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The State of the Health Workforce in Sub-Saharan Africa:

*Evidence of Crisis and Analysis
of Contributing Factors*

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Foreword

The declaration and acceptance of the Millennium Development Goals heralded renewed commitment by countries and the international community to work towards the achievement of a better quality of life for all the people of the developing world. At least 4 of the 8 goals are health related and provide the impetus for governments, bilateral and multilateral development agencies working in the health sector to develop effective strategies to attain these goals.

Yet, for many African countries, it will be hard, if not impossible to achieve the goals by 2015. The key obstacle is now recognized as the lack of a stable human resource base in the health sector. Absolute shortages, internal and external migration, inadequate remuneration and incentive mechanisms, maldistribution and training and education issues of health workers, as well as macroeconomic policy constraints (often highlighted by the Bank, the Fund and other international financial institutions) are identified as root causes for the present situation. The realization that there are health work-force issues of such serious dimensions has led the usage of the phrase “The African health workforce crisis”.

This report is an attempt to systematically document and evaluate the state of the health workforce in Africa. It draws on academic published literature (which is limited), the WHO statistical database (which is incomplete and only sporadically updated), studies of bilateral donors, national documents, and newspaper articles. The report shows clearly that for more than a decade HR issues have received very little attention. Ministries of Finance often consider HR as a recurrent expenditure and a drain on the budget rather than a critical investment and input to the attainment of positive health outcomes. Demotivation of the health workforce has reached alarming levels and resulted in their migration to the developed world. Increasing nursing shortages in many high income countries such as the UK, USA, France, and Canada have led to a dramatic increase in emigration of highly skilled health personnel particularly from Anglophone and now from Francophone countries in Africa.

The situation has been compounded by the HIV/Aids epidemic which has put additional strains on the health care sector. The disease burden has escalated, productivity of health workers has diminished and a great number of

health workers have succumbed to the epidemic, thus aggravating the crisis.

The report shows that Africa faces a crisis and offers recommendations for action. It suggests the need to recognize the importance to align health sector, civil service and macroeconomic policies; it stresses that countries must offer internally competitive wages and nonfinancial incentives; and proposes to invest into training that is specifically oriented to the

needs of national markets. Our hope is that the report will stimulate further work on this important issue.

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Introduction

In 2000, all 189 United Nations member states endorsed the Millennium Development Goals (MDGs). This represented an unprecedented agreement within the development community about key development outcomes (OECD, 2002). The MDGs are a set of 8 goals, 18 targets and 48 performance indicators relating to poverty reduction by 2015. Of these goals, four are directly related to better health outcomes: two-third reduction of infant and under five mortality, three-fourth reduction of maternal mortality, halt and reverse HIV/AIDS, tuberculosis, and malaria epidemics, and halve the proportion of people suffering from hunger. By some estimates, US\$46 billion per year is required to scale up health services in low-income countries (WHO CMH, 2001). The majority of these funds would be used to expand the capacity of human resources in health,¹ as this is a prerequisite for increasing the access to

essential health services and for bringing down the disease burden to the level of the MDGs (WHO CMH, 2001).

This paper examines some of the issues of human resources in the health sector, focusing on the situation in Africa in view of its particularly critical state. First, we examine the current state of the health sector workforce, including the latest statistics and trends. Second, we analyze the economic factors that influence the availability of human resources. Next, we take a close look at the brain loss phenomenon, or exodus of trained health care professionals from the country or from the sector. Then, a discussion of the impact of the HIV/AIDS epidemic on the workforce itself and working conditions follows. Last, we conclude with some issues that governments and development partners need to tackle to address the growing human resources crisis in the African health sector.

Country Estimates of the Health Sector Workforce

Up-to-date reliable statistics on human resources for health (HRH) in Africa are scant, and when available they remain difficult to standardize and compare internationally.² Despite this data challenge, published figures of health personnel to unit population ratios from the 1960s through the mid-to-late 1990s—and some more recent figures—clearly indicate that a serious crisis in human resources exists. The severe shortage and imbalanced distribution of trained health personnel poses a serious obstacle to the achievement of the MDGs and to the improvement of the overall health of the poor. Here is a quantitative overview of the extent of this crisis.

Latest WHO Statistics

There are a range of indicators that measure the level of human resources employed in a country's health services. The principal indicator is the stock of health personnel, typically measured as the proportion of health workers among the total population. Though this indicator is theoretically simple, there are a number of practical difficulties when comparing it across countries. Occupational classifications

are country specific, as well as the method used to count the number of such persons in each occupations (such as the distinction between headcount data and full-time equivalent data) (Diallo et al., 2003). Further, the actual roles and scope of practice of health care workers also vary, making them difficult to compare. Finally, this indicator depends on the accurate measurement of the denominator, e.g. total population. In many low-income countries, and especially in Africa, census data do not exist and when they do are often unreliable.

Health care-related occupations are mainly categorized under two groups according to the International Standard Classification of Occupations:

1. “professionals” (physicians, nurses and midwives, and other health professionals, such as dentists and pharmacists); and
2. “technicians and associate professionals” (medical assistants, dental assistants, physiotherapists, opticians, sanitarians, nursing and midwifery associate professionals and traditional medicine practitioners) (Diallo et al., 2003).

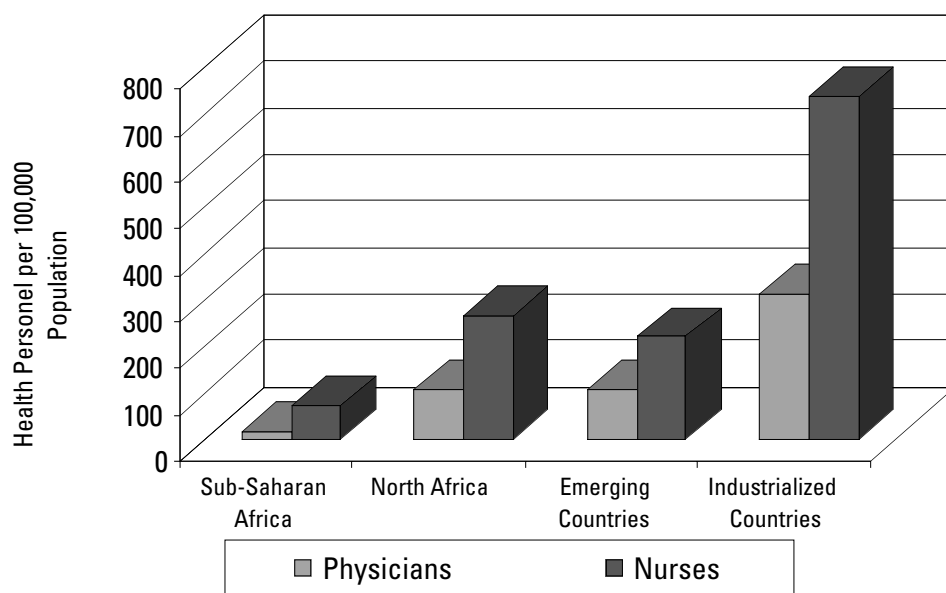
Box 1: Malawi Faces Grave Health Personnel Shortage

The World Bank sponsored a Health, Nutrition, and Population Project in Malawi from 1991–2000. The Implementation Completion Report (ICR) found that under-staffed and under-supplied facilities have become increasingly common, with adverse effects on quality of care. A survey conducted by KPMG in 1999 showed that many district hospitals do not have physicians, that lower-level staff were performing higher-skill functions, and that even in tertiary facilities patients rarely see a physician.

Among SSA countries, Malawi has consistently had one of the worst health worker to population ratios, with 2.22 physicians per 100,000 people, compared to 4.55 in Kenya and 9.09 in Zambia (Picazo, 2002). Currently 50% of the available nursing posts are unfilled. Malawi has struggled with low numbers of health professionals in the past, but the situation has become more acute due to: 1) low pay and poor staff benefits of government workers; 2) an exodus of government workers to the private sector, which offers better salaries and benefits; and 3) the increasing demand for skilled nurses in neighboring countries and in Europe.

The Malawi Nursing and Midwifery Council has also insisted they should produce higher skilled registered nurses (mainly hospital-based, with a longer and more expensive training period) rather than the lower skilled, but more cost-effective community health nurses. In addition, a lack of nursing tutors, severe scarcity of secondary school graduates, limited science education, and increasing death and morbidity from the AIDS epidemic all continue to contribute to the Malawi nursing shortage. Without improvements in training and remuneration of health professionals, Malawi will continue to lose valuable human resources.

Figure 1: Average Health Workforce Availability (1995–2002)



Source: WHO Statistical Information Service. Figures are from one year between 1994–1998, with the exception of Nigeria for which figures are from 1992. May be accessed at <http://www3.who.int/whosis>.

Although health personnel to population ratios are somewhat problematic for the various reasons listed above, they do provide the clearest starting point in recognizing the extent of the crisis.

The World Health Organization (WHO) Statistical Information Service lists such ratios for most countries. Tables 3 and 4 in the Annex list the data for physicians, nurses, midwives, and pharmacists for all available African countries and selected others for comparison. The figures for Africa are appallingly low, especially when compared to other emerging and developed countries (Figure 1 and see Box 1 for the case of Malawi). The average ratio of physicians per 100,000 people in sub-Saharan Africa (SSA) was a meager 15.5, compared to an average of 311.0 in nine selected industrialized countries. For nurses, the same comparison was 73.4 in SSA and 737.5 in industrialized countries. On average, African countries had about 20 times fewer physicians and 10 times fewer nurses than developed countries. Even compared to other emerging countries, SSA numbers are strikingly low. For India, Korea, Singapore, and Vietnam, the average number of physicians per 100,000 people was 106.3; for nurses it was 220.4.

Out of 48 African countries, thirteen³ had fewer than five physicians per 100,000 people, and, except for Burkina Faso, Mozambique, and Tanzania, those same countries had fewer than 20 nurses per 100,000 people (Table 3 in the Annex). Further, there is significant individual variation among countries throughout the continent. For example, Burkina Faso has 4 physicians and 26 nurses per 100,000 people

compared to Egypt with 218 physicians and 284 nurses per 100,000 people. However, some other SSA countries are faring a little better: Botswana has 28.7 physicians and 241.0 nurses per 100,000 people, while Congo has 25.1 physicians and 185.1 nurses per 100,000 people. While pharmacists play a key role in people's access to medicines, very little data has been collected on their numbers. As can be seen from the Table 3 in the Annex, only a handful of countries report data. This data problem is not specific to SSA but applies to other middle or high income countries as well.

Based on the ratio of physicians and nurses to population, we divided the SSA countries into four groups. We use a physician to 100,000 population ratio of 10 and a nurse to population ratio of 20, respectively, as the threshold to categorize each country into either a top or bottom group (Table 1). Thirty three out of 43 analyzed countries (about 78%) have more than 20 nurses per 100,000 population, and only 18 out of the 43 countries (about 42%) have more than 10 physicians per 100,000 population. A total of ten countries have less than 10 physicians and less than 20 nurses per 100,000 population. There are no countries with 10 or more physicians per 100,000 population and less than 20 nurses.

A majority of Lusophone and Arabic speaking countries have more than 10 physicians per 100,000 population, and all of their nurses to population ratios are above 20. In contrast, more than half of the Anglophone countries and almost two third of the Francophone countries have less than 10 physicians per 100,000 population.

Table 1: Classification of Sub-Saharan Countries by HRH Ratios and Languages

	More than 20 Nurses	Less than 20 Nurses
More than 10 Physicians	Anglophone: Botswana, Kenya, Namibia, Nigeria, South Africa, Sudan, Swaziland	
	Francophone: Benin, Congo, Guinea, Mauritius, Senegal, Seychelles	
	Lusophone: Cape Verde, Guinea Bissau, Sao Tome and Principe	Anglophone: Gambia, Liberia, Uganda
	Arabic: Djibouti, Mauritania	Francophone: Burundi, CAR, Chad, Madagascar, Mali, Togo
Less than 10 Physicians	Anglophone: Ghana, Lesotho, Sierra Leone, Tanzania, Zambia, Zimbabwe	Other: Ethiopia
	Francophone: Burkina Faso, Cameroon, Cote d'Ivoire, DR Congo, Niger,	
	Lusophone: Angola, Mozambique	
	Arabic: Somalia,	
	Other: Eritrea	

Source: Annual statistics from the World Bank and WHO. See: World Bank. 1978 and 1980. *World Development Report: World Development Indicators*; World Bank. 1993. *World Development Report: Investing in Health*. p. 208; and WHO. 1998. WHOSIS database. Available at <http://www3.who.int/whosis>.

Trends in the Health Workforce

The production or supply of health sector workers does not even come close to keeping pace with the rate of population growth.⁴ Although these statistics paint a discouraging picture, they provide only part of a larger picture. Issues of health worker distribution within a country and

workplace conditions further compound the current crisis.

Figures 2 and 3 compare the trends in physician and nurse to population ratios since 1960 of eight sub-Saharan countries for which the data was available with Morocco and India. The following are a few key observations

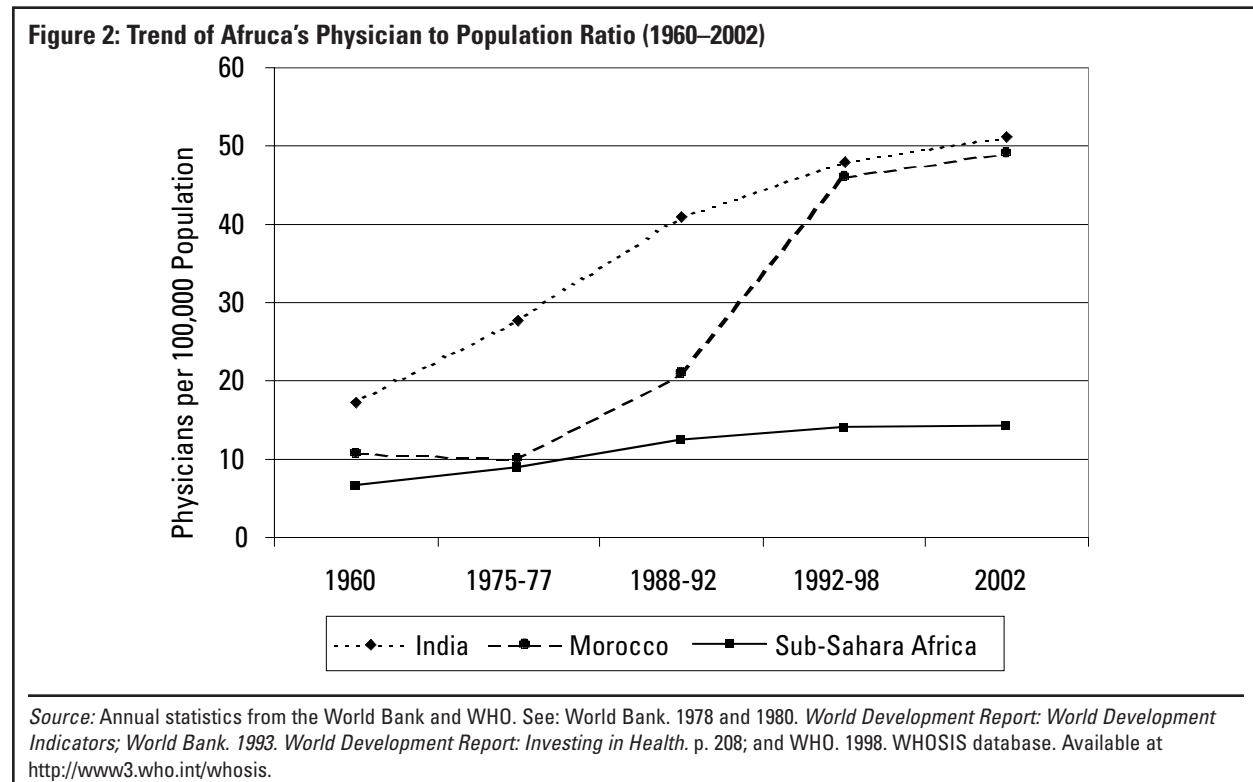
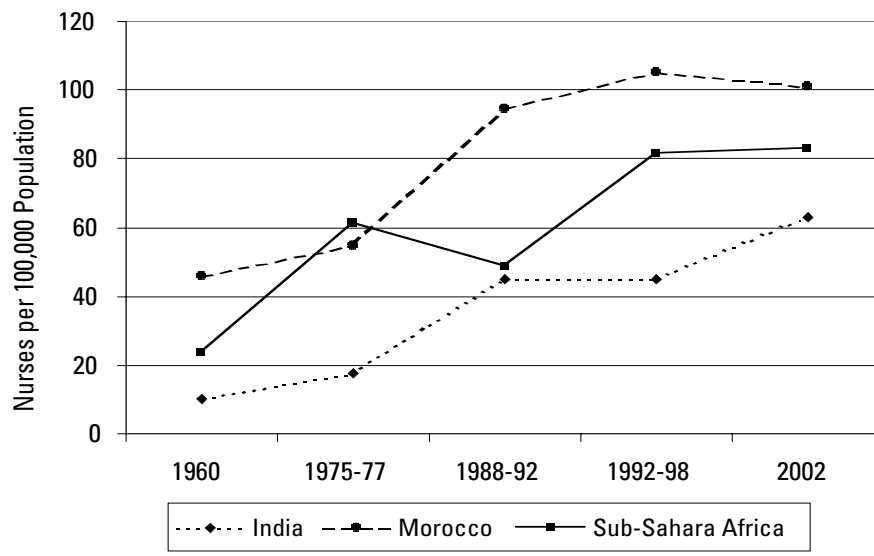


Figure 3: Trend of Africa's Nurses to Population Ratio (1960–2002)

Source: Annual statistics from the World Bank and WHO. See: World Bank. 1978 and 1980. *World Development Report: World Development Indicators*; World Bank. 1993. *World Development Report: Investing in Health*, p. 208; and WHO. 1998. WHOSIS database. Available at <http://www3.who.int/whosis>.

based on country data reported in Tables 5 and 6 in the Annex:

When compared to figures from either the 1970s or 1980s, 7 out of the 8 SSA countries⁵ experienced a decline in physicians per 100,000 population in the 1990s. Five of the African countries⁶ experienced the same trend for nurses. By 2002 the situation had slightly improved in three countries but deteriorated in Madagascar.

The physician to population ratio has stagnated or declined in nearly every SSA country, since 1960. Meanwhile, India has made considerable progress—increasing its physician to population ratio from 17.2 per 100,000 population in 1960 to 51.2 by 2002, and improving its nurse to population ratio from 10.4 per 100,000 population to 62.9 over the same period. Morocco also experienced improvement in the health personnel ratio during this time period.

These figures indicate that ameliorating the human resources for health situation in SSA is an enormous challenge that must be surmounted to adequately serve poor populations. The experience of India shows that it can be done.

In addition to these figures, confirmation that the crisis continues and may be worsening was presented at a recent Consultation of 17 African countries organized by the World Bank and WHO. Background papers documented the following:

- In 1998, medical physician vacancy rates in the public sector were reported at 43% in Ghana and 36% in Malawi.
- In 1998, the public sector nurse vacancy rate was reported at 48% in Lesotho.
- Fifty percent of physicians in public services in Namibia are reported to be expatriates.
- Cameroon has had no recruitment of health personnel in the public sector for 15 years.
- Data from Ghana, Zambia, and Zimbabwe suggest that annual losses from public sector health employment continue at rates of 15% to 40% (WHO/WB, 2002).

Geographical Imbalances

Beyond national-level shortages of health personnel, imbalances in geographic distribution—especially between rural and urban areas—exacerbate the health workforce crisis (Dussault and Franceschini, 2003). In Ghana, Guinea, and Senegal, more than 50% of physicians are concentrated in the capital city where less than 20% of the population lives (Ghana MoH, 2002). In many countries, a similar situation exists for nurses, pharmacists, and medical technicians. For example, 55% of pharmacists in Ghana work in the Greater Accra region, which has 16% of the total population; only 2% of Ghanaian pharmacists work in the Northern Region, with 10% of the population (Ghana MoH, 2002).

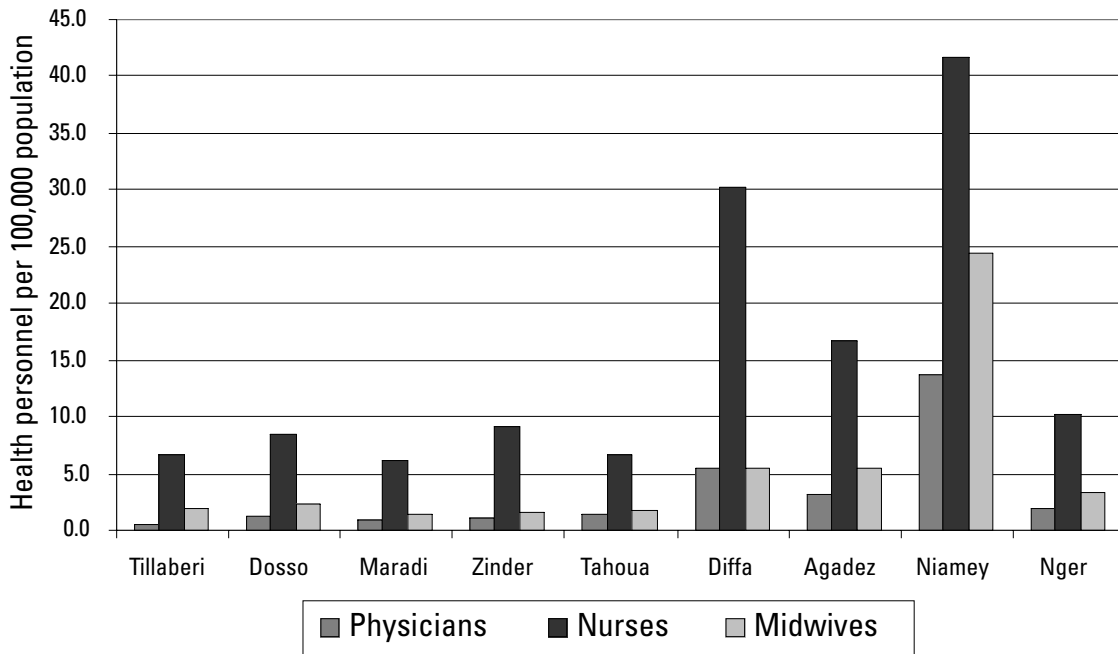
Other recent reports describe this urban-rural split dramatically. In Chad, for example, the capital region of N'Djaména was reported to have 71 physicians per 100,000 population, whereas the rural Chari-Baguirmi region had only 2 physicians per 100,000 (Wyss et al., 2002; Wyss et al., in press, cited in Kurowski, 2003). A report from Mali shows a similar imbalance. Nationwide, Mali was reported to have about 5.15 physicians per 100,000 peo-

ple, but that ratio ranged from 18.7 in the capital region (Bamako) to a mere 1.9 in the Koulikoro region (Ministère de Santé, Mali, 2002).

In Niger, recent data on the regional distribution of health personnel show that most health professionals concentrate in urban areas (Figure 4). In the capital, Niamey, the physicians to population ratio is about 24 times higher than in the Tillabéri region; the nurses and the midwives to population ratios are 7 and 17 times, respectively, higher than in the Maradi region (World Bank, 2002b).

Studies on the health workforce in Tunisia (which has much more adequate nation-wide ratios), Angola, and South Africa equally show geographical imbalances, implying that the urban-rural split is likely to be found continent-wide (Bchir and de Brouwere, 2000; Fresta, Fresta, & Ferrinho, 2000). This indicates that rural populations have much less access to health care services than do urban dwellers, and are often forced to travel significant distances to find any health care, even for their most basic needs. This adds to the costs of services and can even be a deterrent to use services.

Figure 4: Niger Health Personnel Distribution by Region (2000)



Source: World Bank, 2002b.

Impact of Economic Reform Processes

The crisis in the African health workforce has been emerging over several decades. Starting from very low levels in the 1960s, many countries' workforces progressed somewhat in the 1970s and early 1980s, but stagnated or even declined in the late 1980s and the 1990s following the well-known wave of economic crises that hit the continent. Macroeconomic constraints discouraged the expansion of personnel and services; thus, the international community and low-income country governments have given little attention to health-workforce issues in the past two decades. The health workforce was seen as a drain on the budget rather than an asset for poverty reduction, and unemployment of health professionals even appeared in countries where needs were enormous.⁷ Some countries even enacted complete freezes on recruitment of certain health personnel (Ngunfor, 1999; WHO/WB, 2002).⁸

The consequences of a series of reform processes, starting in the mid-1980s, has largely determined the present situation. When many African countries were confronted with a dramatic fall in public revenue from exports of commodities, a series of important economic reforms were introduced. In many of the countries, the reforms were executed through

structural adjustment programs (SAP) of the World Bank and International Monetary Fund (IMF). A central tenet of these reforms included better control of public wages, reduction of public expenditures, privatization of public enterprises, elimination of subsidies, liberalization of the economy, and devaluation of the currency in order to achieve sustained growth.

Results of these measures on public servants, particularly on health personnel, were not dramatically different from one country to another. The impact is a lasting one, largely determining the attitudes of health providers and the actual availability of health personnel. In most countries, the SAP reforms went along with public service reform and decentralization of the health sector. Case studies for Cameroon and Ghana, where detailed research is available including interview surveys with health personnel, are illustrative of the impacts (See Box 2).

Between 1981 and 1991, the Bank conducted 55 civil service reform operations in Africa. More than half of these operations were structural adjustment loans. But the functional reviews failed to mention the impact on the health and education sector. A review of the World Bank's operations on macroeconomics in Africa between 1995 and 2002 found that

Box 2: The Impact of Structural Adjustment Programs in Cameroon and Ghana

In Cameroon, government reform was initiated in the early 1980s as part of their Structural Adjustment Program (SAP) administered by the World Bank and International Monetary Fund (IMF). Measures affecting the health sector resulted in suspending recruitment, strict implementation of retirement at 50 or 55, limiting employment to 30 years, suspension of any financial promotion, reduction of additional benefits (housing, travel expenses, etc.), and two salary reductions—totaling 50%—and a currency devaluation resulting in an effective income loss of 70% over 15 years. In addition, paramedical training for nurses and laboratory technicians was suspended for several years and schools closed.

The overall effect was dramatic. In 1999, the health sector budget had shrunk to 2.4% of the national budget, from 4.8% in 1993. These adjustments occurred while in the private sector (40% of service provision—mostly denominational) wages substantially increased, adjusting again for the effects of the devaluation. Thus, the spread between public and private health worker income is large. Not surprisingly, in 1999, jobs in the public sector were about 80% unfilled, and Cameroon had a truly de-motivated national health workforce.

Notwithstanding the efforts of many health workers to provide services, in general, a *laissez faire* attitude prevails—with under the table payments, absenteeism and a lack of attention to quality. The perception of punishment inflicted by the IMF and the World Bank is still common. On the positive side, however, budgets have been decentralized and are now available locally, and the private sector has been strengthened. The serious shortage of health workers, though, has led to the direct recruitment of qualified personnel by communities and hospitals, which have the financial resources.

In Ghana, the reform process focused on national democratization, decentralization, and the creation of the Ghana health services. While the civil service lost 32,000 jobs between 1987–1989, the health sector remained somewhat a priority and fared better than other sectors. There was also meaningful sector reform with emphasis on the quality of services. Health workers have received some benefits—such as first priority housing in rural areas and increased salaries in urban areas. Despite the well-documented severe shortage of health workers and significant brain drain, the motivation of the health workforce remains good in Ghana (Wiskow, 1999).

while half of the operations discussed the impact of changes in public expenditure on health, the impact on the health workforce was not mentioned in any of the documents. Although one third of the operations apparent-

ly were associated with changes in the wage bill for public sector health employees, only 10% of the operations mentioned the implications to the health workforce (Elmendorf, 2003).

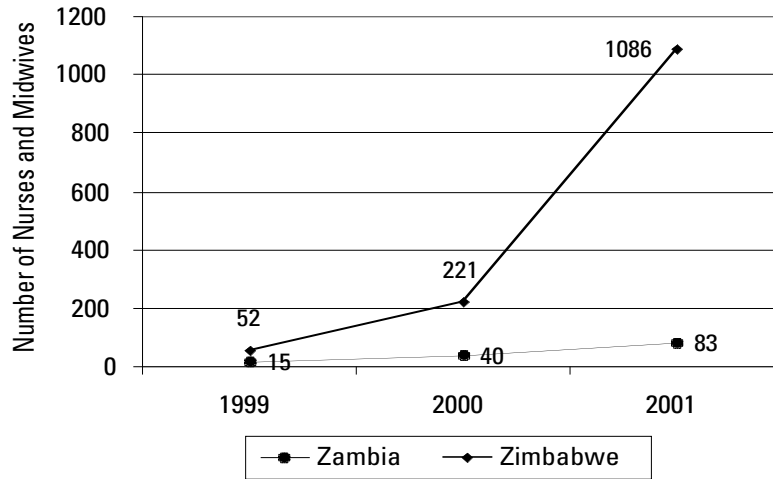
International Migration of Health Professionals

Emigration of highly skilled persons from developing to developed countries has increased in the last decade (Lowell and Findlay, 2001). Growing concerns among many rich countries about actual or future shortages⁹ has initiated large-scale recruitment of foreign-trained health workers. Foreign-trained health professionals are estimated to represent more than a quarter of the medical and nursing workforces of Australia, Canada, the UK, and the US (OECD, 2002), and the needs are rapidly growing. This trend is expected to increase, with health professionals being increasingly recruited from SSA. The number of overseas trained nurses and midwives registering with the United Kingdom Co-operative Council from SSA¹⁰ increased from 905 in 1998/99 to 2133 in 2000/01 (Martineau et al., 2002). Figure 5 illustrates this accelerating trend with a depiction of Zambia's and Zimbabwe's loss of nurses and midwives to the U.K. It has been estimated that 15,000 foreign nurses were recruited in the U.K. in 2001 and that 35,000 more are needed by 2008 (USAID SARA, 2003).

The permanent departure of skilled labor, or “the emigration or flight of skilled human capital from one country to the other in search of better returns to one’s knowledge, skills, quali-

fications, and competencies” (Lowell and Findlay, 2001) is depleting human capital in many developing countries and further reducing the possibility for strong economic growth.¹¹ Simply put, the emigration of an individual is a loss because s/he is an investment loss to her country, since s/he will not apply the education gained in-country. The UN Commission for Trade and Development estimated that each migrating African professional represents a loss of US\$184,000 to Africa. Paradoxically, Africa spends US\$4 billion a year on the salaries of 100,000 foreign experts (Seepe, 2001).

In Ghana, for example, a continuous flow of physicians, nurses, midwives, and pharmacists have left the country directly after receiving their degrees (See Box 3). According to its Health Minister, Kenya has only retained 600 of 6,000 physicians trained in public hospitals. This number rose to 1200 after increasing compensation for physicians, which is still below the requirement. Similarly, 4,000 Kenyan nurses have left for the UK and the US (BBC, 2003). In Zimbabwe, only 360 of 1,200 physicians trained during the 1990s were practicing in their country in 2000; half of those trained in Ethiopia and Zambia have also emigrated (Frommel, 2002). Table 8 in the Annex

Figure 5: Health Personnel from Zambia and Zimbabwe Registered in the UK

Source: Loewenson and Thomson, 2002.

summarizes earlier studies of the sub-Saharan brain drain.

A pattern has emerged where physicians and nurses are continually moving to countries with a perceived higher standard of living, creating what has been referred to as a “carousel” of movement (Martineau, Decker, and Bundred, 2002). Canada for instance recruits primary care physicians from South Africa to work in remote areas, leaving South Africa to fill vacancies by recruiting from Zimbabwe, Botswana, Malawi, and other African countries. More than 600 South African physicians are registered in New Zealand, at a cost to South African taxpayers of roughly US\$37 million, reports the University of Western Cape, South Africa. As of 1999, 78% of rural physicians in South Africa were from abroad, mostly from Cuba (OECD, 2002). South Africa presents a rare case because it is one of the few developing countries that pays comparatively higher salaries and is, thus, able to compensate for emigration. Yet WHO data, summarized in Figure 6, show that the country still experienced a strong net loss of health personnel. The ratios of physicians and nurses per 100,000 population dropped by 55% and 70%, respectively, between 1996 and 2001. For the many

sub-Saharan countries not able to pay competitive salaries and, therefore, not able to attract health personnel from abroad the situation is even more critical.

This brain loss is a particular problem in Africa where the challenge of developing and retaining human resources is extremely difficult and fundamental for development (Wadda, 2000). Worsening economic conditions and severely declining or stagnant salaries and benefits contribute to the loss of health personnel. Although data on this phenomenon is sketchy, the International Office for Migration estimates that 300,000 African professionals live and work in the West (Shinn, 2002).

The brain drain will remain a relevant force for the foreseeable future and entails significant costs to sub-Saharan Africa. As summarized in Figure 7, a study of migration issues in six African countries found that 68% of health workers in Zimbabwe intend to migrate, 49% in Cameroon, and about 60% in Ghana and South Africa (Awases, Gbary, and Chatora, 2003). A study by the Ministry of Health in Ghana (2002) projects that the costs will amount to US \$55 million between 2001 and 2006 (Table 2). The largest fractions of these

Box 3: Ghana's Loss of Health Sector Workers

The State of Ghanaian Economy Report 2002 shows that 31% of trained health personnel, including physicians, nurses, midwives, and pharmacists, left the country between 1993 and 2002 (Safo, 2003). Table 1 below shows trends in employment of human resources in health by the government of Ghana between 1996 to 2002 based on a government report. While both reports signify the extensive degree of brain loss in Ghana, it is questionable whether any of the currently existing records demonstrate accuracy, consistency, and reliability, since variations occur from report to report. As seen in Table 2 below, the University of Ghana Medical School, the School of Medical Sciences of KNUST, and the UDS Medical School train only approximately 150 medical officers annually. However, 50% of every graduating class leaves the country within the second year, while 80% have left by the fifth year (Safo, 2003).

This exodus of medical officers is mirrored in other health sector professions. Out of 944 pharmacists trained between 1995 and 2002, a total of 410 were presumed to have left the country by the end of 2002. The number of nurses and midwives immigrating to foreign countries is greatest compared to all other categories; of the 10,145 trained between that same period, 1,996 were deemed to have left Ghana by the end of 2002 (Safo, 2003).

Table 1: Public Sector Health Staff, Ghana

CATEGORY	1996	1998	2000	2002
Physicians	1,154	1,132	1,015	964
Nurses (including auxiliaries)	14,932	15,046	13,742	11,325
Pharmacists			230	200

Source: Ghana MoH. (2002). Human Resources Projections from Internal Report.

Table 2: Annual Output of Trained Public Sector Health Staff, Ghana

CATEGORY	Annual Production
Physicians	150*
Professional Nurses	500
Midwives	200
Community Health Nurses	200

Source: Ghana MoH. (2002). Human Resources Projections, Internal Report.

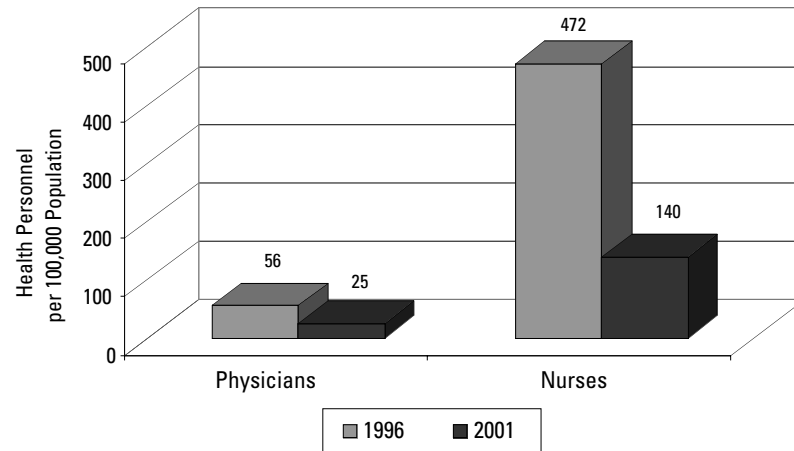
*Safo, A. (2003). 604 physicians abandon Ghana. Public Agenda

costs are the lost investment in physicians' and pharmacists' training.

Factors Contributing to Emigration

To exactly define the factors contributing to emigration is a difficult task because most health professionals do not report their inten-

tion to emigrate, nor the reasons why they do so; they simply vacate their posts, resign, or ask for leave without pay for an indefinite period of time (Awases, Gbary, and Chatora, 2003). The causes and extent of emigration vary from one country to another, but lack of job opportunities, low wages, and a poor working environment are the most commonly cited causes. Negative side effects of SAPs,

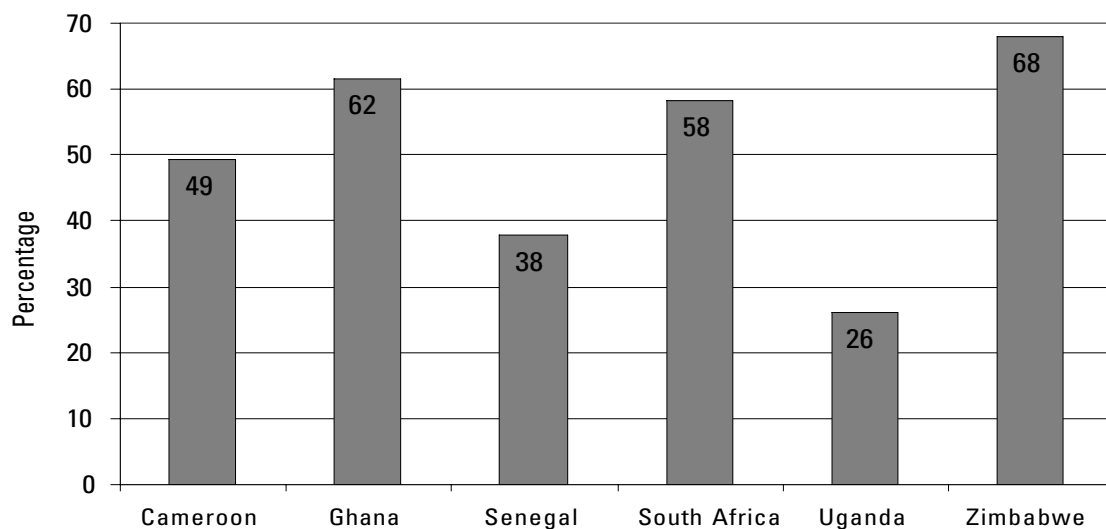
Figure 6: Health Personnel in South Africa 1996 vs. 2001

Source: WHO, 2003.

with their associated measures to eliminate or reduce budget deficits and public expenditure, downsizing or retreat of government from economic activity, and the liquidation or privatization of enterprises, have also led to the emigration of professionals (Mato, 2002). Awases, Gbary, and Chatora (2003) report that other de-motivating factors include a lack of oppor-

tunities for continuing education and training, mediocre quality of training, and inadequate day care facilities for their children.

Political instability, lack of security and an environment of abject poverty have also been cited as factors contributing to out-migration. Today, health professionals in SSA work in extraordinary circumstances. The pressure of

Figure 7: Proportion of Health Workers Who Intend to Migrate

Source: Awases, Gbary, and Chatora, 2003.

Table 2: Projection of the Cost of the Health Personnel Brain Drain for Ghana (in millions of US\$)

	2001	2002	2003	2004	2005	2006	Total
Physicians	3.60	3.84	4.02	4.14	4.38	4.50	24.48
Pharmacists	3.82	4.14	3.58	3.15	2.77	2.51	19.97
LabTechnician	0.11	0.15	0.10	0.08	0.07	0.06	0.57
GenNurses	1.31	1.31	1.32	1.33	1.33	1.33	7.93
Midwives	0.36	0.36	0.36	0.37	0.37	0.37	2.19
C.H. Nurses	0.06	0.06	0.07	0.07	0.08	0.08	0.42
Total	9.26	9.87	9.45	9.14	8.99	8.86	55.57

Source: Ghana Ministry of Health Report, 2002.

having too many patients increases daily stress levels and leads to poor quality of care. Poor working conditions are reported to seriously undermine health systems performance by thwarting staff morale and motivation, and directly contributing to problems in recruitment and retention (WHO, 1996). These “push” factors are compounded by “pull” fac-

tors, including active recruitment strategies by agencies from rich countries. While the many aforementioned factors may de-motivate and discourage health care workers, other studies have found that most individuals who do *stay* in the health sector, work hard and receive recognition and status from colleagues and family (Stillwell, 2001).

Impact of HIV/AIDS on the Health Sector

While we have touched upon some of the issues affecting the number, distribution, and performance of workers in the health sector, the enormous impact of the HIV/AIDS epidemic merits its own discussion. The epidemic has impacted health sector workforce in two ways: 1) direct costs—labor loss, disability and death benefits, and increasing medical aid costs; and 2) indirect costs—increased absenteeism, reduced productivity, and stressed workforce from additional staff recruitment and training of personnel (Kinoti, 2001). See Box 4 for the case of Kenya.

With a generalized epidemic of HIV/AIDS in many African countries, health care workers themselves are being infected, as they are part of the adult, sexually active population. The impact of HIV/AIDS is serious and is estimated to be the cause of between 19-53% of all deaths of government health employees in African countries today (Tawfik and Kinoti, 2001). This results in personnel attrition due to death and absenteeism due to sickness. For example, by some estimates a person living with AIDS may be away from work for up to half the time of their final year of life (Tawfik and Kinoti, 2001). Caring for ill family members or dependents and attending funerals also

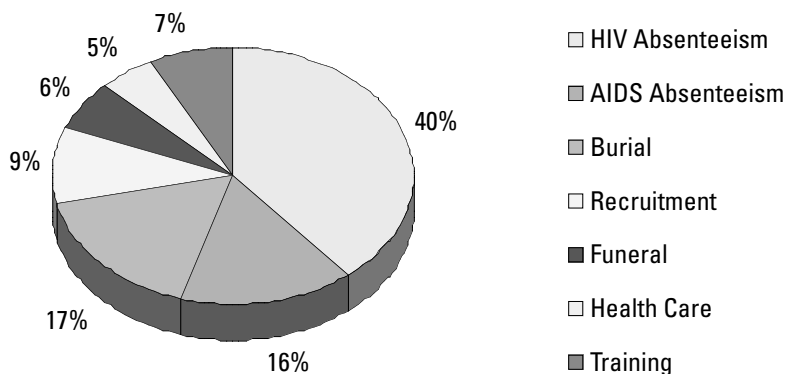
contributes to worker absenteeism. Studies in Zimbabwe indicate that almost 60% of increased labor costs are attributed to HIV/AIDS absenteeism (Whiteside and Sunter, 2001). For a distribution of these costs see Figure 8.

Caring for AIDS patients has made the work environment more complex, difficult and stressful as well as a chilling place to work—with the fear of infection and also with a constant observance of patients dying. One study of Zairian nurses indicated that they had to “work significantly more, sometimes at double effort, to care for AIDS patients” (Lombela, 1996; cited in Kinoti, 2002).

The HIV/AIDS epidemic has placed additional strain on the health care sector and contributed to the human resource crisis. But the extent of the impact of HIV/AIDS on the health care sector is not fully known. More comprehensive country-level assessments of the impact are needed.

In 2000, ABT Associates undertook a health sector assessment in Botswana (using a 25% prevalence rate as baseline) which projected HIV-related morbidity and mortality among health workers (Figure 9). The model takes into consideration the demographic profiles of health workers, leading to two estimations,

Figure 8: Distribution of Increased Labor Costs due to HIV/AIDS in Zimbabwe



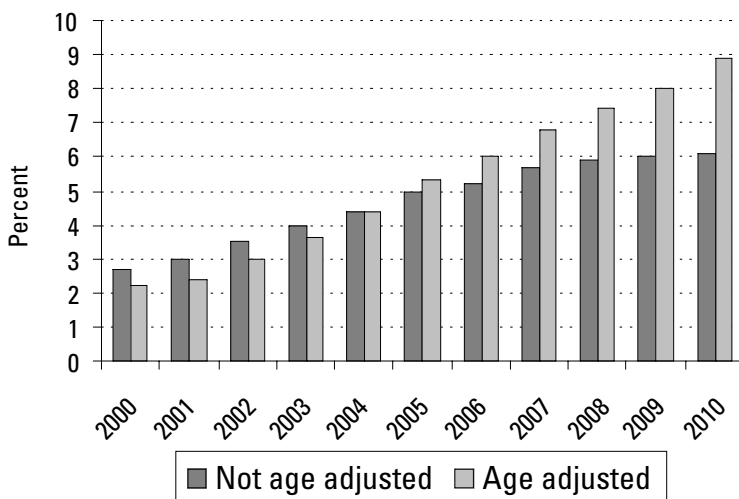
Source: Whiteside and Sunter, XXXX.

non-age adjusted and age adjusted. The non-age adjusted estimation assumes that health workers have the same HIV/AIDS prevalence as the general 20-64 age group population.

As illustrated by Figure 9, 2% to 3% of health workers had AIDS in 2001. Assuming no interventions are taken to reverse the epidemic, 6% to 9% of health workers will be liv-

ing with HIV/AIDS by 2010. The Abt health sector assessment also showed that the projected cumulative AIDS deaths in Botswana among health workers will increase from 5% of current health workforce in 2000 to about 17% by 2005 and 40% of current health workforce by 2010.

Figure 9: Projected Health Workers with AIDS in Botswana (2000 to 2010)



Source: ABT Associates, 2000.

Box 4: Impact of HIV/AIDS on Kenya's Health Workforce

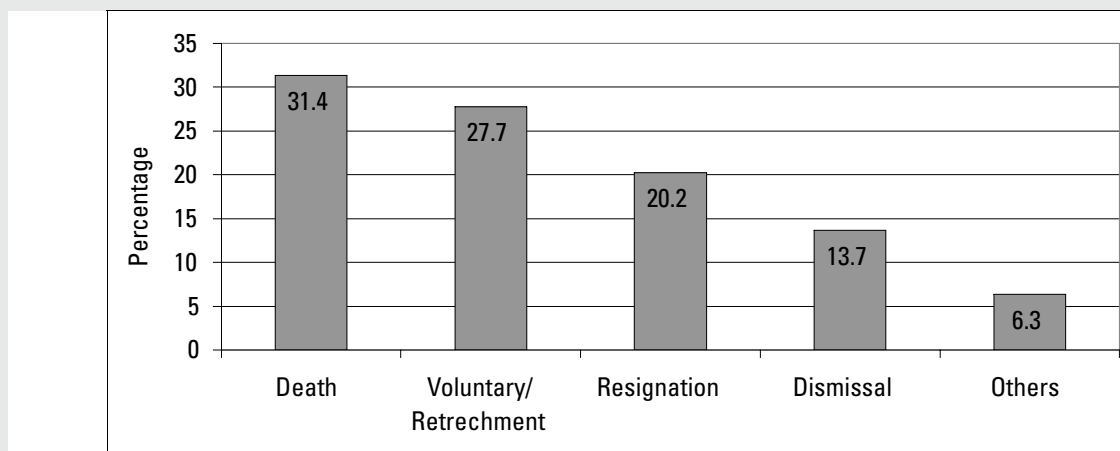
Since the first HIV/AIDS case was reported in Kenya in 1984, a total of 1.75 million adults have been infected. The current prevalence rate of HIV/AIDS is at 9.4%. Assuming a similar infection rate, 3,500 health workers in Kenya are infected by HIV. The disease caused about 55,000 deaths, mainly among young people, including health workers.

A recent study of the impact of HIV/AIDS on the health workforce in Kenya collected data from 6 sampled hospitals between 1996 to 2002. The study shows that HIV/AIDS caused an increased demand for health services. Between 1996 and 2002 there has been a 40% increase in total admissions due to HIV/AIDS. Bed occupancy by HIV related illness is high and is associated with long stays and frequent re-admissions. Overall, fifty percent of the Medical wards' patients are admitted with HIV/AIDS related illness.

Kenya recently introduced VCT and PMTCT and rapidly scaled up these interventions using the existing health workforce. There are strong indicators of overload among the service providers. Ideally a counselor is expected to have an average of 160 clients per month. The study showed that, among the sampled hospitals, each VCT provider had 349 clients, while each PMTCT provider had 560 clients per month. Current staffing levels are not adequate to cope with the workload for HIV/AIDS and other services.

Among the sampled facilities, there is a trend toward death becoming the primary reason for health personnel attrition (Figure 1). Of the 170 deaths with record of cause, 45% are due to AIDS related illnesses (pneumonia, tuberculosis, chronic diarrhea and immunosuppression). Further, these deaths occur predominantly among relatively young people (age 15 to 49).

Figure 1: Cause of Health Personnel Attrition



Source: Cheluget, Ngare, Wahiu, et al, 2003.

Achieving the Millennium Development Goals

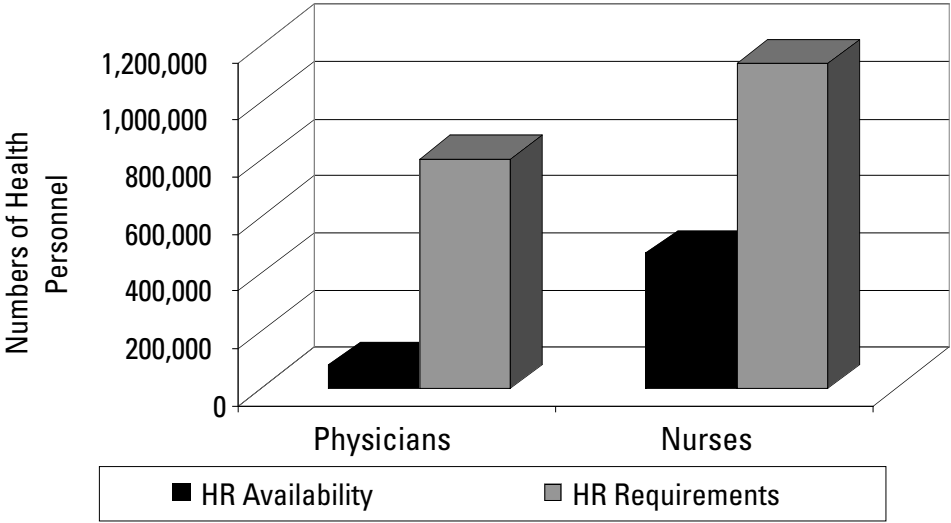
In 2003, Kurowski et al. undertook case studies of Tanzania and Chad to look at the ‘role and importance’ of human resources for scaling up health services in low-income countries. This study examined the size, structure, and compositions of the health workforces; and estimated future human resource availability and requirements for scaling up priority interventions, as recommended by the Commission on Macroeconomics and Health.

The study indicates that future staff availability is grossly insufficient for the scaling up of priority interventions, accounting for only 40% and 20% of requirements in Tanzania and Chad, respectively, by 2015. Shortages are likely to be greater than indicated, since the total health workforce would not be available for the provision of priority interventions. Even if training capacities would be immedi-

ately increased by 50%, the 2015 workforce would constitute only 45% and 25% of total human resource requirements. In Figure 14, Kurowski et al. estimate the shortage of health workers for all low and lower-middle income countries in SSA.

The study also identified four priority issues for scaling up, which merit further research: 1) geographical imbalances must be better understood and overcome; 2) more needs to be known about health staff attrition rates—especially due to emigration—which has implications for training; 3) how can staff productivity (estimated at approximately 50% to 65%) be improved through better staff management; and 4) alternative service delivery mechanisms need to be developed. Finally, the authors urged decades-long international commitment to scaling up, to ensure that the efforts made are not wasted.

Figure 10: Estimates of Shortages of Health Workers in SSA



Source: Kurowski, 2003.

Conclusion

Given the crisis of human resources in the health sector of sub-Saharan Africa outlined in this paper, the health-related MDGs are arguably difficult targets for most African countries to attain. However, MDGs are useful in highlighting underlying problems or constraints hindering their attainment.

Some of the key issues that African governments and development partners should focus on, to address this human resource crisis, include:

- Instituting a consultative process in which all stakeholders collectively develop strategies to address the crisis facing the health workforce.
- Recognizing the importance to align health sector, civil service and macroeconomic policies and their objectives to improve the health workforce (and health sector) performance.
- Acknowledging that African countries must offer internally competitive wages and benefit packages to retain highly trained staff; this includes increasing compensation so that workers receive a living wage, and do not have to seek outside employment or under-the-table payments for services to survive.
- Investing into training capacities, in particular training that is specifically oriented to the needs of national markets to stem brain drain.
- Improving training and knowledge regarding HIV/AIDS to decrease risk for workers, address fears and misconceptions, and improve patient care.¹²
- Investing into HIV/AIDS prevention and care to mitigate the impact of the epidemic on the demand for health services and to prevent any further depletion of the workforce.
- Exploiting alternative service delivery mechanisms (community based, syndromic approaches) to reduce the workload of health personnel.
- Improving the non-monetary incentive framework faced by health personnel (e.g. continuous training, supervision, appropriate equipment) to improve motivation

and thus the productivity and quality of the health workforce.

The limited availability of human resources in Africa is likely to singularly determine the

pace of scaling-up services and to limit the capacity to absorb additional financial resources. More importantly, it is likely to be the most significant impediment towards the attainment of the health related MDGs.

Annex

Table 3: WHO Estimates of Health Personnel per 100,000 Population for SSA

Country	Physicians ¹	Nurses ¹	Midwives ²	Pharmacists ²
Algeria	85.0	300.0	NA	NA
Angola	5.0	114.0	4.3	NA
Benin	10.0	20.0	7.9	NA
Botswana	28.7	241.0	0.0	NA
Burkina Faso	4.0	26.0	3.4	NA
Burundi	0.5	1.0	NA	NA
Cameroon	7.4	36.7	0.5	NA
Cape Verde	17.1	55.8	NA	NA
CAR	3.5	8.8	4.9	NA
Chad	2.5	15.0	2.3	NA
Congo	25.1	185.1	24.9	NA
Côte d'Ivoire	6.8	44.1	15.0	NA
DR Congo	9.0	31.2	NA	NA
Djibouti	13.0	64.0	NA	2.0
Egypt	218.0	284.0	NA	56.0
Eritrea	5.1	21.0	2.2	NA
Ethiopia	3.0	6.0	NA	NA
Gambia	3.5	12.5	8.2	NA
Ghana	9.0	64.0	53.2	NA
Guinea	13.0	55.7	5.2	NA
Guinea-Bissau	16.6	109.3	12.7	NA
Kenya	14.1	108.0	NA	NA
Lesotho	7.0	33.0	47.0	NA
Liberia	2.3	5.8	4.3	NA
Libya	120.0	360.0	NA	23.0
Madagascar	8.7	18.8	10.7	NA
Mali	4.4	12.6	3.0	NA
Mauritania	13.8	62.4	10.1	NA
Mauritius	85.0	232.9	NA	NA

Country	Physicians ¹	Nurses ¹	Midwives ²	Pharmacists ²
Morocco	49.0	101.0	NA	11.0
Mozambique	2.4	20.5	NA	NA
Namibia	29.1	165.8	116.5	NA
Niger	3.3	23.1	5.5	NA
Nigeria	26.9	66.2	52.4	NA
Sao Tome and Principe	46.7	127.4	29.6	NA
Senegal	10.0	50.0	6.6	NA
Seychelles	132.4	467.6	394.6	NA
Sierra Leone	8.8	90.7	4.7	NA
Somalia	4.0	20.0	NA	0.1
South Africa	25.1	140.0	NA	NA
Sudan	16.0	86.0	NA	1.1
Swaziland	15.1	40.0	NA	NA
Tanzania	4.1	85.2	44.8	NA
Togo	5.6	16.7	10.4	NA
Tunisia	70.0	286.0	NA	17.0
Uganda	4.7	5.6	13.6	NA
Zambia	6.9	113.1	NA	NA
Zimbabwe	5.7	54.1	28.1	NA
Africa Region Average	25.1	93.5	30.9	NA

¹ Source: WHO 2003

² Source: WHO Statistical Information Service. Figures are from one year between 1994-1998, with the exception of Nigeria for which figures are from 1992. May be accessed at <http://www3.who.int/whosis>.

Table 4: WHO Estimates of Health Personnel per 100,000 Population, Averages

Country	Physicians ¹	Nurses ¹	Midwives ²	Pharmacists ²
Sub-Saharan Africa Average	15.5	73.4	30.9	1.1
SSA without South Africa Average	15.2	71.8	30.9	1.1
North African Average ³	108.4	266.2	NA	26.8
Four Emerging Countries:				
India	51.2	62.9	NA	NA
Korea	180.0	341.0	NA	NA
Singapore	140.0	421.1	NA	NA
Viet Nam	53.8	56.6	17.6	NA
Four Emerging Countries' Average	106.3	220.4	NA	NA
Industrialized Countries:				
Australia	247.4	769.5	40.0	NA
Canada	187.0	748.0	NA	NA
France	329.7	668.6	21.7	100.0
Germany	363.2	954.8	11.3	57.7
Italy	606.5	446.5	29.2	102.0
Japan	201.5	821.3	18.9	NA
Russia	420.4	793.0	62.5	6.2
UK	164.0	497.0	43.3	58.2
USA	279.0	939.0	NA	NA
Industrialized Countries' Average	311.0	737.5	32.4	64.8

¹ Source: WHO 2003

² Source: WHO Statistical Information Service. Figures are from one year between 1994 and 1998, with the exception of India for which figures are from 1992. May be accessed at <http://www3.who.int/whosis>.

³ Algeria, Egypt, Libya, Morocco, and Tunisia

Table 5: Trends in Physicians 1960-1998^{1,2}

Country	1960	1975/77	1988/92	1992/98	2002
Burkina Faso	1.7	1.8	3.0	3.4	4.0
Cameroon	2.5	6.1	8.0	7.4	7.4
CAR	2.8	5.7	4.0	3.5	3.5
Ghana	8.2	10.0	4.0	6.2	9.0
India	17.2	27.6	41.0	48.0	51.2
Kenya	9.5	8.4	14.0	13.2	14.1
Madagascar	10.4	9.8	12.0	10.7	8.7
Morocco	10.6	9.9	21.0	46.0	49.0
Tanzania	4.8	6.5	3.0	4.1	4.1
Tunisia	10.0	20.8	53.0	70.0	70.0
Zambia	8.3	9.8	9.0	6.9	6.9

¹ Measured as physicians per 100,000 population. Figures are from an individual year within the given period.

² Annual statistics from the World Bank and WHO. See: World Bank. 1978 and 1980. *World Development Report: World Development Indicators*; World Bank. 1993. *World Development Report: Investing in Health*. p. 208; and WHO. 1998. WHOSIS database. Available at <http://www3.who.int/whosis>.

Table 6: Trends in Nurses 1960-1998^{1,2}

Country	1960	1975/77	1988/92	1992/98	2002
Burkina Faso	1.7	1.8	3.0	3.4	4.0
Cameroon	2.5	6.1	8.0	7.4	7.4
CAR	2.8	5.7	4.0	3.5	3.5
Ghana	8.2	10.0	4.0	6.2	9.0
India	17.2	27.6	41.0	48.0	51.2
Kenya	9.5	8.4	14.0	13.2	14.1
Madagascar	10.4	9.8	12.0	10.7	8.7
Morocco	10.6	9.9	21.0	46.0	49.0
Tanzania	4.8	6.5	3.0	4.1	4.1
Tunisia	10.0	20.8	53.0	70.0	70.0
Zambia	8.3	9.8	9.0	6.9	6.9

¹ Measured as nurses per 100,000 population. Figures are from an individual year within the given period.

² Annual statistics from the World Bank and WHO. See: World Bank. 1978 and 1980. *World Development Report: World Development Indicators*; World Bank. 1993. *World Development Report: Investing in Health*. p. 208; and WHO. 1998. WHOSIS database. Available at <http://www3.who.int/whosis>.

Table 7. Health Personnel Statistical Database

	GDP (2002)	Income level ¹	Region ²	Population (2002)	IMR		Physicians per 100,000 (1995-1999)	Nurses per 100,000 (1995-1999)	Midwives per 100,000 (1995-1999)	Dentists per 100,000 (1995-1999)	Pharmacists per 100,000 (1995-1999)	Year	
					1990	2002							
Afghanistan		1	3	27,963,000	167	165	11	18	1997	1	1997	2	1997
Albania	\$1,071	2	4	3,195,100	37	23	129	380	1998	31.5	1996	40.6	1994
Algeria	\$1,657	2	5	31,320,000	42	39	84.6	297.8	1995	28.2	1995	...	...
American Samoa				70,000	0								
Andorra		5	4	70,000	0	6	253	283	1998	53.1	1998	89.1	1998
Angola	\$598	1	1	13,896,000	166	154	7.7	114.5	1997	0	1997	...	...
Antigua & Barbuda	\$9,204	5	6	68,890	0	12	113.6	330.3	1996	18.2	1996	...	...
Argentina	\$6,579	3	6	37,928,000	25	16	268.4	76.8	1992	66.2	1997	...	...
Armenia	\$1,495	2	4	3,072,000	50	31	316	481	1998	27.6	1998	3.8	1998
Aruba		5	6	90,000	0								
Australia	\$24,801	4	2	19,581,000	8	6	240	830	1998	40	1998	...	...
Austria	\$33,480	4	4	8,140,900	8	5	302	532	1998	47.2	1998	52.8	1997
Azerbaijan	\$505	1	4	8,184,300	84	77	360	767	1998	27.1	1998	33.1	1998
Bahamas	\$13,836	5	6	313,990	24	13	151.8	229.7	1996	25.4	1996	...	...
Bahrain	\$11,070	5	5	671,970	15	13	100	283	1997	9	1997	20	1997
Bangladesh	\$396	1	3	135,680,000	96	51	20	11	1997	...	...	...	...
Barbados	\$8,610	5	6	269,380	14	12	125.4	330.3	1993	16.1	1993	...	...
Belarus	\$1,579	2	4	9,930,800	18	17	443	1182	1998	40.6	1998	30.7	1998
Belgium	\$31,333	4	4	10,320,000	8	5	395	1075	1996	68.2	1998	145	1998
Belize	\$3,227	3	6	253,330	39	34	54.8	82	1996	10.6	1996	...	...
Benin	\$435	1	1	6,603,400	111	94	5.7	20.4	1995	0.3	1995	...	...
Bermuda		5	6	60,000	0								
Bhutan	\$580	1	3	850,820	0	74	16	39	1995	...	...	...	...
Bolivia	\$947	2	6	8,697,100	87	60	129.9	69.4	1997	21.1	1997	...	...
Bosnia & Herzegovina	\$1,671	2	4	4,120,600	18	15	143	452	1998	19	1998	11	1998
Botswana	\$4,233	3	1	1,711,800	45	80	23.8	219.1	1994	2.2	1994	...	...
Brazil	\$4,644	2	6	174,490,000	50	31	127.2	41.3	1996	85.1	1996	...	...
Brunei	\$17,650	5	2	350,630	10	6	84.8	401.5	1996	12.8	1996	...	...
Bulgaria	\$1,733	2	4	7,868,000	15	14	345	713	1998	58.6	1998	18.5	1998
Burkina Faso	\$258	1	1	11,831,000	118	104	3.4	19.6	1995	0.3	1995	...	...
Burundi	\$143	1	1	7,071,000	114	114	...	...	...	...	...	...	...

	GDP (2002)	Income level ¹	Region ²	Population (2002)	IMR 1990	IMR 2000- 2002	Physicians per 100,000 (1995-1999)	Nurses per 100,000 (1995-1999)	Midwives per 100,000 (1995-1999)	Dentists per 100,000 (1995-1999)	Pharmacists per 100,000 (1995-1999)	Year
Cambodia	\$325	1	2	12,487,000	80	97	29.7	73.8	28.8	1.8	...	1998
Cameroon	\$711	1	1	15,523,000	85	96	7.4	36.7	0.5	0.4	...	1996
Canada	\$23,590	4	6	31,414,000	7	5	229.1	897.1	...	58.6	...	1997
Cape Verde	\$1,571	2	1	458,030	45	29	17.1	55.6	...	1.5	...	1996
Cayman Islands		5	6	35,000	0							...
Central African Republic	\$348	1	1	3,828,000	115	115	3.5	8.8	4.9	0.2	...	1995
Chad	\$248	1	1	8,144,400	118	117	3.3	14.7	2.3	0.2	...	1994
Channel Islands		5	4	149,000	7	6						...
Chile	\$5,436	3	6	15,579,000	16	10	110.3	47.2	...	41.5	...	1996
China	\$942	2	2	1,281,000,000	38	31	161.7	98.6	3.9	...	...	1998
Colombia	\$2,274	2	6	43,745,000	29	19	116	48.3	...	40.3	...	1994
Comoros	\$436	1	1	585,940	88	59	7.4	34.1	14	14	...	1997
Congo, Dem. Rep.	\$87	1	1	53,797,000	128	129	6.9	44.2	...	1.1	...	1996
Congo, Rep	\$87	1	1	53,797,000	128	129	25.1	185.1	24.9	...	...	1995
Cook Islands	\$0			0	83	81	90	200	30	90	...	1997
Costa Rica	\$3,927	3	6	3,941,800	15	0	141.1	109.1	...	39.4	...	1997
Côte d'Ivoire	\$712	1	1	16,775,000	100	102	9	31.2	15	...	...	1996
Croatia	\$5,549	3	4	4,376,900	11	7	229	474	33	65.7	45.5	1998
Cuba		2	6	11,263,000	11	7	530.4	677.6	...	84.5	...	1997
Cyprus	\$14,800	5	4	764,970	11	5	255	447	...	65	104	1995
Czech Republic	\$5,691	3	4	10,210,000	11	4	303	886	44.7	62	44.3	1998
Denmark	\$39,211	4	4	5,373,300	8	4	290	722	21.1	88.6	18.2	1994
Djibouti	\$775	2	5	656,510	119	100	14	74	...	1.7	2	1996
Dominica	\$3,157	3	6	71,800	19	14	49.3	415.5	...	5.6	...	1996
Dominican Republic	\$2,129	2	6	8,634,700	53	41	215.6	29.9	...	23.4	...	1997
Ecuador	\$17,046	2	6	13,112,000	43	24	169.6	70.1	...	63.9	...	1997
Egypt, Arab Rep.	\$1,250	2	5	66,372,000	76	35	202	233	...	25	56	1996
El Salvador	\$1,763	2	6	6,523,900	46	33	107.1	34.9	...	35.6	...	1997
Equatorial Guinea	\$1,541	1	1	481,420	122	101	24.6	39.5	2.2	1	...	1996
Eritrea	\$166	1	1	4,308,800	92	72	3	16	2.2	0.1	...	1996
Estonia	\$5,000	3	4	1,358,000	12	11	297	625	37.4	67.9	53.5	1998

(continued on next page)

Table 7 (continued)

	GDP (2002)	Income level ¹	Region ²	Population (2002)	IMR		Physicians per 100,000 (1995-1999)	Nurses per 100,000 (1995-1999)	Midwives per 100,000 (1995-1999)	Dentists per 100,000 (1995-1999)	Pharmacists per 100,000 (1995-1999)	Year
					1990	2002						
Ethiopia	\$124	1	1	67,335,000	128	116	...	...	...	...	...	...
Faeroe Islands		5	4	50,000	0							
Fiji	\$2,910	2	2	823,300	25	18	47.6	195.1	...	4.3	...	...
Finland	\$32,575	4	4	5,199,000	6	4	299	2162	78	93.7	145	1998
France	\$30,667	4	4	59,442,000	7	4	303	497	21.7	67.8	100	1997
French Polynesia	\$19,895	5	2	239,800	18	10						
Gabon	\$4,405	3	1	1,290,600	60	60	...	...	...	...	...	...
Gambia, The	\$370	1	1	1,375,700	103	91	3.5	12.5	8.2	0.5	...	...
Georgia	\$537	1	4	5,177,000	24	24	436	474	31.1	35.3	9.2	1998
Germany	\$32,807	4	4	82,495,000	7	4	350	957	11.3	75.9	57.7	1998
Ghana	\$432	1	1	20,071,000	74	57	6.2	72	53.2	0.2	...	...
Greece	\$14,157	4	4	10,631,000	10	5	392	257	18.5	102	69.2	1998
Grenada	\$3,516	3	6	101,710	30	20	49.5	367.7	...	8.6	...	...
Guam		5	2	159,350	9	6						
Guatemala	\$1,545	2	6	11,992,000	60	43	93.3	27	...	13	...	...
Guinea	\$628	1	1	7,744,400	145	109	13	55.7	5.2	...	...	...
Guinea-Bissau	\$193	1	1	1,252,700	153	130	16.6	109.4	12.7	0.9	...	...
Guyana	\$938	2	6	771,970	65	54	18.1	84.2	...	3.8	...	...
Haiti	\$344	1	6	8,286,500	102	79	8.4	10.7	...	1.2	...	...
Honduras	\$711	2	6	6,755,100	47	31	83.2	25.5	...	16.8	...	...
Hungary	\$5,735	3	4	10,166,000	15	8	357	385	18.6	42.4	47.3	1998
Iceland	\$31,835	4	4	283,990	6	3	326	885	85.9	105	83.1	1997
India	\$494	1	3	1,048,300,000	80	67	48	45	...	...	...	...
Indonesia	\$1,060	1	2	211,720,000	60	33	16	50	26	...	...	...
Iran, Islamic Rep.	\$1,787	2	5	65,540,000	54	35	85	259	...	16	11	1996
Iraq		2	5	24,256,000	40	107	55	236	411	5.7	11.8	1998
Ireland	\$30,157	4	4	3,877,600	8	6	219	1593	...	46.2	77.8	1998
Israel	\$17,067	5	5	6,494,200	10	6	385	613	18.6	116	60.5	1998
Italy	\$21,233	4	4	57,919,000	8	4	554	296	29.2	64.4	102	1997

	GDP (2002)	Income level ¹	Region ²	Population (2002)	IMR 1990	IMR 2000- 2002	Physicians per 100,000 (1995-1999)	Nurses per 100,000 (1995-1999)	Year	Midwives per 100,000 (1995-1999)	Year	Dentists per 100,000 (1995-1999)	Year	Pharmacists per 100,000 (1995-1999)	Year
Jamaica	\$2,174	2	6	2,612,900	17	17	140.1	64.5	1996	...	...	9	1994	...	...
Japan	\$44,108	4	4	127,140,000	5	3	193.2	744.9	1996	18.9	1996	68.6	1996	...	...
Jordan	\$1,661	2	5	5,171,300	35	27	166	296	1997	...	...	49	1997	77	1997
Kazakhstan	\$1,893	2	4	14,795,000	42	81	353	649	1998	56.1	1998	25.1	1998	65.7	1994
Kenya	\$325	1	1	31,345,000	63	78	13.2	90.1	1995	...	...	2.2	1995	...	...
Kiribati	\$575	2	2	94,700	65	51	29.6	235.8	1998	...	...	4.9	1998	...	...
Korea, Dem. Rep.		1	2	22,519,000	26	42	297	180	1995	60	1995	...	...	...	...
Korea, Rep.	\$14,280	4	2	47,640,000	8	5	136.1	291.2	1997	...	...	33.4	1997	...	...
Kuwait	\$13,345	5	5	2,103,900	14	9	189	475	1997	...	...	26	1997	35	1996
Kyrgyz Rep.	\$13,345	1	4	2,103,900	14	9	301	750	1998	72.8	1998	27.4	1998	6.7	1998
Lao, PDR	\$477	1	2	5,530,100	120	87	24.3	107.7	1996	...	...	4.3	1996	...	...
Latvia	\$3,100	3	4	2,335,000	14	17	282	549	1998	33.2	1998	43.5	1998	...	...
Lebanon	\$2,868	3	5	4,441,200	32	28	210	100	1997	...	...	80	1997	50	1997
Lesotho	\$577	1	1	2,086,700	102	91	5.4	60.1	1995	47	1995	0.5	1995	...	...
Liberia	\$199	1	1	3,295,100	157	157	2.3	5.9	1997	4.3	1997	0.1	1997	...	...
Libya		3	5	5,533,900	34	16	128	360	1996	...	...	13	1996	23	1996
Lithuania	\$2,659	3	4	3,476,000	10	8	395	884	1998	43.5	1998	61	1998	57.8	1998
Luxembourg	\$56,513	4	4	443,500	7	5	272	782	1998	21.9	1998	65.8	1998	69.4	1998
Macedonia, FYR	\$2,418	2	4	2,038,000	32	22	204	488	1998	66.6	1998	51.9	1998	14.9	1998
Madagascar	\$217	1	1	16,437,000	103	84	10.7	21.6	1996	10.7	1996	1	1996	...	...
Malawi	\$162	1	1	10,743,000	146	114	...	...	...	...	...	...	...	...	...
Malaysia	\$4,811	3	2	24,305,000	16	8	65.8	113.3	1997	27.1	1997	8.6	1997	...	...
Maldives	\$1,990	2	3	286,680	80	58	40	113	1995	185	1995	...	...	...	...
Mali	\$313	1	1	11,346,000	152	141	4.7	13.1	1994	3	1994	0.1	1994	...	...
Malta	\$10,098	5	5	397,000	9	5	261	1100	1998	77.1	1993	35.8	1998	49.3	1998
Marshall Islands	\$1,554	2	2	53,200	63	54	42.2	148.8	1996	10.1	1996	5.1	1996	...	...
Mauritania	\$513	1	1	2,828,000	120	120	13.8	62.4	1995	10.1	1995	2	1995	...	...
Mauritius	\$4,537	3	1	1,212,400	21	17	85	232.9	1995	...	...	13.5	1995	...	...
Mexico	\$3,713	3	6	100,920,000	37	24	186.4	86.5	1990	...	...	65.9	1990	...	...
Micronesia Fed. Sts.	\$3,713	2	2	100,920,000	37	24	57.3	279	1999	0.8	1999	12.2	1999	...	...

(continued on next page)

Table 7 (continued)

	GDP (2002)	Income level ¹	Region ²	Population (2002)	IMR		Physicians per 100,000 (1995-1999)	Nurses per 100,000 (1995-1999)	Midwives per 100,000 (1995-1999)	Dentists per 100,000 (1995-1999)	Pharmacists per 100,000 (1995-1999)	Year
					1990	2002						
Moldova, Rep.	\$729	1	4	4,255,000	30	27	350	874	87.1	41.2	67.5	1994
Monaco		5	4	30,000	0	0	664	1621	35.7	121	218	1995
Mongolia	\$440	1	2	2,448,500	77	61	243.3	307.3	...	13.5	...	1998
Morocco	\$1,476	1	5	29,641,000	66	39	46	105	...	4	11	1996
Mozambique	\$229	1	1	18,438,000	143	125	...	...	...	...	...	...
Myanmar		1	2	48,895,000	91	77	29.7	26.1	22.1	2.1	...	1999
Namibia	\$2,412	2	1	1,823,200	65	55	29.5	168	116.5	4	...	1997
Nauru ³	\$0			0	65	55	157	588	...	...	...	...
Nepal	\$241	1	3	24,122,000	100	0	4	5	7.4	...	...	...
Netherlands	\$31,160	4	4	16,144,000	7	5	251	902	9.1	47.1	17.4	1997
New Zealand	\$19,024	4	4	3,869,600	8	6	217.5	771	56.2	39	...	...
Nicaragua	\$437	1	6	5,334,900	52	36	85.6	91.9	...	18.6	...	...
Niger	\$207	1	1	11,542,000	191	156	3.5	22.9	5.5	0.2	...	...
Nigeria	\$248	1	1	132,780,000	114	110	18.5	66.1	52.4	2.6	...	...
Niue ³	\$0			0	114	110	130.4	478.3	87	87	...	...
Norway	\$38,843	4	4	4,538,700	7	4	413	1840	59.1	118	57.1	1998
Oman	\$6,277	3	5	2,539,400	25	12	133	325	...	9	19	1998
Pakistan	\$527	1	3	144,900,000	96	84	57	34	5.6	2.3	34	1996
Palau	\$5,435	3	2	19,900	0	24	110.4	144	...	11	...	...
Panama	\$3,839	2	6	2,940,400	27	19	166.8	144.1	...	83.8	...	...
Papua New Guinea	\$856	1	2	5,373,300	79	70	7.3	67	...	2.7	...	...
Paraguay	\$1,703	2	6	5,510,000	30	26	109.8	23.9	...	22.8	...	...
Peru	\$2,404	2	6	26,749,000	58	30	93.2	115.2	...	39.6	...	...
Philippines	\$1,195	2	2	79,944,000	45	29	123	418	163	52	...	...
Poland	\$3,762	3	4	38,626,000	19	8	236	527	64.3	45.6	53.5	1997
Portugal	\$13,151	4	4	10,032,000	11	5	312	379	8.3	33.3	75.3	1998
Qatar		5	5	610,490	19	11	126	289	...	21	51	1996
Romania	\$1,611	2	4	22,355,000	27	19	184	409	39.6	23.9	7.3	1998
Russian Federation	\$2,734	2	4	144,070,000	17	18	421	821	62.5	32.2	6.2	1998

	GDP (2002)	Income level ¹	Region ²	Population (2002)	IMR 1990	IMR 2000- 2002	Physicians per 100,000 (1995-1999)	Nurses per 100,000 (1995-1999)	Year	Midwives per 100,000 (1995-1999)	Year	Dentists per 100,000 (1995-1999)	Year	Pharmacists per 100,000 (1995-1999)	Year
Rwanda	\$295	1	1	8,163,000	107	96	...	...	...	...	...	...	...	...	...
Samoa	\$1,491	2	2	176,200	33	20	34.4	155	1996	36	1996	4	1996	...	...
San Marino		5	4	30,000	0	4	252	508	1990	26	1990	36.4	1984	52.1	1990
Sao Tome & Principe	\$347	1	1	154,210	69	57	46.7	127.4	1996	29.6	1996	5.2	1996	...	...
Saudi Arabia	\$6,614	3	5	22,116,000	34	23	166	330	1997	...	...	16	1997	21	1997
Senegal	\$628	1	1	10,007,000	90	79	7.5	22.1	1995	6.6	1995	1.2	1995	...	...
Seychelles	\$5,715	3	1	83,590	17	13	132.4	467.6	1996	394.6	1996	12.2	1996	...	...
Sierra Leone	\$165	1	1	5,235,500	185	182	7.3	33	1996	4.7	1996	0.4	1996	...	...
Singapore	\$27,254	5	2	4,164,000	7	3	162.7	492.1	1998	...	...	28.9	1998	...	...
Slovak Rep.	\$27,254	3	4	4,164,000	7	3	353	708	1998	39.3	1995	48.2	1998	33.8	1998
Slovenia	\$12,326	5	4	1,992,000	8	4	228	681	1998	32.7	1990	60.8	1998	36.3	1998
Solomon Islands	\$527	1	2	443,300	29	20	14	119	1995	...	...	7	1995	...	...
Somalia		1	1	9,390,800	133	133	4	20	1997	...	...	0.2	1997	0.1	1997
South Africa	\$4,183	2	1	43,580,000	45	56	56.3	471.8	1996	...	...	17.8	1996	...	...
Spain	\$17,885	4	4	41,180,000	8	4	424	458	1997	16.2	1988	38.5	1997	113	1997
Sri Lanka	\$891	2	3	18,968,000	19	17	36.5	102.7	1999	41.9	1999	2.5	1999	4.5	1999
St. Kitts & Nevis	\$6,125	3	6	45,980	30	20	117.1	497.6	1997	...	...	19.5	1997	...	...
St. Lucia	\$3,709	3	6	158,520	19	17	47.3	263	1997	...	...	6.2	1997	...	...
St. Vincent & the Grenadines	\$2,471	2	6	116,720	21	22	87.7	238.6	1997	...	...	5.3	1997	...	...
Sudan	\$356	1	1	32,365,000	75	65	9	58	1996	...	...	0.7	1996	1.1	1996
Suriname	\$1,057	2	6	422,570	35	26	25.2	156.3	1996	...	...	0.9	1996	...	...
Swaziland	\$1,528	2	1	1,088,200	77	106	15.1	...	1996	...	...	...	...	...	...
Sweden	\$32,117	4	4	8,924,000	6	3	311	821	1997	71.8	1991	152	1997	67.3	1998
Switzerland	\$46,983	4	4	7,227,500	7	5	323	779	1998	26.5	1990	48.8	1997	61.5	1998
Syrian Arab Rep.	\$801	2	5	17,005,000	37	23	144	189	1998	...	...	74	1998	53	1998
Tajikistan	\$453	1	4	6,315,700	98	0	201	484	1998	65.4	1998	18.4	1998	12	1998
Tanzania	\$204	1	1	35,181,000	102	104	4.1	85.2	1995	44.8	1995	0.7	1995	...	...
Thailand	\$2,986	2	2	61,613,000	34	24	24	87	1995	...	...	...	...	...	...
Timor-Leste				753,000	0	85
Togo	\$324	1	1	4,766,600	88	79	7.6	29.7	1995	10.4	1995	0.7	1995

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Table 7 (continued)

	GDP (2002)	Income level ¹	Region ²	Population (2002)	IMR		Physicians per 100,000 (1995-1999)	Nurses per 100,000 (1995-1999)	Midwives per 100,000 (1995-1999)	Dentists per 100,000 (1995-1999)	Pharmacists per 100,000 (1995-1999)	Year
					1990	2002						
Tonga	\$1,750	2	2	101,160	25	17	44	315.1	31	9.2	...	1997
Trinidad & Tobago	\$5,466	3	6	1,318,300	21	17	78.8	286.8	...	8.4	...	1994
Tunisia	\$2,580	2	5	9,788,300	37	21	70	286	...	13	17	1997
Turkey	\$2,942	2	4	69,626,000	61	36	121	109	64.4	21	33.6	1998
Turkmenistan	\$1,787	2	4	5,545,400	80	69	300	587	78.4	21.6	33.5	1997
Tuvalu ³	\$0			0	80	69	30	300	90	10	...	1999
Uganda	\$367	1	1	23,395,000	100	79	...	18.7	13.6	0.2	...	1996
Ukraine	\$1,038	2	4	48,717,000	18	17	299	736	58.7	39	46.7	1998
United Arab Emirates	\$15,590	5	5	3,049,200	12	8	181	341	...	26	81	1996
United Kingdom	\$23,015	4	4	58,858,000	8	6	164	497	43.3	39.8	58.2	1989
United States	\$31,977	4	4	288,370,000	9	7	279	972	...	59.8	...	1996
Uruguay	\$5,463	3	6	3,381,000	20	14	370.3	70	...	126.3	...	1996
Uzbekistan	\$525	1	4	25,391,000	53	52	309	1011	67.5	24.4	3.1	1998
Vanuatu	\$1,176	2	2	205,570	52	34	12	260	...	...	...	1997
Venezuela, RB	\$2,978	3	6	25,093,000	23	19	236.3	64.4	...	57.1	...	1997
Viet Nam	\$2,978	1	2	25,093,000	23	19	48	56	17.6	...	...	1998
Yemen, Rep.	\$314	1	5	18,601,000	98	79	23	51	...	1.6	4	1996
Zambia	\$410	1	1	10,461,000	108	112	6.9	113.1	...	...	...	1995
Zimbabwe	\$522	1	1	12,967,000	53	76	13.9	128.7	28.1	1.3	...	1995

1 The measure for income level, 1, 2, 3, 4, and 5 corresponds to low income, lower middle income, upper middle income, high income OECD, and high income non-OECD countries, respectively.

2 The measure for region, 1, 2, 3, 4, and 5 corresponds to SSA, EAP, SA, ECA, and MENA countries, respectively.

3 No WDI data.

Source: Courtesy of Christopher Kurowski

Table 8: Brain loss in 9 SSA countries, by profession

Country	Physicians	Nurses and Others
Cameroon	49% of health workers have intention to emigrate (p.47) (Awases, Gbary, and Chatora, 2003).	
Ghana	<p>600 Ghanaian medical practitioners are practicing in New York. 62% of health workers have intention to emigrate (p.47) (Frimpong, 2002).</p> <p>604 (70%) out of 871 (70%) medical officers trained between 1993-2002 left the country (Safo, 2003).</p> <p>UNDP notes that in Africa, the loss of physicians has been the most striking. At least 60% of physicians trained in Ghana during the 1980s have left the country (Mutume, 2003).</p> <p>In 1999, 40 of Ghana's 43 final year medical students planned to leave immediately after graduation, while 70% of its 1995 graduates had already emigrated by 1999 (Loewenson and Thomson, 2002).</p>	<p>Ghana has lost about 2,500 nurses to Europe from 1999 to 2002 according to the president of the nurse association of Ghana (Awases, Gbary, and Chatora, 2003).</p> <p>Ghana lost 328 nurses in 1999 which was equivalent of its annual output (Loewenson and Thomson, 2002).</p>
Kenya	Kenya estimated that only 600 physicians work in public hospitals out of more than 5000 registered. The rest have moved abroad or are working in private sector (Pang, Lansang, and Haines, 2002)	
Malawi		<p>In 2001, the School of Medicine stated that: Out of a group of 35 RN graduates, some went to work with NGOs and 4 went directly overseas. Four of their teachers also went to work overseas (p.30) (Martineau et al, 2001).</p> <p>The Nursing Association reports that in 2001, 100 nurses applied for references application to work abroad and 80 have made similar request up to September 2002 (Hornby, Kathyola, and Martineau, 2002).</p> <p>Nurses and midwives registering with the UK CC (Loewenson and Thomson, 2002):</p> <p>1998/1999: 1 1999/2000: 15 2000/2001: 45</p>
Senegal	38% of health workers have intention to emigrate (p.47) (Awases, Gbary, and Chatora, 2003).	

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Table 8 (continued)

Country	Physicians	Nurses and Others						
South Africa	<p>58% of health workers have intention to emigrate (p.47) (Awases, Gbary, and Chatora, 2003).</p> <p>In the past four years(1998-2002), South Africa has 600 of its medical graduates (trained at a cost of US\$ 37 million) registered in New Zealand (Lancet, 2002).</p> <p>10% of Canada's hospital-based physicians are South African graduates (Loewenson and Thomson, 2002).</p> <p>South Africa medical school suggest that a third to a half of its graduates emigrate to the developed world (Pang, Lansang, and Haines, 2002).</p>	<p>More than 300 South African specialist nurses are thought to leave the country every month (Tetty, 2003).</p> <p>Nurses and midwives from South Africa registering with the UK CC (Loewenson and Thomson, 2002):</p> <table> <tr> <td>1998/1999:</td> <td>599</td> </tr> <tr> <td>1999/2000:</td> <td>1460</td> </tr> <tr> <td>2000/2001:</td> <td>1086</td> </tr> </table>	1998/1999:	599	1999/2000:	1460	2000/2001:	1086
1998/1999:	599							
1999/2000:	1460							
2000/2001:	1086							
Uganda	<p>Uganda produces 150 physicians per annum, estimated migration is 30% for physicians (Omaswa, 2003).</p> <p>Many Ugandan physicians left for more affluent countries. One of South Africa's medical schools has several senior faculty from Uganda (Bundred and Levitt, 2000).</p> <p>26% of health workers have intention to emigrate (p.47) (Awases, Gbary, and Chatora, 2003).</p>	<p>Uganda produces 200 registered nurses/ midwives per year, more than 10% of these professionals are estimated to migrate (Omaswa, 2003).</p>						
Zambia	<p>Zambia's medical school in Lusaka has trained over 600 Zambian medical graduates in its 23 years, but only 50 work in the Zambia public sector health service now (Bundred and Levitt, 2000).</p> <p>The Zambian public health system has retained only about 50 of more than 600 physicians trained in the country since independence (Loewenson and Thomson, 2002).</p>	<p>Nurses and midwives from Zambia registering with the UK CC (Loewenson and Thomson, 2002):</p> <table> <tr> <td>1998/1999:</td> <td>15</td> </tr> <tr> <td>1999/2000:</td> <td>40</td> </tr> <tr> <td>2000/2001:</td> <td>83</td> </tr> </table> <p>The principal reason for staff losses is salary, with a large number of nurses and midwives leaving Zambia for jobs in the UK and the US. The Zambian government recently increased the salaries of nurses and midwives, but complaints that the salaries remain insufficient even after the increase are widespread. Therefore, it is not clear that this recent salary increase will influence staff loss rates (Huddart, Lyons, and Furth, 2003).</p>	1998/1999:	15	1999/2000:	40	2000/2001:	83
1998/1999:	15							
1999/2000:	40							
2000/2001:	83							

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Country	Physicians	Nurses and Others						
Zimbabwe	<p>68% of health workers have intention to emigrate (p.47) (Awases, Gbary, and Chatora, 2003).</p> <p>About 200 physicians left Zimbabwe for Botswana and South Africa in 1992. Of 1200 Physicians trained in Zimbabwe during the 1990s, only 360 were still practicing in the country in 2001. (= 840 went abroad) (Loewenson and Thomson, 2002).</p>	<p>18,000 Zimbabwean nurses work abroad (Mangwende, 2002).</p> <p>Nurses and midwives from Zimbabwe registering with the UK CC (Loewenson and Thomson, 2002):</p> <table data-bbox="927 394 1122 489"> <tr> <td>1998/1999:</td> <td>52</td> </tr> <tr> <td>1999/2000:</td> <td>221</td> </tr> <tr> <td>2000/2001:</td> <td>1086</td> </tr> </table>	1998/1999:	52	1999/2000:	221	2000/2001:	1086
1998/1999:	52							
1999/2000:	221							
2000/2001:	1086							
Non-specific	<p>UN Commission for Trade and Development estimated that each migrating African professional represents a loss of US\$184,000 to Africa. Paradoxically, Africa spends US\$4bn a year on the salaries of 100,000 foreign experts (Seepe, 2001).</p>							

Notes

1. In many countries, up to three quarters of recurrent health expenditures are used on staffing costs and wages.

2. At the time of writing, the most current and comprehensive data available is compiled by the WHO, using a variety of national health surveys. More information on this topic can be found in Diallo et al. (2003).

3. Burkina Faso, Burundi, Central African Republic, Chad, Ethiopia, Gambia, Liberia, Mali, Mozambique, Niger, Somalia, Tanzania, and Uganda.

4. As of 2002, SSA had an estimated population of 693 million, which is expected to increase to 1081 million by 2025, (Population Reference Bureau, World Population Data Sheet, 2002).

5. Cameroon, CAR, Ghana, Kenya, Madagascar, Tanzania, and Zambia.

6. Burkina Faso, Cameroon, CAR, Ghana, and Madagascar.

7. CREDESS, Paris, 1999 data for Ivory Coast, unpublished.

8. See, for example, the case of Cameroon, Congo, and Cote d'Ivoire.

9. These are attributable to demographic factors (an aging population which requires

more services, a smaller pool of recruits for the health professions), social and cultural factors (more career options available to young people, particularly to women), work related factors (lower attractiveness of health occupations perceived as demanding and not well rewarded).

10. Statistics available for South Africa, Zimbabwe, Nigeria, Ghana, Zambia, Kenya, and Malawi.

11. This is often described as “brain drain”, an expression traditionally used to describe the permanent emigration of qualified persons. The notion of “brain loss” is more comprehensive, as it also encompasses losses due to people leaving the health sector to take other jobs which reward them better.

12. An example of an interesting and potentially effective measure is the International Council of Nurses supported Zambian Nurses Association partnership with the Zambian Ministry of Health in the administration of a program to provide free testing and treatment for pregnant nurses and other health workers (see ICN, http://www.icn.ch/PR26_03.htm).

References

- Abt Associates South Africa Inc. (2000). The Impact of HIV/AIDS on the Health Sector in Botswana. Commissioned by the Ministry of Finance and Development Planning with support from the United Nations Development Program. April.
- Adams, R.H. (2003). *International migration, remittances and the brain drain: A study of 24 labor-exporting countries*. Washington, DC: World Bank.
- Arresting the health brain drain. (2002, Nov. 24). *Public Agenda (Accra)*, OPINION. Retrieved January 13, 2003, from <http://fr.allafrica.com/stories/printable/200211250738.html>.
- Awases, M., A. Gbary, and R. Chatora (2003). *Migration of health professionals in six countries: A synthesis report*. Brazzaville: World Health Organization Regional Office for Africa.
- BBC (2003). Halting Africa's health brain drain. *BBC News*. Retrieved June 30, 2003, from <http://news.bbc.co.uk/go/pr/fr/-/2/hi/africa/3040825.stm>.
- Bchir, A. and V. Brouwere (2000). The performance of medical doctors in Tunisia. In Ferrinho, P. and W. Van Lerberghe, eds. *Providing Health Care Under Adverse Conditions: Health Personnel Performance and Individual Coping Strategies*. Studies in Health Services Organization and Policy 16. Antwerp: ITGPress.
- Buchan, J. (2000). *Making up the difference: A review of the UK nursing labour market in 2000*. London: RCN.
- Buchan, J. (2002a). Global nursing shortages are often a symptom of wider health system or societal ailments. *British Medical Journal* 324: 751-752.
- Buchan, J. (2002b). *International recruitment of nurses: United Kingdom case study*. London: RCN.
- Buchan, J. (2003). *Here to stay? International nurses in the UK*. London: RCN.
- Buchan, J. and I. Seccombe (2002). *Behind the headlines: a review of the UK nursing labour market in 2001*. London: RCN.
- Bundred, P. and C. Levitt (2000). Medical migration: who are the real losers? *The Lancet* 356 (9225): 245-246.
- Campbell, E.K. (2002). *Skills and brain drain and the movement of skilled migrants in Southern Africa*. Paper presented at SAMP/LHR/HSRC workshop on regional integration, poverty and South African's proposed migration policy, Pretoria, South Africa (April 23).

- Chatora R. (2003). Migration of Health Professionals. Presentation at 38th Regional Health Ministers' Conference, Livingstone, ZAMBIA (17-21 November).
- Cheluget B., C. Ngare, J. Wahiu, et al. (2003). Impact of HIV/AIDS on Health Workforce in Kenya. Ministry of Health, Kenya.
- Commonwealth Secretariat (2002). *Commonwealth code of practice for international recruitment of health workers*. London: Commonwealth Secretariat.
- Diallo, K., P. Zurn, N. Gupta, and M. Dal Poz (2003). Monitoring and evaluation of human resources for health: an international perspective. *Human Resources for Health* 1(3). <http://www.human-resources-health.com/content/1/1/3>.
- Dickson, P. (2002). Unskilled workers pour in. *Pretoria News* (Oct. 16). Retrieved Jan. 17, 2003 from <http://www.neasa.com/article20.htm>.
- Dussault, G. and C. Franceschini (2003). *Not enough here, too many there: understanding geographic imbalances in the distribution of health personnel*. Washington, DC: The World Bank Institute.
- Elmendorf A.E. and K. Larusso (2003). Health workforce issues under World Bank-financed Health, Nutrition and Population projects in Africa, 1974–2002 (Draft). Washington, DC: The World Bank.
- Elmendorf A.E., I. Pimenta (2003). Health workforce issues in World Bank macro-economic operations in Africa (Draft). Washington, DC: The World Bank.
- Elmendorf A.E. and R. Nesbitt (2003). Health workforce issues in HIPC and PRSP documentation of African countries (Draft). Washington, DC: The World Bank.
- Fresta, E., M.J. Fresta, and P. Ferrinho (2000). The internal brain drain in the Angolan health sector. In Ferrinho, P. and W. Van Lerberghe, eds. *Providing Health Care Under Adverse Conditions: Organization and Policy* 16. Antwerp: ITGPress.
- Frimpong, D. (2002). GTV News Jan. 21, 2002. Cited in Awases, Gbary, and Chatora (2003).
- Frommel, D. (2002). Quand le Nord débauche les médecins du Sud. *Le Monde diplomatique* 28-29 (April).
- Fülop, T. and M. Roemer (1987). *Reviewing health manpower development: A method for improving national health systems*. Public Health Paper 83. Geneva: World Health Organization.
- Gaidzanwa, R. (1999). *Voting with their feet: Migrant Zimbabwean nurses and doctors in the era of structural adjustment*. Nordiska Afrikainstitutet. Research Report 11: 79-81.
- Ghana Ministry of Health (2002). Internal Report on Human Resources.
- Government wakes up to flight for health workers. (2002). *UN Integrated Regional Information Networks, NEWS*, May 15. Retrieved Feb. 12, 2003, from <http://allafrica.com/stories/printable/200205150003.html>.
- Health services threatened by "brain drain". (2002). *UN Integrated Regional Information Networks, NEWS*, August. Retrieved Feb. 12, 2003, from <http://allafrica.com/stories/printable/200108220382.html>.
- Hornby, P., J. Kathyola, and T. Martineau (2002). SWAp Design Mission Human Resource Report, 19 September 2002, Malawi.
- Huddart, J., J.V. Lyons, and R. Furth (2003). HIV/AIDS Workforce Study, Initiatives Inc., October 7, 2003.
- Kinoti, S. (2002). The impact of HIV/AIDS on the health sector in sub-Saharan Africa: The issue of human resources. Paper presented at the consultative meeting on improving collaboration between health professionals, government and stakeholders in human resource development for health, Addis Ababa (Jan/Feb).

- Kurowski, C., K. Wyss, S. Abdulla, Yèmadji, N'Diekhon, and A. Mills (2003). Improving the health of the poor: the human resource challenge. Submitted for publication to *The Lancet*.
- Lancet (2002). Medical migration and inequity of health care. *The Lancet* 356 (9225), July 15: 177.
- Loewenson R. and C. Thomson (2002). Health personnel in Southern Africa: Confronting mal-distribution and brain drain. EQUINET discussion paper 3. Regional Network for Equity in Health in Southern Africa (EQUINET) Health System Trust (South Africa) and MEDACT (UK).
- Lowell, B.L. and A.M. Findlay (2001). *Migration of highly skilled persons from developing countries: impact and policy responses*. International Migration Papers 44. Geneva: International Labour Office.
- Lowell, B.L. (2001). *Some developmental effects of the international migration of highly skilled persons*. International Migration Papers 46. Geneva: International Labour Office.
- Mangwende, B. (2002). Health sector records massive brain drain. Daily News (Zimbabwe), April 10, 2001. Cited in Pang, Langsang, and Haines (2002).
- Martineau, T. and J. Buchan (2000). *HR and the success of health sector reform: Eliminating health disparities*. Paper presented at the 128th annual meeting of the American Public Health Association, Boston, MA.
- Martineau, T., K. Decker, and P. Bundred (2002). Briefing Note on International Migration of Health Professionals: Leveling the Playing Field for Developing Country Health Systems. Liverpool School of Tropical Medicine.
- Martineau, T., K. Sargent, A. Mvula, and S. Lungu (2001). Institutional and Human Resources Appraisal of Sexual and Reproductive Health Program, Mission Report, April 2001, Ministry of Health and Population, Government of Malawi.
- Mato, N. (2002). Brain drain in Africa. International Association of University Presidents. Retrieved February 20, 2003, from <http://www.auc.dk/iaup/5chap5.htm>.
- Mbanefoh, N. (1992). *Dimensions of brain drain in Nigeria: a case study of some critical high level manpower in the university college hospital (UCH), Ibadan*. NISER Monograph 8. Ibadan: Nigerian Institute of Social and Economic Research (NISER).
- Mensah, K. (2002). *Attracting and retaining health staff: A critical analysis of the factors influencing the retention of health workers in deprived/hardship areas*. Yak-Aky Services.
- Ministère de la Santé, Mali (2002). *Gestion du Service de santé*. Technical notes (mimeographed), Mission d'Appui au développement des ressources humaines (MDRH).
- Mutume, Gumisai (July 2003). Reversing Africa's 'brain drain' New initiatives tap skills of African expatriates. *Africa Recovery* 17/2.
- Ngufor, G. F. (1999). Public service reforms and their impact on health sector personnel in Cameroon. In ILO/WHO/World Bank. *Public service reforms and their impact on health sector personnel: Case studies on Cameroon, Colombia, Jordan, Philippines, Poland, and Uganda*.
- OECD (Organization for Economic Co-operation and Development) (2002). *International migration of physicians and nurses: causes, consequences, and health policy implications*. Paper presented at expert meeting for human resources for health-care of the OECD Health Project, Paris, France (December).
- Omaswa, F.G. (2003) Human resources for the Millennium Development Goals: The Challenge in Uganda, Meeting of Interested Parties, WHO, Geneva, November4, 2003.

- Pablos-Mendez, A., H. Brown, T. Evans, and L. Chen (2002). *Strategies on Human Resources for Health and Development: A Joint Exploration*. The Rockefeller Foundation.
- Pang, T., M.A. Lansang, and A. Haines (2002). Brain drain and health professionals: a global problem needs global solutions. *British Medical Journal* 324 (7336): 499-500.
- Picazo, O.F. (2002). *Better Health Outcomes from Limited Resources: Focusing on Priority Services in Malawi*. Africa Region Human Development Working Papers Series. Washington, D.C.: World Bank, Africa Region, Human Development Division.
- Picazo, O.F. (2002). *Human Capacity Development and HIV/AIDS*. Slides presented at Human Capacity Development and HIV/AIDS meeting, London (2-3 October).
- Population Reference Bureau (2002). World Population Data Sheet.
- Rosenblatt, R., M. Whitcomb, T. Cullen, T., D. Lishner, and G. Hart (1992). Which medical schools produce rural physicians. *JAMA* 268(12): 1559-65.
- Safo, A. (2003). 604 Doctors Abandon Ghana. *Public Agenda* (July 7).
- Secretary of State for Health (2000). *The NHS plan: A plan for investment, a plan for reform*. London: Department of Health.
- Secretary of State for Health (2002). *Delivering the NHS plan: Next steps on investment, next steps on reform*. London: Department of Health.
- Seepe S. (2001). "Brain drain costly" Int. Herald Trib. (18 October). The brain drain will continue unabated. Cited in Pang T, M.A. Lansang, and A. Haines (2002). Brain drain and health professionals: A global problems need global solutions. *British Medical Journal* 324: 499-500.
- Shinn, D. (2002). Reversing the Brain Drain in Ethiopia. *AllAfrica.com* (December 6).
- Stillwell, B. (2001). *Health worker motivation in Zimbabwe*. World Health Organization unpublished.
- Tawfik, L. and S. Kinoti (2001). *The impact of HIV/AIDS on the health sector in sub-Saharan Africa: the issue of human resources*. The SARA Project.
- Tettey, Wisdom J. (2003). "Africa's options: Return, retention or diaspora?" SciDev Net, policy briefs, May 2003.
- UNAIDS and WHO (2003). AIDS Epidemic Update 2003.
- USAID SARA (2003). *Health sector human resources crisis in Africa: An issues paper*. Support for Analysis and Research in Africa. Bureau for Africa, Office of Sustainable Development, Washington.
- Vaughan, P. (1992). *Health personnel development in Sub-Saharan Africa*. Policy research working paper. Washington, DC: World Bank, Population and Human Resources Department.
- Van de Looij, F. and J. Benders (1995). Not just money: quality of working life as employment strategy. *Health Manpower Management* 21: 27-33.
- Wadda, R. (2000). *Brain drain and capacity building in Africa: the Gambian experience*. Paper presented at the Joint ECA/IOM/IDRC Regional Conference on Brain Drain and Capacity Building in Africa, Addis Ababa, Ethiopia.
- Wibulprasert, S. (2002). *Integrated strategies to tackle inequitable distribution of doctors in Thailand: four decades of experience*. Thailand: Ministry of Public Health.
- Wiskow, C. (1999). *Summary of findings from the country studies on Ghana and Cameroon*. Human resource management and development in district health series in African countries. GTZ.
- Whiteside, A and C. Sunter (2001). AIDS: The challenge for South Africa. Human & Rosseau

- World Bank (1999). Operations Evaluation Department. *Development Effectiveness in Health, Nutrition, and Population: Lessons from World Bank Experience*. Sector Study (May).
- World Bank (2002). Santé et Pauvreté au Niger. Vers les objectifs Internationaux. Le Groupe Thématique Santé et Pauvreté du Niger en préparation du Document de Stratégie de Réduction de la Pauvreté (Draft). Washington D.C. (July).
- World Health Organization (1996). Strengthening nursing and midwifery: Progress and future directions, 1996-2000. Geneva: WHO.
- World Health Organization (2000). *World Health Report 2000*. Geneva: WHO.
- World Health Organization (2001). *Human resources in health toolkit for planning, training, and management, country HRH problems and policies*. Retrieved on February 2, 2003 from http://hrhtoolkit.forumone.com/mstr_workforce.../workforce-05.htm.
- World Health Organization (2002). *Strategic directions for strengthening nursing and midwifery services*. Geneva: WHO.
- World Health Organization (2001). *Macroeconomics and Health: investing in health for economic development*. Commission on Macroeconomics and Health chaired by J.D. Sachs. Presented to G.H. Brundtland, Director-General of the WHO, Geneva (December 20).
- World Health Organization (2002). *Building strategic partnerships in education and health in Africa*. Regional Office for Africa. Document presented at the consultative meeting on improving collaboration between health professionals, governments, and other stakeholders in human resources for health development, Addis Ababa, Ethiopia.
- World Health Organization (2002). *The HRD Advocacy Pack*. Regional Office for Africa. Compiled and mimeographed by School of Public Health, University of Western Cape, South Africa.
- World Health Organization and World Bank (2002). *Building Strategic Partnerships in Education and Health in Africa*. Report presented at the consultative meeting on improving collaboration between health professionals, governments and other stakeholders in human resources for health development, Addis Ababa, Ethiopia.
- Wyss K., M.D. Doumagoum, and B. Callewaert (in press). Constraints to Scaling-up health related interventions: The case of Chad, Central Africa. *Journal for International Development*, in press.
- Wyss, K., D.D. Moto, N. Yémadji, and C. Kurowski (2002). *Human resources availability and requirements in Chad*. Swiss Center for International Health, Swiss Tropical Institute, Basel.
- Zimbabwe: Only one doctor left for Bulawayo. (2003, June 23). *The Daily News Harare*.
- Zinyama, L.M. (1990). "International migrations to and from Zimbabwe and the influence of political changes on population movements, 1965-1987," *International Migration Review* (electronic version) 24(4): 748-767.

