and the search for a science of clinical care*. New York, NY, University of California Press and Milbank Memorial Fund, 2005.
34. Singh-Manoux A, Marmot MG, Adler NE. Does subjective social status predict health and change in health status better than objective status? *Psychosomatic Medicine*, 2005, 67:855–861.
35. Melchior M, Goldberg M, Krieger N, Kawachi I, Menvielle G, Zins M et al. Occupational class, occupational mobility and cancer incidence among middle-aged men and women: a prospective study of the French GAZEL cohort. *Cancer Causes and Control*, 2005, 16:515–524.
36. Slovensky DJ, Paustian PE. Preparing for diversity management strategies: teaching tactics for an undergraduate healthcare management program. *Journal of Health Administration Education*, 2005, 22:189–199.
37. Reynolds PP, Kamei RK, Sundquist J, Khanna N, Palmer EJ, Palmer T. Using the PRACTICE mnemonic to apply cultural competency to genetics in medical education and patient care. *Academic Medicine*, 2005, 80:1107–1113.
38. Smith R, Woodward D, Acharya A, Beaglehole R, Drager N. Communicable disease control: a "Global Public Good Perspective". *Health Policy and Planning*, 2004, 19:271–278.
39. Beauchamp D, Steinbock B. *Public health ethics – New ethics for the public's health*. New York, NY, Oxford University Press, 1999.
40. Banerji D. *Poverty, class and health culture in India*. Prachi Prakashan, New Delhi, 1982.
41. Laurell AC. El estudio social del proceso salud-enfermedad en América Latina [Latin American social study on health disease process]. *Cuadernos médicos-sociales*, 1986, 37:3–18.
42. Mutabaruka E, Nshimirimana D, Goilav C, Meheus A. EIP training needs assessment in 12 African countries, 2002–2004. *Communicable Diseases Bulletin for the African Region*, 2005, 3:1–4.
43. Jones RB, Hampshire AJ, Tweddle S, Moult B, Hill A. The clinician's role in meeting patient information needs: suggested learning outcomes. *Medical Education*, 2001, 35:565–571.
44. Matillon Y, LeBoeuf D, Maisonneuve H. Defining and assessing the competence of health care professionals. A survey of 148 organizations. *Presse Médicale*, 2005, 34:1703–1709.
45. Buchan J. A certain ratio? The policy implications of minimum staffing ratios in nursing. *Journal of Health Services Research and Policy*, 2005, 10:239–244.
46. Jamshidi HR, Cook DA. Some thoughts on medical education in the twenty-first century. *Medical Teaching*, 2003, 25:229–238.
47. Jones R, Higgs R, de Angelis C, Prideaux D. Changing face of medical curricula. *Lancet*, 2001, 357:699–703.
48. Butler R, Inman D, Lobb D. Problem-based learning and the medical school: another case of the emperor's new clothes? *Advances in Physiology Education*, 2005, 29:194–196.

49. Dolmans DH, De Grave W, Wolfhagen IH, van der Vleuten CP. Problem-based learning: future challenges for educational practice and research. *Medical Education*, 2005, 39:732–741.
50. *Critical challenges: revitalizing the health professions for the twenty-first century – The third report of the PEW Health Professions Commission*. San Francisco, CA, The Pew Health Professions Commission, 1995.
51. *Duties of a doctor*. London, General Medical Council, 1993.
52. Littlewood S, Ypinazar V, Margolis SA, Scherpbier A, Spencer J, Dornan T. Early practical experience and the social responsiveness of clinical education: systematic review. *BMJ*, 2005, 331:387–391.
53. Dornan T. Osler, Flexner, apprenticeship and "the new medical education". *Journal of the Royal Society of Medicine*, 2005, 98:91–95.
54. Sturmberg JP, Reid S, Khadra MH. A longitudinal, patient-centred, integrated curriculum: facilitating community-based education in a rural clinical school. *Education for Health: Change in Learning and Practice*, 2002, 15:294–304.
55. Coomarasamy A, Khan KS. What is the evidence that postgraduate teaching in evidence-based medicine changes anything? A systematic review. *BMJ*, 2004, 329:1017–1021.
56. Atchison C, Boatright DT, Merrigan D, Quill BE, Whittaker C. *Demonstrating excellence in practice-based teaching for public health*. United States Department of Health and Human Resources, Health Resources and Services Administration, Bureau of Health Professionals, 2004 (http://www.asph.org/UserFiles/ASPH_10_2004.pdf, accessed 8 February 2006).
57. Walsh A. *The tutor in problem-based learning: a novice's guide*. Hamilton, McMaster University, 2005.
58. Mehta BH, Rodis JL, Nahata NC, Bennett MS. Advancing patient care through innovative practice: the Clinical Partners Program. *American Journal of Health System Pharmacy*, 2005, 62:2501–2507.
59. Gerbert B, Showstack J, Chapman S, Schroeder S. The changing dynamics of graduate medical education: Implications for decision-making. *Western Journal of Medicine*, 1987, 146:368–373.
60. PLoS Medicine editors. Improving health by investing in medical education, *PLoS Medicine*, 2005, 2:e424.
61. Dahlstrom J, Dorai-Raj A, McGill D, Owen C, Tymms K, Watson DA. What motivates senior clinicians to teach medical students? *BMC Medical Education*, 2005, 5:27.
62. Macq J, Van Lerberghe W. Managing health services in developing countries: moonlighting to serve the public? In: Ferrinho P, Van Lerberghe W, eds. *Providing health care under adverse conditions: health personnel performance and individual coping strategies*. Antwerp, ITG Press, 2000 (Studies in Health Services Organisation and Policy, 16:177–186).
63. *Strengthening health systems: promoting an integrated response for chronic care*. The Tropical Health and Education Trust (THET) (http://www.thet.org, accessed 13 February 2006).
64. Hern MJ, Vaughn G, Mason D, Weitkamp T. Creating an international nursing practice and education workplace. *Journal of Pediatric Nursing*, 2005, 20:34–44.
65. Ozgediz D, Roayaie K, Debas H, Schecter W, Farmer D. Surgery in developing countries: essential training in residency. *Archives of Surgery*, 2005, 140:795–800.
66. Wright S, Cloonan P, Leonhardy K, Wright G. An international programme in nursing and midwifery: building capacity for the new millennium. *International Nursing Review*, 2005, 52:18–23.
67. L'Institut de Santé Publique, d'Épidémiologie et de Développement (ISPED) (http://ead.isped.u-bordeaux2.fr, accessed 13 February 2006).
68. *Literature review on the costs of education of human resources for health*. Geneva, World Health Organization, 2003 (Department of Human Resources for Health working paper).
69. *Global education digest 2004: comparing education statistics across the world*. Montreal, UNESCO, Institute for Statistics, 2004.
70. Bhargava A. The AIDS epidemic and health care infrastructure inadequacies in Africa: a socioeconomic perspective. *Journal of Acquired Immune Deficiency Syndromes*, 2005, 40:41–42.

71. Naimoli JF, Rowe AK, Lyaghfouri A, Larbi R, Lamrani LA. Effect of the Integrated Management of Childhood Illness strategy on health care quality in Morocco. *International Journal for Quality in Health Care*, 2006, 18 (published electronically in advance of print publication).
72. *Integrated Management of Childhood Illness (IMCI)*. World Health Organization, Bangladesh (http://www.whoban.org/imci.html, accessed 8 February 2006).
73. *Pre-service training for the Integrated Management of Childhood Illness (IMCI): report of an informal consultation.* Geneva, World Health Organization, 1998 (http://www.who.int/child-adolescent-health/New_Publications/IMCI/Reports/Report-Informal_Consultation_1998.htm).
74. *Report of an intercountry training workshop on IMCI pre-service training*. Geneva, World Health Organization, 1999 (http://www.who.int/child-adolescent-health/New_Publications/IMCI/Reports/Report-Intercountry_Workshop_1999.htm, accessed 13 February 2006).
75. *IMCI pre-service training review and planning meeting*. Harare, World Health Organization Regional Office for Africa, Integrated Management of Childhood Illness (IMCI) Unit, 2002 (http://www.afro.who.int/imci/reports/pre-service_training_review_report.pdf, accessed 8 February 2006).
76. *IMCI pre-service training.* Cairo, World Health Organization Regional Office for the Eastern Mediterranean, Child and Adolescent Health and Development, 2004 (http://www.emro.who.int/cah/PreServiceEducation-IMCI.htm, accessed 8 February 2006).
77. *IMCI (Integrated Management of Childhood Illness) model chapter for textbooks*. Geneva, World Health Organization and United Nations Children's Fund, 2001 (http://www.who.int/child-adolescent-health/New_Publications/IMCI/WHO_FCH_CAH_00.40/WHO_FCH_CAH_00.40.pdf, accessed 8 February 2006).
78. Pechura CM. Programs of the Robert Wood Johnson Foundation to develop minority medical careers. *American Journal of the Medical Sciences*, 2001, 322:290–292.
79. Muula A, Mfutso-Bengo J, Makoza J, Chatipwa E. The ethics of developed nations recruiting nurses from developing countries: the case of Malawi. *Nursing Ethics*, 2003, 10:433–438.
80. *Atlas of psychiatric education and training across the world*. Geneva, World Health Organization and World Psychiatric Association, 2005.
81. Snadden D, Bates J. Expanding undergraduate medical education in British Columbia: a distributed campus model. *Canadian Medical Association Journal*, 2005, 173:589–590.
82. Wang L. A comparison of metropolitan and rural medical schools in China: which schools provide rural physicians? *Australian Journal of Rural Health*, 2002, 10:94-98.
83. Programa Ampliado de Libros de Texto y Materiales de Instrucción (PALTEX) [The Expanded Textbook and Instructional Materials Programme (PALTEX)]. Washington, DC, Pan American Health Organization and Pan American Health and Education Foundation, 2005 (http://www.pahef.org/pahef/pages/paltex, accessed 13 February 2006).
84. Aronson B. Improving online access to medical information for low-income countries. *New England Journal of Medicine*, 2004, 350:966–968.
85. Paraje G, Sadana R, Karam G. Public health. Increasing international gaps in health-related publications. *Science*, 2005, 308:959–960.
86. Nogueira RP. Trends and perspectives in health personnel research in the Americas. *Educación Médica y Salud*, 1985, 19:25–47.
87. *Tracking human resources and wage bill management in the health sector: a study to identify bottlenecks and constraints in the production, recruitment and management of health workers and funds for the wage bill in the public health services*. Kampala, African Medical and Research Foundation and Ministry of Health, 2005.
88. Basu K, Gupta A. Un modèle prévisionnel de l'offre et de la demande de médecins dans la province canadienne de la Nouvelle-écosse [A physician demand and supply forecast model for Nova Scotia]. *Cahiers de sociologie et de démographie médicales*, 2005, 45:255–286.
89. Joint Learning Initiative (JLI). Human resources for health, 2004: health human resources demand and management: strategies to confront crisis. Report of the working group on demand. Boston, MA, Global Health Trust, 2004 (http://www.globalhealthtrust.org/doc/WG3Report.pdf, accessed 8 February 2006).

90. Uganda leads way in innovative HIV/AIDS treatment. *Bulletin of the World Health Organization*, 2005, 83: 244–245 (http://www.who.int/bulletin/volumes/83/4/infocus0405/en/index.html, accessed 13 February 2006).
91. Egger D, Mouyokani J, Adzodo KMR. *Renforcement de la gestion sanitaire au Togo: Quelles leçons peut-on en tirer? [Strengthening management in Togo: what can be learnt?]*. Geneva, HDS/OMH, World Health Organization, 2005.
92. Ssengooba F. *Human resources for health in decentralized Uganda: developments and implications for health systems research*. Paper presented at: Global Forum for Health Research 9, Mumbai, India, 12–16 September 2005.
93. Bossert T, Beauvais J, Bowser D. *Decentralization of health systems: preliminary review of four country case studies*. Bethesda, MD, Partnerships for Health Reform, Abt Associates Inc., 2000 (Major Applied Research 6, Technical Report 1; http://www.localgovernance.org/documents/aid_healthdecentralization.pdf).
94. Seshamani V, Mwikisa CN, Odegaard K, eds. *Zambia's health reforms: selected papers 1995–2000*. Lund, Swedish Institute for Health Economics and University of Zambia, Department of Economics, 2002.
95. Mercer A, Mobarak HK, Haseen F, Lira Huq N, Uddin N, Larson C. *Level and determinants of neonatal mortality in rural areas of Bangladesh served by a large NGO Programme*. Dhaka, ICDDR,B Centre for Health and Population Research, Bangladesh Population and Health Consortium, 2005.
96. Reid S. Community service for health professionals. In: *South African health review 2002*. Durban, Health Systems Trust, 2002 (Chapter 8:135–160; http://www.hst.org.za/uploads/files/chapter8.pdf).
97. de Vries E, Reid S. Do South African medical students of rural origin return to rural practice? *South African Medical Journal*, 2003, 93:789–793.
98. National Programme for Family Planning and Primary Health Care, Lady Health Workers, Ministry of Health, Government of Pakistan (www.phc.gov.pk/template.php?id=27, accessed 13 February 2006).
99. Jokhio HR, Winter HR, Cheng KK. An intervention involving traditional birth attendants and perinatal and maternal mortality in Pakistan. *New England Journal of Medicine*, 2005, 352:2091–2099.
100. Douthwaite M, Ward P. Increasing contraceptive use in rural Pakistan: an evaluation of the Lady Health Worker Programme. *Health Policy and Planning*, 2005, 2:117–123.
101. *Evaluation of the Prime Minister's Lady Health Worker Programme*. Oxford, Oxford Policy Management, 2002 (http://www.opml.co.uk/social_policy/health/cn1064_lhw.html, accessed 8 February 2006).