

How to bridge the gap in human resources for health

Charles Hongoro, Barbara McPake

Human resources are the crucial core of a health system, but they have been a neglected component of health-system development. The demands on health systems have escalated in low income countries, in the form of the Millennium Development Goals and new targets for more access to HIV/AIDS treatment. Human resources are in very short supply in health systems in low and middle income countries compared with high income countries or with the skill requirements of a minimum package of health interventions. Equally serious concerns exist about the quality and productivity of the health workforce in low income countries. Among available strategies to address the problems, expansion of the numbers of doctors and nurses through training is highly constrained. This is a difficult issue involving the interplay of multiple factors and forces.

Introduction

Human resources have been described as “the heart of the health system in any country”,¹ “the most important aspect of health care systems”,² and “a critical component in health policies”.³ There is a consensus that despite their importance human resources have been a neglected component of health-system development in low income countries.

Much is needed of health sectors in the present decade. At least three and arguably all of the Millennium Development Goals will not be achieved without improvement in the functioning of health systems.⁴ Although substantial new resources are promised to health systems, many of the constraints cannot easily be resolved by money alone.⁵ A substantial portion of these new resources are earmarked for expanding access to HIV/AIDS treatment. For goals in this specialty to be achieved, primary care systems will need to provide a more complex intervention than has ever been expected of them, and partnership between primary and secondary levels of systems will have to become much more effective.

The present situation

A new, up-to-date, and complete country and international database of health workers has recently become available. A comparison of estimated ratios of health workers to population sheds some light on the issue (table 1). Disparities across countries are large.

These ratios should be interpreted carefully because the definition, training, and quality of professional groups differs from country to country. Nevertheless, these differences may mean that disparities in the data are underestimated when further qualifications and quality in general is taken into account. High income countries have three to four times more doctors and nurses than lower income countries per unit of population.

The importance of estimated health worker to population ratios has been questioned. Analyses done between 1978 and 2001 did not show evidence of a causal link between numbers of health workers and health outcomes such as mortality rates. However, a

re-analysis with more complete data that have become available shows strong evidence for such a link. Anand and Baernighausen⁶ state that human resources for health in aggregate terms matter significantly in explaining maternal mortality, infant mortality, and under 5 mortality rates. The analysis suggests that physicians matter most, and that the maternal mortality rate is most responsive to larger numbers of health workers, perhaps because maternal deaths are most directly associated with absence of appropriate medical intervention.

Estimates of the physician/nurse ratio have been produced from the same data (table 2). These ratios are surprising in that some low income countries in Asia and South America have ratios far larger than the global average. This anomaly seems to imply that investment in human resources for health has not only been insufficient in absolute terms but has also been inefficient in its distribution.

Although data are scarce, some evidence suggests that the pool of health workers in low and middle income countries has been depleted and that the situation may be getting worse. One reason is migration to greener pastures.^{2,8,9} Marchal and Kegels⁹ report that 27 000 highly qualified Africans, including doctors, emigrated between 1960 and 1975, an average of 1800 people per year. This annual rate had risen to 8000 by 1987, and to

	Physicians per 100 000 population	Nurses per 100 000 population
Bangladesh	23	24
India	51	61
Nepal	5	26
Pakistan	66	47
Sri Lanka	43	79
Papua New Guinea	5	53
Peru	117	67
Bolivia	73	32
Niger	3	27
Brazil	206	51
Global average*	170	399

Source: WHO⁷. *All countries in database.

Table 1: International comparisons of physician and nurse population ratios

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London School of Hygiene and Tropical Medicine, London, UK
(Charles Hongoro PhD,
Barbara McPake PhD)

Correspondence to:
Dr Barbara McPake, Department
of Public Health and Policy,
Health Policy Unit, London
School of Hygiene and Tropical
Medicine, Keppel Street, London
WC1E 7HT, UK
barbara.mcpake@lshtm.ac.uk

	Physician/nurse ratio
Bangladesh	0.96
India	0.83
Nepal	0.19
Pakistan	1.4
Sri Lanka	0.54
Papua New Guinea	0.09
Peru	1.74
Bolivia	2.28
Niger	0.11
Brazil	4.04
Global average	0.43

Source: WHO⁷.

Table 2: International comparisons of physician/nurse ratios

20 000 during the 1990s. Mangwende⁸ reports that 18 000 Zimbabwean nurses work abroad and Weiner and colleagues¹⁰ report that a third to a half of South Africa's medical graduates emigrate.

Migration from developing countries provides some compensation. Annual remittances from overseas employment in general have been estimated at US\$11.5 billion for India, \$6.5 billion for Mexico, and \$3.5 billion for Egypt.¹¹ In recognition of this fact, some countries such as the Philippines operate a managed migration policy and the Philippines itself is the largest source of registered nurses working overseas. Nevertheless, there are 30 000 unfilled nursing positions in the Philippines, and in countries that do not encourage migration, there are large numbers of vacancies too: in Ghana, 42.6% of doctor posts and 25.5% of nurse posts, and in Malawi 36.3% and 18.4% of doctor and nurse posts, respectively, are vacant.¹¹

Initiatives have been taken toward responsible recruitment policies but it is not clear whether they have yet had much effect. For example, the UK National Health Service has signed up to an ethical recruitment code that lists nearly every developing country as countries in which National Health Service managers should not recruit. Nevertheless, recruitment agencies find loopholes in the system.¹² An estimated 40 000 overseas nurses are reported to have registered in the UK between 2001 and 2004, mostly from the Philippines, South Africa, Australia, and India,¹³ and more than half of the new professional registrations in Britain were from overseas during 2001 to 2002.¹⁴ However, many of these data originate from media coverage, which can be inaccurate.¹⁵

Kurowski and colleagues¹⁸ assessed health-worker availability against health system needs in Tanzania and Chad. They showed, first that there are stark gaps between the number of health workers available and the number needed for provision of basic health services in these countries. On the basis of projections from these data, the researchers estimated that sub-Saharan African countries as a whole are facing an employment shortage of 720 000 physicians and 670 000 nurses. Second, the skills needed to implement basic packages of services

are either inadequate or set at unrealistically high standards, making them difficult to put into practice. Third, the rate of production of health workers lags behind losses from the system because of deaths, attrition, and, increasingly, emigration.

Factors causing present problems

A host of causes underpins this worsening situation. The HIV/AIDS epidemic is killing health workers. In 1997, Malawi lost 44 nurses as a result of AIDS, which is 44% of the annual number of nurses trained; in 1999 in Zambia 185 nurses died, which is 38% of the annual number of nurses trained in government institutions.¹⁹ Problems of absence from work and reduced productivity associated with the epidemic are also common. HIV/AIDS functions as a push factor in migration, increasing the numbers of health workers willing to work overseas.

Training capacity is especially low in Africa where problems are most pronounced. Two thirds of sub-Saharan African countries have only one medical school. Some have none.² Investment in educational infrastructure and educators is declining.^{2,20} Training strategies tend to focus on highly skilled but easily exportable workers,²¹ and to emphasise initial training over continued professional development.

Professional bodies that protect the interests of their members have played a part in defending training that promotes a level of specialisation inappropriate to the health needs of low and middle income countries. In Uganda, midwives may supervise less than one delivery per day on average in rural facilities, but there is a need for nurses who can do both this task and the regular nursing tasks involved in delivering primary care to a rural population. However, nurses' organisations have protested against moves toward the development of a new comprehensive nurse cadre that would fulfil this role.²² Despite these protests, it seems that the comprehensive role will be introduced. Professional bodies have at times promoted a continued breadth of practice that excludes lower level cadres from tasks they might appropriately do. The Brazilian Medical Council succeeded in securing legislation that prohibits any health professional, including university trained nurses, from prescribing any medicine. Until the law was passed both doctors and nurses were being trained in the algorithms of integrated management of childhood illness but this has now been restricted to doctors alone (Victoria C, personal communication). Regulations governing extended roles for lower-level health workers are quite common.²³

Poor working conditions and remuneration serve as additional factors that push health workers out of the public sector, the health sector, or the country. A survey of African health workers intending to migrate or already migrated showed that issues of salary and living conditions dominated, with 80% of health workers

surveyed in Cameroon citing living conditions, and 72% in Uganda and 89% in Senegal citing salary as reasons for intending to leave their country.²⁰ Average wages in a list of source countries were 17% of average wages in destination countries for nurses and 19% for doctors according to the data available.²⁰ It is not uncommon for health workers to engage in dual practice or solicit informal payments to supplement their income and this causes various further difficulties in accountability and equity of access to services.^{24,25}

In the same survey reported by Vujicic and colleagues,²⁰ 55% of health workers in Cameroon stated that they might be persuaded to stay by improvements in health care system management, and 64%, 68%, and 36% of health workers in Ghana, South Africa, and Uganda, respectively, stated that improvements in the work environment might persuade them to stay.

Training strategies that fail to emphasise continued professional development, together with poor working conditions and remuneration, affect not only the numbers of health workers as shown by the data in tables 1 and 2, but also the quality and performance of these workers. These dimensions are not easily captured in data that enable international comparison, but are widely understood to be at least as important as more quantifiable factors in explaining the performance of the health sector.

Available strategies to address human resource difficulties

Although substantial emphasis is often put on training as a solution to human resource difficulties, the constraints to effective strategies based on training are many. Africa's paucity of medical schools points to the need for innovative approaches to improve training capacity in the short term. It is tempting to suggest that countries should invest in medical training infrastructure when this is unlikely to be feasible in the short term, and unlikely to be the most cost-effective strategy in the long term. Medical schools are experiencing an exodus of specialist lecturers, who are in many cases providers of health services themselves. Clearly, investing in physical infrastructure without the requisite personnel will not produce desired results.

There are other difficulties in a strategy that emphasises medical and nursing training in developing countries. For example, it takes at least 5 years to train a doctor and 3 years to produce a nurse; a long time, in view of the immediate need for health workers, particularly in sub-Saharan Africa.

Strategies of bonding health workers to government after training have largely failed because health workers find ways to evade the system. This failure is partly explained by absence of punitive action and capacity to enforce penalties, and availability of buy-out options.²⁶ However, the strategy seems to work in

Thailand where bonding of doctors has been used in tandem with other incentive strategies.²⁷

Since developing countries would be ill-advised to develop their own new medical schools, one strategy might be to make increasing use of the existing capacity in the developed world. Twinning medical schools in developing countries with those in developed countries that are well resourced and can provide training support in the form of training staff in neglected areas is one option. Promotion of distance learning, particularly in non-clinical areas by public health schools in the developed world, is another option. However, a major constraint to these strategies is that preparing the workforce for developing country health sectors is neither the core interest nor the expertise of most institutions in the developed world. Sufficient funding on the international level would have to support these strategies to induce developed world institutions to play a substantial part, and such funding has high opportunity costs in developing countries themselves.

In view of these difficulties, a focus on auxiliary cadres provides an alternative strategy. Skills substitution, or improving use of available skills seems to be a practical response to skill shortages,²⁸ and might generate efficiency gains²¹ (WHO, 2000). Auxiliary cadres are often less employable abroad, especially if the qualifications involved do not easily translate into those used in the developed world, such as medical assistant or clinical officer. Conversely, nurse training is a highly saleable asset in the international market. One report from the Philippines suggests that doctors are retraining as nurses there in order to more easily emigrate (Ramanos P, personal communication).

Health workers who are normally judged auxiliary are increasingly becoming the main providers of health services in many countries.²⁸ In Africa, for example, nurse aids, medical assistants (with more basic training than a nurse), and clinical officers (the equivalent of medical assistants in Tanzania and Uganda) are doing essential medical tasks, especially in rural areas, despite the existence of professional restrictions and regulations. A good example is Malawi, where clinical officers are a major resource. They undertake surgical procedures and give anaesthetics as well as providing medical care. Table 3 shows the numbers of clinical officers or medical assistants in seven African countries compared with the number of doctors. These cadres usually have about 3 years of post-school education pre-service and 1 year or 18 months further training in post.²⁹

Research on use of auxiliary cadres is very restricted and much of the material is anecdotal.²⁸ Fenton and colleagues³⁰ explored the safety of clinical officers in Malawi by looking at outcomes in emergency caesarean section. They reported an overall maternal death rate of 1.3% — high, but much lower than the expected rate if services did not exist or delays had been long. Neonatal

	Clinical officers/medical assistants	Doctors
Ghana	442*	1600
Kenya	4300 (2300 public sector)	4900 (1200 public sector)
Malawi	442	315
Mozambique	627*	278*
Central African Republic	182	121
Uganda	750	671
Zambia	1458	900

*Public sector numbers only. Source: simplified from Dovlo (2004).²⁹

Table 3: Estimates of practising auxiliaries and doctors in selected African countries

mortality was 13%. None of the anaesthetists was medically qualified, but there were much better outcomes when these practitioners had received anaesthetics training; the percentage of maternal deaths was 0.9% compared with 2.4%. No substantial difference in outcome was shown between surgeons who were medically qualified and those who were trained initially as clinical officers.

A growing number of reports from developed countries show that nurses can be safe and effective in place of doctors in primary care.³¹ Mid-level midwives and other skilled health workers have been shown to provide high quality surgical abortion.³² The general fear is that use of non-medically qualified health staff will affect quality and safety. While this is an important issue, it should be remembered that even if new professionals are less safe than doctors, they might be much safer than nothing. The available studies are very limited, and therefore care should be taken in interpreting results, but what evidence exists suggests that, at least in some circumstances, well trained clinical officers can safely substitute for doctors in the provision of important but well understood procedures.³³

Community health workers act as the first line of contact with the health system in most low and middle income countries. These workers are selected community members who are trained in general primary care functions (—eg, treatment of diarrhoea, immunisations, health education and nutrition, environmental sanitation, and malaria control) or in specific activities (—eg, DOTS supervision, family planning, rehabilitation, and nutrition).³⁴

The restricted evidence available on the use of community health workers from Gambia, South Africa, Tanzania, Zambia, Madagascar, and Ghana suggests that these workers enhance the performance of community level health programmes and some evidence shows that they are cost-effective.^{35,36} Health services such as condom distribution, food and hygiene counselling, distribution of insecticide impregnated bed nets, and nutrition education can safely be provided by trained community workers. However, there have been concerns about the sustainability of such strategies.³⁷

Traditional birth attendants have been shown to provide essential and sometimes the only delivery services to rural women.³⁸ Training more traditional birth attendants in midwifery raises the number of attended deliveries.³⁹ However, evidence on effectiveness is mixed. Training traditional birth attendants has been shown to heighten knowledge and, to an extent, practice, but does not result in observable reductions in maternal or infant morbidity and mortality.³⁶

Staff retention and support

The way the health system is funded, organised, managed, and regulated affects health workers' supply, retention, and performance. The contested policies of public and health sector reform can be construed as attempts to craft the incentive environment to produce improved performance.

There is some reported evidence that use of provider incentives and enablers can improve performance under specific circumstances. For example, Eichler and colleagues⁴⁰ show that indicators of achievement that were used to establish bonus payments improved when a bonus system was introduced in Haiti, and use of financial incentives was reported to positively change health worker behaviour in terms of heightened productivity in Cambodia.⁴¹ In fact, based on evidence from a wide range of settings, there is little doubt that health workers do respond to incentives. Birch (UK),⁴² Rodrigues (Brazil),⁴³ Mooney (Denmark),⁴⁴ Kroneman and Nagy (Hungary),⁴⁵ and Lang et al (Taiwan)⁴⁶ provide just a selection of examples.

The difficulty is to ensure that incentives motivate the performance desired. Paying health workers (or promoting them, or providing ad hoc benefits such as access to training programmes) according to measured indicators of activity for example is likely to improve the indicators. However, it might not improve the performance the indicator is intended to measure for one of two reasons. First, data might merely be manipulated. Monitoring strategies that protect against this eventuality are more expensive than trust of health workers' own data provision. Second, an indicator can improve without more of the activity intended to be measured happening. For example, patients can be encouraged to accept more care than is needed, or to continue to occupy beds when they could be discharged. It is difficult (and therefore costly) to find indicators that are robust against both situations.^{6,47–49}

There are further difficulties even when monitoring issues are resolved. First, those aspects of performance that are not monitored or rewarded, usually because there are particular difficulties in doing so, are likely to be neglected. Second, much health work is done in teams. Attaching bonuses or other rewards to team work dilutes the strength of the incentive effect, but continuing to allocate rewards as if outputs were produced individually might undermine team work.^{50,51}

Finally, when transparency of the reward system in place is poor, its credibility will be questioned and health workers might not respond to the explicit incentive system at all.

Perhaps the most difficult problem to overcome in crafting incentives effectively is the danger that treating health workers as if their motivations were wholly financial might undermine whatever produces the ethos of public service. Such an ethos is likely to emerge slowly from a complex set of factors, and reforms that do not take this factor into account will undermine the development of the public mission itself.⁵²

In view of all these difficulties, it is not surprising that the grounds of public and health sector reform are so strongly contested, or that reforms seem to have undermined human resources in health sectors as often as making a positive contribution. That is not meant to imply that leaving the incentive environment to whatever happens to be the default is more likely to be a better option than reforming.

Which strategies offer the most promise?

There is an urgent need for more evidence to inform this debate. Although the volume of reported discussion in relation to human resources in health has risen over the past few years, funding for investigations that could provide new data to distinguish between more and less promising strategies has not been forthcoming.

On the basis of the available evidence, three areas seem to have the most scope to make advances. First, expansion of the numbers and roles of auxiliaries whose qualifications are not internationally recognised seems to be a quiet success story, providing large numbers of health workers who keep the system running in a number of countries. Much more needs to be documented about the parts played by these workers and their safety in different areas. More too could be understood about the efficiency of alternative training strategies. Planned dialogue with professional bodies needs to be built into any strategy to pursue this option.

Second, incentive environments have been ignored for too long. Careful understanding of the various aspects of this issue is needed, requiring much more data and experimentation in a wide range of settings. How health workers will respond to different reimbursement structures, monitoring strategies, and management contexts is largely unknown.

Third, although there has been little success so far, it is difficult to believe that countries who are importing health workers from developing countries could not do more to mitigate the present outpour. Buchan and colleagues,²⁶ for example, argue that besides the need to improve working conditions for health workers in both exporting and importing countries, there are further options to be explored in relation to multilateral agreements and compensation arrangements. Pressure from the international community and sympathetic

Panel: Meeting Millennium Development Goals.

Interventions recommended by the Commission on Macroeconomics and Health for scaling up to meet Millennium Development Goals by 2015:^{16,17}

- 1 Childhood diseases: integrated management of childhood illness, expanded programme on immunisation, which includes vaccination for tuberculosis, diphtheria/polio/tetanus, and measles
- 2 Maternal conditions: antenatal care, skilled birth attendance, postnatal care, family planning, and emergency obstetric care
- 3 HIV/AIDS: voluntary counselling and testing, public condom distribution, information and education in schools, prevention of mother-to-child transmission, sexually transmitted infection syndromic management, palliative care, prevention and treatment of opportunistic infections, and highly active antiretroviral treatment
- 3a Malaria: diagnosis and treatment, insecticide-treated nets
- 3b Tuberculosis: diagnosis and treatment, directly observed treatment

groups within recipient countries needs to be brought to bear on recipient country governments to leverage movement on these issues. Exporting country governments can also do more.⁵³

Finally, it has been the conclusion of many researchers commenting on this specialty that the human resource management function needs to be substantially upgraded in the public sector as a whole, and specifically the health sector. To make headway in the directions suggested here, human resource management needs to be understood as a strategic function rather than administrative routine.

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