

Scaling up

health workforce production:

a concept paper towards the implementation of
World Health Assembly resolution WHA59.23



**World Health
Organization**

Evidence and Information for Policy, Department of Human Resources for Health
Geneva, January 2007

© World Health Organization 2006

All rights reserved. Publications of the World Health Organization can be obtained from WHO Press, World Health Organization, 20 Avenue Appia, 1211 Geneva 27, Switzerland (tel: +41 22 791 2476; fax: +41 22 791 4857; email: bookorders@who.int). Requests for permission to reproduce or translate WHO publications – whether for sale or for noncommercial distribution – should be addressed to WHO Press, at the above address (fax: +41 22 791 4806; email: permissions@who.int).

The designations employed and the presentation of the material in this publication do not imply the expression of any opinion whatsoever on the part of the World Health Organization concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted lines on maps represent approximate border lines for which there may not yet be full agreement.

The mention of specific companies or of certain manufacturers' products does not imply that they are endorsed or recommended by the World Health Organization in preference to others of a similar nature that are not mentioned. Errors and omissions excepted, the names of proprietary products are distinguished by initial capital letters.

All reasonable precautions have been taken by the World Health Organization to verify the information contained in this publication. However, the published material is being distributed without warranty of any kind, either express or implied. The responsibility for the interpretation and use of the material lies with the reader. In no event shall the World Health Organization be liable for damages arising from its use.

Contents

Introduction..... 1

1. The magnitude of the health workforce crisis in Africa 2

2. Scaling up health workforce production 3

 2.1 Improving production capacity..... 4

 2.2 Producing a responsive skill mix 6

 2.3 Establishing a regulatory framework for professional training and practice 9

3. Implications of moving forward..... 9

References 11

Annex 1. African countries with critical shortages of health workers..... 12

Scaling up health workforce production:

concept paper towards the implementation of World Health Assembly resolution WHA59.23

Introduction

The *World health report 2006: Working together for health* recognized the centrality of the health workforce for the effective operation of country health systems. It also recognized that there is a chronic shortage of well-trained health workers worldwide, including both clinical and administrative and logistics staff at all systems levels.

There is increasing evidence that health worker shortages are interfering with efforts to achieve the internationally agreed-upon health-related development goals, including those contained in the Millennium Declaration and those of WHO's priority programmes (WHO, 2006d; Speybroeck et al., 2006). This health workforce crisis is severely hampering the ability of additional financial resources – made available through new modalities such as debt alleviation or the Global Fund to Fight AIDS, Tuberculosis and Malaria – to attain their goals. In many countries, there is simply insufficient human capacity to absorb, deploy and use efficiently the financing offered by global health initiatives (WHO, 2006f).

In poorer countries, while the population is increasingly ageing, rapidly urbanizing and still suffering from infectious diseases, the health services fail to respond to current and emerging needs. The chasm is widening between what is theoretically possible and what is actually being done. Success in bridging this gap will be determined in large measure by how well the workforce is developed in order to contribute towards more effective health systems (WHO, 2006d).

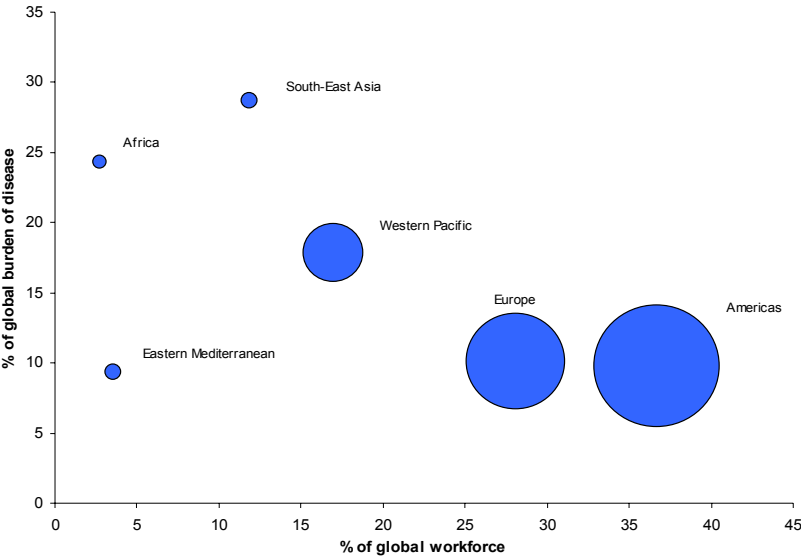
The *World health report 2006* estimated a shortage of 2.3 million doctors, nurses and midwives to scale up the health workforce to the levels required to strengthen health systems and accelerate progress towards attaining the MDGs (WHO, 2006d; Speybroeck et al., 2006). An absolute health workforce shortage is experienced in 57 countries. The cost of training and deploying the needed workforce worldwide would require an increase in health spending of about USD 10 per capita in each country by 2025.

The shortage is accompanied by inequalities in the global distribution of health workers, as illustrated in Figure 2, which provides the global burden of disease on the vertical axis and the percentage of the global health workforce on the horizontal axis. The size of the dots represents total health expenditure. The African continent bears 24 % of the global burden of disease but has only 3 % of the world's health workforce and less than 1 % of the world's financial resources for health, even when loans and grants from abroad are included. In contrast, the Region of the Americas, which includes Canada and the United States, bears 10 % of the global burden of disease; yet almost 37 % of the world's health workers live there and more than 50 % of the world's financial resources for health are spent there. Europe has a similarly high share of the world's human and financial resources for health.

The challenges of training an adequate number of health workers and deploying them where they are needed most requires massive investments and a high level of political leadership and commitment. This was recognized at the World Health Assembly in May 2006, which adopted a resolution on rapid scale-up of health workforce production (WHO, 2006b) as well as resolution WHA59.27, on strengthening nursing and midwifery (WHO, 2006c). The resolution WHA59.23 on rapid scaling up calls on both developed and developing countries for urgent, sustained and innovative action to address the health workforce crisis. Developing countries are encouraged to formulate health workforce plans and use innovative approaches to increase production capacity, including the use of information and communication technology.

This note discusses challenges and options in scaling up the production of skilled health workers and strengthening the health professions educational capacity of the countries in crisis, particularly in Africa.

Figure 1. Distribution of health workers by level of health expenditure and burden of disease, WHO regions



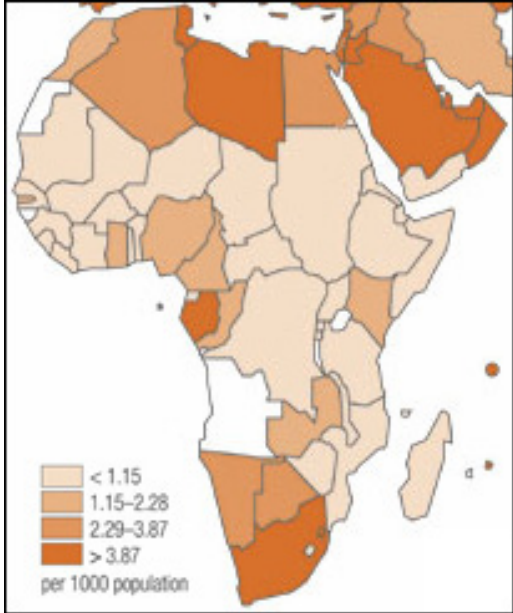
Source: WHO 2006d.

1. The magnitude of the health workforce crisis in Africa

WHO has identified a threshold in workforce density below which high coverage of essential interventions, including those necessary to meet the health-related MDGs, is very unlikely (WHO, 2006d). Based on these estimates, there are now 57 countries with critical shortages of skilled health workers. The WHO Africa Region alone, with 36 of these countries, must train and deploy more than an additional 800 000 doctors, nurses and midwives, which implies scaling up the current workforce in the continent by some 139%. Figure 2 shows the 36 countries on the African continent experiencing health workforce shortages; a list of these countries is presented in Annex 1.

Table 1 shows the skill mix and estimated shortage of other types of health workers in these countries, based on the current skill mix in 36 African countries experiencing shortages. If the future skill mix is to remain unchanged, the shortage of all types of health workers in the 36 African countries will likely reach close to 1.5 million health workers.

Figure 2. African countries with health workforce shortages



Source: WHO 2006d.

Table 1. Skill mix of health workers in 36 countries in Africa with shortages in 2004

Active workforce	Current stock	Current mix (in %)	Estimated shortage
Physicians	76 749	7%	108 100
Nurses & midwives	503 850	48%	709 900
Other professionals	28 965	3%	40 800
Other associate professionals	650 34	6%	91 600
Public and other health workers	48 676	5%	68 600
Front-line health workers	159 894	15%	225 300
Health management & support workers	171 621	16%	241 800
Total	1 054 789	100%	1 486 100

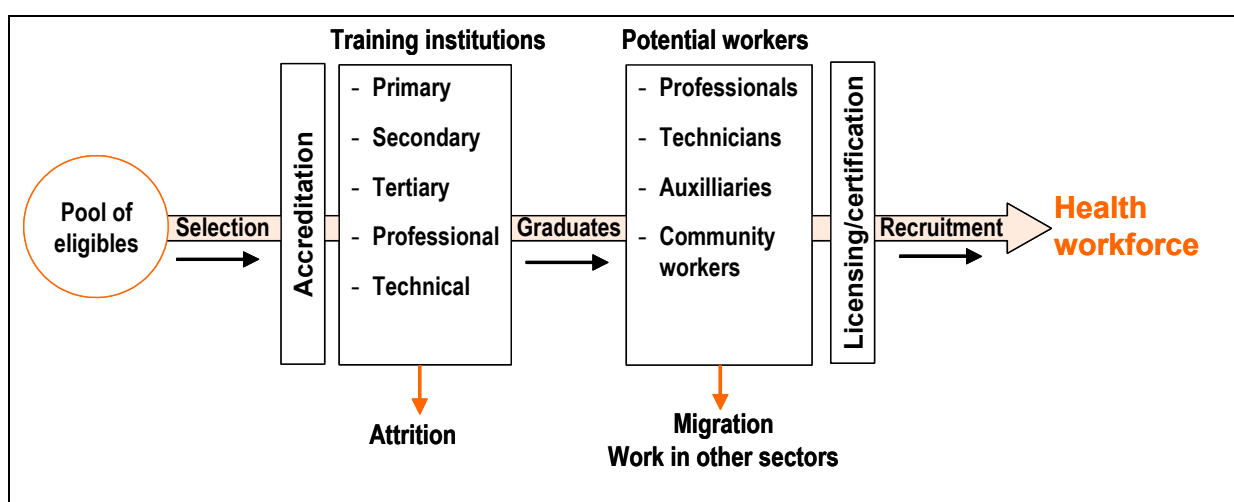
Source: WHO 2006d; WHO 2006a.

2. Scaling up health workforce production

"Making up the shortfall through training requires a significant investment. Assuming very rapid scaling up in which all the training is completed by 2015, the annual training costs range from a low of US\$ 1.6 million per country per year to almost US\$ 2 billion in a large country like India. The average cost per country of US\$ 136 million per year is of the same order of magnitude as the estimated cost of Malawi's Emergency Human Resources Programme. Financing it would require health expenditures to increase by US\$ 2.80 per person annually in the average country (the range is from US\$ 0.40 to just over US\$ 11) – an increase of approximately 11% on 2004 levels." (WHO, 2006d).

The concept of the pipeline for recruitment into the educational institutions provides the basis for discussing the various challenges at the different stages in the pipeline (figure 3). The educational process doesn't always work as smoothly as it may appear from the diagram, and in some countries the institutions within the pipeline don't even exist as such. So scaling up means not only increasing numbers of students, but ensuring that the "pipeline" exists and is functional, and the education and training programmes are adapted to the changing needs of the population.

Figure 3. Pipeline to generate and recruit the health workforce



As highlighted in the *World health report 2006*, scaling up the health workforce implies a significant investment in health workforce production; the magnitude of the shortage also implies a need to accelerate the process. In consequence, resources must be mobilized and used effectively.

The current annual capacity in Africa for training health professionals and duration of education is indicated in Table 2. Production could be increased by reducing the attrition as well as by increasing the size of the classes, both processes have to be decided according to local capacities.

Table 2. Annual number of graduates in Africa by category

Category	Number of graduates per year	Average length of education
Physicians	4 000	6 years
Professional nurse/midwife	12 000	2 years
Associate nurse/midwife	20 000	1 year
Other professionals	6 400	4 years
Other associates	13 600	1 year

Source: Mercer H, Dal Poz MR (2006).

Production is an essential component of a broader package that must be in place to ensure that the health workforce increases in number and is competent. This is what must be done:

1. improve production capacity;
2. identify the skill mix for rapid scaling up and future health workforce strategies;
3. establish a regulatory framework for professional training and practice.

2.1 Improving production capacity

A country's production capacity is the number that its training institutions (public or private) can train with the resources they have. Actions to improve production capacities fall into three key areas:

- developing physical capacities: having the physical infrastructure (buildings, classrooms, laboratories, dormitories) to accommodate trainers and trainees;
- improving technical capacities: ensuring that there are enough faculty to provide a range of teaching methodologies and appropriate educational content;
- improving organizational/operational capacities: reducing attrition from health professionals' educational courses while at the same time maximizing the number of graduates, increasing other inputs (books, equipment, pedagogical tools, etc.) and guaranteeing enough auxiliary staff to make training possible and effective.

Infrastructure improvement

Building and equipping educational facilities – although this requires heavy initial investment – offers opportunities not only for increasing pre-service education, but also for continuing professional development for health workers. Improving the supply of classrooms, accommodation and equipment, and teachers, means improving a country's long-term capacity to prepare and maintain a high-quality workforce.

The three options likely to be available for improving the physical capacity are:

- building new schools
- reforming, upgrading and networking existing schools
- outsourcing education through means such as involving WHO collaborating centres and establishing more collaborating centres in areas of greatest need.

It is likely that a combination of these options will meet needs. Building new health professions schools and upgrading existing ones also offer greater opportunity to create new categories of health workers, prepared in locally developed curricula and able to fulfil some of the more conventional physician and

nursing roles. Such categories may include health care assistants, able to assume basic nursing functions but – when supervised by nurses, nurse practitioners or medical assistants – able to take over some conventional medical functions. In addition, community health workers may be able to contribute to the delivery of public health interventions, especially in health promotion activities and giving support for home-based care to families and communities.

The costs of building new schools should be assessed, but within this option there are choices, too. In Africa it is not unusual to find one school of health sciences training all health workers together; this is a far cheaper option than building different schools for each profession. The building of new schools should be seen in the context of overall training. Schools normally are sited close to hospitals in order to give practical experience to students, but this has budget implications. As capital investment in infrastructure is costly for countries, the option of open universities and a distance-learning approach should be considered, depending on the levels of training.

Strengthening the faculty

Building and upgrading facilities is vital, but it is the faculty that makes those facilities function. The current exodus to richer countries of many qualified physician, nurse and midwifery teachers and researchers means that expansion of educational faculties in Africa is almost impossible. Any investment plan for education must therefore include attention to the availability of faculty.

The following are examples of ways to strengthen the faculty.

- Seconded staff can be brought in for a short time from institutions rich in resources; this serves not only to increase the teaching faculty available, but also to share ideas and research.
- Twinning of university faculties can strengthen capacity over a longer period through regular teacher exchanges.
- Migrant lecturers and researchers can be offered inducements to return for a semester to teach and help prepare new faculty members.
- New faculty can be prepared by on-the-job teaching and coaching, so that they are available for work with students even as they are learning.
- Part-time lecturer posts can be established, perhaps combined with clinical posts.
- Clinical placements for students in practice settings, especially in the community, can enrich student experience and develop responsiveness to the particular problems of rural, inner-city or remote-area residents, and at the same time can offer practitioners in those settings an opportunity for teaching, mentoring and coaching. Such placements are already part of most curricula. In some countries, model rural facilities are used for medical and nursing students to practise, as in the Mwachisompola Centre, rural Lusaka, Zambia.

These are just a few examples: creative thinking will result in more.

There are many agencies with considerable expertise in education, and it is anticipated that with improved networking, their expertise can be made more widely available. New modes of learning are creating many opportunities for sharing materials and for virtual interactions. Although Africa has developed slowly in this regard, there are now huge strides towards electronic telecommunications connectivity; these modes of learning should certainly not be ignored.

Strengthening organizational/operational capacities and performance

Access to teaching materials

Support for institutional development should also include the provision of medical and health science books. A successful example of this is the Expanded Textbook and Instructional Materials Program - PALTEX, which is a joint technical programme of the Pan American Health Organization (PAHO) and the Pan American Health and Education Foundation (PAHEF). Over a 30-year period, PALTEX has

provided nearly 4 million books to students and health workers at over 600 institutions in 20 Latin American and Caribbean countries. It also includes a series of practical manuals for front-line health workers. Other options include the use of an e-granary – an electronic library that can be provided at minimal cost – and mobile libraries.

Introducing new approaches and training methodologies

It is widely recognized that traditional methods of delivering education are grossly insufficient to educate and train the expanded numbers of health workers needed; innovative approaches must be introduced. On the other hand, educators and medical practitioners increasingly share the view that information and communication technology (ICT) has the potential to revolutionize how medicine is learnt by students and health care professionals.

Some recent evaluations suggest that ICT-based learning techniques have the potential not only to make medical education courseware more readily accessible than traditional methods, but also to enhance learning efficiency and be at least as effective as traditional modes of learning (Erkonem et al., 1994; Santer et al., 1995; Dayton et al., 2000). Internet-based group learning is expected to produce spectacular improvements in learning by students of the health professions. Distance education programmes also provide opportunities to increase capacities; improving ICT facilitates the expansion of such programmes.

Reducing attrition and producing enough graduates

Many health professions schools in Africa suffer from an exceptionally high student drop-out rate. Numbers may be cut by half between the first and second year, and there may be only a small percentage of graduates at the end of a course. This situation is worst in medicine, probably because of the length of the programme. Anecdotal reports blame the difficulty in meeting student fees for some of this attrition, but also the poor quality of classrooms, insufficient faculty to provide stimulating teaching and guidance in innovative learning methods, and lack of books and other equipment.

In some places the number of entrants is also falling, even though there are many applicants, and this, too, can be attributed to worsening conditions and reduced faculty, and therefore to the lack of interest in health professions overall. This is a matter of governance: high-level decisions are required to support education by paying or subsidizing fees for students; revitalized buildings and materials, including attention to technology; and an explicit valuing of learning and the contribution that it brings to the development of society. If issues of attrition were adequately addressed, the number of programme graduates might greatly increase in some places, even double (Gbary et al., 2006).

2.2 Producing a responsive skill mix

Achieving the right mix is one of the most important challenges and opportunities for the health system. The need for rapid scale-up forces us to go beyond the traditional skill mix and expand the diversity and competences of the health workforce.

However, long-term vision and plans are of utmost importance in ensuring fundamental solutions; production should be planned in accordance with the national health and health workforce policy and plans for the long run.

Some emphasis can be given to the mid-level categories with specific, if limited, training in the short term as one way to address the critical health workforce shortfall. This would require identifying the skill mix that would meet the needs of the health system while remaining within a country's production capacity.

Training of mid-level categories

Mid-level practitioners, particularly in low-income countries, include nurse practitioners, assistant medical officers, etc. They may have different titles and slightly different functions, but the main characteristic is that they can be trained in less time than doctors to perform some of the functions previously exclusive to doctors. There are many examples of the success of using mid-level categories in clinical services, from

the perspective of impact on both health outcomes and on costs of investment in training (see boxes 1 and 2).

An interesting example of scaling up is Brazil's national Programme for Training Auxiliary Nurses (PROFAE). During the last five years the Brazilian government, with the support of an Inter-American Development Bank loan, disbursed around USD 200 million to promote the development of schooling and the training of about 350,000 auxiliary health workers (123,000 certified auxiliary nurses). At the same time the Ministry of Health and the Ministry of Education contributed to strengthening the regulation of health personnel training and the provision of health sector labour market information.

Box 1. Training assistant medical officers: the técnicos of Mozambique

In 1984, a three-year programme was initiated to create assistant medical officers (*técnicos de cirurgia*) to perform fairly advanced surgical procedures in remote areas where consultants were not available (Vaz, 1999). The programme trains middle-level health workers in skills required for three broad priority areas: pregnancy-related complications, trauma-related complications and emergency inflammatory conditions. Two years of lectures and practical sessions in the Maputo Central Hospital are followed by a one-year internship at a provincial hospital, under the direct supervision of a surgeon.

Forty-six assistant medical officers were trained between 1984 and 1999, and the evaluation of their influence on quality of care is promising. For example, a comparison of 1000 consecutive caesarean sections conducted by *técnicos de cirurgia* with the same number conducted by obstetricians or gynaecologists indicated that there were no differences in the outcomes of this type of delivery or in the associated surgical interventions (Pereira, 1996). Many countries have now started or are considering similar programmes, based on their claimed cost-effectiveness. The potential impact of this type of health worker on both quality and efficiency of health care must continue to be evaluated (WHO, 2003).

Box 2. Nurse practitioners in Fiji: practice patterns and community acceptance

The impact of nurse practitioners in the remote areas of Fiji is considered positive: they play key roles in providing health care to rural and remote communities. The nurse practitioners currently perform many functions in Fiji's health centres, including: assessing and managing acute and chronic illnesses; managing health centre activities; conducting health screenings and community education sessions; making field visits to surrounding villages and settlements; performing surgical procedures, including tooth extractions and circumcisions; and delivering babies. The nurse practitioners prescribe medications deemed necessary to treat minor or common medical complaints through the use of national protocols (WHO, 2006e).

Nevertheless there are challenges to training mid-level practitioners. A regulatory framework must be developed, into which the scope of practice of the new category will fit, to ensure high standards of safe practice for the public. The public must accept the new roles, which may require that communication strategies be developed. Other health professionals must support and supervise the new categories, but initially they may not find the new roles acceptable. Finally, the scope of practice of new categories must gain broad agreement before an educational programme can be developed. Introducing new categories requires policies and plans to support them, as part of the broader framework of human resources development.

The contribution of community health workers

Community health workers (CHWs) were introduced in the early 1970s "to act as a bridge between the community and the formal health system; they may provide opportunities to increase effectiveness of curative and preventive services, and more importantly community management and ownership of health-related programmes" (Khassey, Taylor et al., 1998).

During the 1970s, in many countries CHW programmes followed a developmental approach as a way to expand access to primary health care, related to the Declaration of Alma-Ata. More recently, CHWs have been seen as an extension of health systems, particularly to reach out to population groups in underserved

areas. In general, their role is to act as agents of health promotion and health development. They can also provide local outreach of health services that might otherwise be unavailable; they often provide a link between communities and formal health services.

In terms of scope of practice, in general the CWHs have been used in one single activity, to perform a limited number of tasks, or as polyvalent workers with a wider range of tasks. Examples of the former are the traditional birth attendants (TBA) (Sibley L, Ann Sipe T, 2004). The latter are represented by the community health agent (Svitone et al., 2000).

The duration and content of training of CHWs has been found to vary from 10 days (in Tanzania: seven days' medical training and three days' literacy) to three to six months' one-off training, with subsequent refresher courses twice a year (Nigeria) or more comprehensive programmes (in Somalia: three weeks' training on clinical topics, in-service work for four to six months, a second course of four weeks on clinical topics and problem-solving, and a one-week refresher course every six months) (Lehman & Sanders 2004).

The optimal number of CHWs depends on their envisaged functions as well as policies and capacities of the countries. Some current ratios of CHW to population identified in some countries provide examples to these variations: the policy targets in Brazil are 1:150 families in rural areas and 1:250 families in urban areas (Campos et al., 2004); in Ethiopia the target is two per health post, serving about 5000 inhabitants (Centre for National Health Development in Ethiopia, 2006).

A meta-analysis of 15 studies showed that lay health workers offered promising benefits compared to more usual care in only a small number of interventions: promoting immunization uptake in children and adults; improving outcomes for selected infectious diseases, such as acute respiratory infectious and malaria in children under five years of age; and promoting breast-feeding. They also had a small effect in promoting uptake of breast cancer screening. It must be noted, however, that most of the studies included in the review were conducted in developed countries (Lewin et al., 2003).

There are also a few studies suggesting that CHWs could be cost-effective only when delivering specific health interventions or increasing coverage of a particular health intervention. In urban areas of Mexico and communities along the Amazon in Ecuador, CHWs were found to cost less and be more effective than outreach teams by health staff for vaccination programmes (Calderon, Ortiz & Mejia-Mejia, 1996; San Sebastian et al., 2001). In South Africa, community-based DOTS has been found more effective than hospitalization or sanitarium care (Wilkinson, Floyd & Gilks, 1997; Sinanovic et al., 2003); similar findings were reported from Kenya (Nganda et al., 2003), Uganda (Okello et al., 2003), and rural Bangladesh (Islam et al., 2002).

To be successful, the creation of new types of health worker – including CHWs – requires that they be valued for their distinctive contribution, rather than treated as second-class providers. This means offering them career development prospects, rotation to and from rural and underserved areas, good working conditions, the chance to work as a team with other professionals, and an adequate salary. New categories can be seen not only as a pragmatic response to current shortages, but as a cohort whose skills can be continually upgraded through in-service training, leading in the longer term to their incorporation in the more highly qualified professional categories. Evidence is growing that community members can carry out a wide range of health care tasks, including treatment of more complex conditions (Farmer, 2001a; Maher, 2003; Farmer, 2001b; Nsutebu, 2001).

Though the current evidence on the effectiveness of CHWs examined only small-scale projects, the evidence shows that CHWs are not a substitute for all health care workers, but they can be a highly effective complementary component of a care team (Lehmann & Sanders, 2004) if they are integrated into the existing health system and given adequate support in terms of infrastructure. They can expand the existing services to reach out to improve equitable access to previously excluded vulnerable groups.

However, if the quality and impact of the work of CHWs are to be improved, scaling up their use will require extensive and effective supervision, to be provided by nurses or other health workers based in the community. This extra workload may overburden the existing staff, who may already be in short supply.

2.3 Establishing a regulatory framework for professional training and practice

Schools, faculty and educational materials are part of an institutional landscape that normally takes generations to be established. Education works when there is a continuous interaction between schools, families, professional regulatory bodies and associations, libraries and role models. All these actors are part of an educational system based on rules and values that have worked and still work satisfactorily in almost every country.

A basic regulatory framework encompasses ethical, legal, economic and social interventions. Professional, governmental and community-based institutions could perform such interventions through licensing, registration and accreditation actions that are part of health professions' self regulation, government regulatory prerogatives and societal and patients' participation in quality and responsiveness issues.

Since an important part of any scale-up policy is linked with the concept of skill mix development, the regulatory framework could be either a constraint or a facilitator for innovative interventions. Regulatory institutions should offer conditions to improve the dialogue between educational institutions and national health needs instead of only protecting current professional demarcations.

Another type of example is the long-standing activities of the World Federation for Medical Education (WFME). Together with WHO, WFME has produced Global Standards in medical education (from basic education, postgraduate medical education, and continuous professional development), to ensure a minimum quality of medical education nationally and internationally (WHME, 2003a, 2003b, 2003c). Although they are intended for use by medical schools worldwide in institutional self-evaluation of their educational programmes and for use by peer review committees and bodies involved in recognition and accreditation of medical schools, they have been used in other health professions educational institutions as well. A strategic partnership has been established between WHO and WFME to improve accreditation capacities in Member States (WHO, 2005). The same approach could be adopted to update regulatory capacity in countries where there is a lack of institutional resources.

3. Implications of moving forward

The road map for scaling up the production of health workers must be embedded in broader health system policy development so that it is closely linked to a system-wide and sustainable approach to training, retaining and sustaining the health workforce. Moving from advocacy to action imposes responsibilities at both global and country levels, and has implications for the work of WHO.

Sharing responsibilities

The rapid scale-up of production and deployment of health workforce calls for a significant investment of funds in education and employment expansion. The international community – which has made commitments to supporting developing countries to attain the MDGs – must increase and target funding to support the critical contribution of the health workforce, despite the traditional difficulties associated with investing in recurrent costs, such as wages and incentives. A paradigm shift is called for, wherein workforce investment is recognized by donors as capital investment; the recent concerns with the shortages of health personnel expressed in the *World health report 2006* and the World Health Assembly resolutions emphasize the centrality of the contribution of health workers to good health.

This paper has extensively discussed the funding requirements for progress to be made. Without the cooperation of the international community in reconsidering funding frameworks and employment ceilings, it will be difficult – and sometimes impossible – for countries to make substantial progress.

Against this background, governments must take the lead to make progress in planning, formulating and implementing the required health workforce policies. Alliances of stakeholders within countries, backed by global and regional reinforcement, are needed to properly address the technical and political challenges of health workforce development.

Health workforce strategies and investment plans

In countries, formulation of comprehensive health workforce strategies is the first step needed in workforce development. It is vital to involve a broad range of stakeholders at the planning stages, including professional bodies, the public and private sectors and nongovernmental organizations.

The existing capacities for production must be assessed, exploring ways to rapidly scale up the health workforce, if this is needed, based on optimal skills and competence distribution. Pre-service and continuing education mechanisms can be used to increase the numbers and quality of practice of health workers. Estimating the costs of scaling up the workforce must include not only education but also pay, housing, incentives (for example, to attract workers to rural areas) and transport. Undoubtedly, joint work between the ministries of education, finance and health will be the key to supportive policy formation. A jointly constructed investment plan, setting out the financing of strategies over five to 10 years, will enable all the players to understand and monitor the expected progress towards a strengthened workforce.

Innovative thinking and approaches

There can be little doubt that most countries have, at some time, developed strategies to enhance the performance of their health workforce, and yet there are few examples of sustained success. New ways of thinking about this issue and innovative approaches to finding new solutions are emerging, and leadership that is ready to take risks is called for in putting into place fresh strategies accompanied by operational research to monitor and adjust progress.

For example, it is possible to use many practice settings for training, and to involve all types of health personnel. Preparing practitioners to be coaches and mentors can enhance their personal capacity as well as expanding the pool of trainers by not limiting them to the university or training school faculty.

Greater access to education at lower cost can also be achieved by regional pooling of resources and expanding the use of information technologies such as distance education and telemedicine. Many developing countries are leapfrogging into the use of sophisticated technologies, able to use technological advances made elsewhere. Consider, too, regional health sciences schools, with links to universities and health facilities in countries, where some economies of scale can be found.

References

- Calderon Ortiz R, Mejia-Mejia J. Estrategia de Contratacion Permanente dentro del Programa de Vacunacion Universal. *Salud Publica de Mexico*. 1996; 38(4): 243-8.
- Campos FE., Ferreira JR, de Souza MF, de Aguiar RAT. Innovations in Human Resources Development: the role of Community Health Workers Joint Learning Initiative – Working Group 6. March 2004
- Center for National Health Development in Ethiopia (2006). Assessment of working conditions of the first batch of health extension workers. Centre for National health Development in Ethiopia. Earth Institute at Columbia University, Addis Ababa, Ethiopia
- Dayton et al. (2000). Evaluation of an Internet-based decision-support system for applying the ATS/CDC guidelines for tuberculosis preventive therapy. *Medical Decision Making*. 2000;20(1):1-6.
- Erkonen et al. (1994). Longitudinal comparison of multimedia textbook instruction with a lecture in radiology education. *Academic Radiology*. 1994;1(3):287-92.
- Farmer P (2001a). Community-based approaches to HIV treatment in resource-poor settings. *The Lancet*, 358:404–409.
- Farmer P (2001b). Community-based treatment of advanced HIV disease: introducing DOT-HAART (directly observed therapy with highly active antiretroviral therapy). *Bulletin of the World Health Organization*. 2001;79:1145–1151.
- Gbary A et al (2006). Gbary A, Phiri M, Mercer H, Siloggwe E, van Niekerk JP. External evaluation of health professional education institutions in Malawi. Mission report. World Health Organization Regional Office for Africa, Brazzaville, Congo, 2006.
- Islam, MA, Wakai, S., Ishikawa, N., Chowdhury, AMR., Vaughan, JP. Cost-effectiveness of community health workers in tuberculosis control in Bangladesh. *Bulletin of the World Health Organization*. 2002; 80(6): 445-50.
- Kahssay, HM. Community health workers : the way forward. *World Health Organization*, Geneva. 1998.
- Lehman, U. Friedman I, Sanders D. 2004. Review of the utilization and effectiveness of Community-Based Health Workers in Africa. Joint Learning Initiative Working Group 4. February, 2004.
- Lewin et al. (2003). Cochrane systematic review. SA Lewin, J Dick, P Pond, M Zwarenstein, G Aja, B van Wyk, X Bosch-Capblanch, M Patrick. Lay health workers in primary and community health care. The Cochrane Database of Systematic Reviews 2006 Issue 2. Copyright © 2006 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.
- Maher D (2003). The role of the community in the control of tuberculosis. *Tuberculosis*, 83:177–182.
- Mercer H, Dal Poz MR (2006). Global health professional training capacity. Geneva, World Health Organization. Background paper for *The world health report 2006: Working together for health*. (available at <http://www.who.int/hrh>).
- Nganda et al. (2003). Cost and cost-effectiveness of increased community and primary care facility involvement in tuberculosis care in Machakos District, Kenya. *Int J Tuberc Lung Dis* 2003; 7(9 Suppl 1): S14-20.
- Nsutebu EF (2001). Scaling-up HIV/AIDS and TB home-based care: lessons from Zambia. *Health Policy and Planning*, 16:240–247.
- Okello D, Floyd K, Adatu F, Odeke R, Gargioni G. Cost and cost-effectiveness of community-based care for tuberculosis patients in rural Uganda. *Int J Tuberc Lung Dis* 2003; 7(9 Suppl 1): S72-9
- Pereira, C. (1996). A comparative study of caesarean deliveries by assistant medical officers and obstetricians in Mozambique. *British Journal of Obstetrics and Gynaecology*. 1996;193:508–512.
- San Sebastian M et al.(2001). Improving immunization coverage in rural areas of Ecuador: a cost-effectiveness analysis. *Tropical Doctor*. 2001; 31(1): 21-24.
- Santer et al. (1995). A comparison of educational interventions. Multimedia textbook, standard lecture, and printed textbook. *Archive of Pediatrics and Adolescent Medicine*. 1995;149(3):297-302.
- Sibley L, Ann Sipe T (2004). What can a meta-analysis tell us about traditional birth attendant training and pregnancy outcomes? *Midwifery*. 2004; 20(1):51–60.
- Sinanovic et al. (2003). Sinanovic E, Floyd K, Dudley L, Azevedo V, Grant R, Maher D. Cost and cost-effectiveness of community-based care for tuberculosis in Cape Town, South Africa. *International Journal of Tuberculosis and Lung Diseases*. 2003;7(9 Suppl 1): S56-62.
- Speybroeck N et al. (2006). Inequality in access to human resources for health: measurement issues. Geneva, World Health Organization. Background paper for *The world health report 2006: Working together for health*. (available at <http://www.who.int/hrh>).
- Svitone, EC; Garfield, R; Vasconcelos, MI; Craveiro, VA. Primary health care lessons from the Northeast of Brazil: the Agentes de Saúde Program. *Revista Panamericana de Salud Pública/Pan American Journal of Public Health*. 2000; 7(5):293-302.
- Vaz, F. (1999). Training medical assistants for surgery. *Bulletin of the World Health Organization*, 77:688–691.
- WFME (2003a). *Basic medical education. WFME global standards for quality improvement*. WFME Office, University of Copenhagen, Denmark, 2003.
- WFME (2003b). *Post-graduate medical education. WFME global standards for quality improvement*. WFME Office, University of Copenhagen, Denmark, 2003
- WFME (2003c). *Continuing professional development (CPD) for medical doctors. WFME global standards for quality improvement*. WFME Office, University of Copenhagen, Denmark, 2003.
- WHO (2003). *The World health report 2003: Shaping the future*. Geneva, World Health Organization.
- WHO (2005). *Implementing the WFME global standards for quality improvement of medical education*. Report to WHO, by the WFME Office. Internal report, available from the Department of Human Resources for Health, WHO, Geneva 2005.
- WHO (2006a). *Global Atlas of Health Workforce*. Geneva, World Health Organization.
- WHO (2006b). *Resolution WHA59.23. Rapid scaling up of health workforce production*. Geneva, World Health Organization.
- WHO (2006c). *Resolution WHA59.27. Strengthening nursing and midwifery*. Geneva, World Health Organization.
- WHO (2006d). *The world health report 2006: Working together for health*. Geneva, World Health Organization.
- WHO (2006e). (WPRO publication, submitted for the WHR2006). Manila, World Health Organization Regional Office for the Western Pacific.
- WHO (2006f). Opportunities for Global Health Initiatives in the Health System Action Agenda. Working paper 4. Making health systems work Series. Geneva, World Health Organization. WHO/EIP/healthsystems/2006.1
- Wilkinson, D., Floyd, K., Gilks, C. Costs and cost-effectiveness of alternative tuberculosis management strategies in South Africa—implications for policy. *South Africa Medical Journal*. 1997; 87(4): 451-5.

Annex 1. African countries with critical shortages of health workers

Country

Angola
Benin
Burkina Faso
Burundi
Cameroon
Central African Republic
Chad
Comoros
Congo
Côte d'Ivoire
Democratic Republic of the Congo
Equatorial Guinea
Eritrea
Ethiopia
Gambia
Ghana
Guinea
Guinea-Bissau
Kenya
Lesotho
Liberia
Madagascar
Malawi
Mali
Mauritania
Mozambique
Niger
Nigeria
Rwanda
Senegal
Sierra Leone
Togo
Uganda
United Republic of Tanzania
Zambia
Zimbabwe

Source: WHO. *The world health report 2006: Working together for health*. Geneva, World Health Organization, 2006.