The Brain Drain in Africa: An Emerging Challenge to Health Professionals' Education

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Abstract

A health crisis is facing sub-Saharan Africa. The population has increased markedly. In recent decades, communicable diseases and 'new' noncommunicable disease epidemics have intensified. HIV/AIDS is perhaps the biggest health challenge. However, the supply of health workers remains low and has been worsened by their migration to developed countries. This paper reviews health professionals' 'brain drain' using data from Ghana and other African countries, with proxy data supplying some information on which direct data do not exist. Not only is retention of health professionals a serious challenge, but training output has also remained limited. There are few studies of how stakeholders, including institutions of tertiary education, can moderate the effects of brain drain. Sub-Saharan Africa cannot compete economically with industrialised countries in the same health labour market. This paper discusses ways in which educational systems and the health sector can collaborate to mitigate the effects of health professionals' migration and to sustain health services including (a) new modes of selecting candidates for the professions, (b) establishing new and relevant curricula, (c) profiling new cadres that are better retained, and (d) co-ordinating with the health sector on bonding and community service schemes to facilitate retention.

Résumé

L'Afrique subsaharienne est confrontée à une crise sanitaire. La population de cette zone a connu une forte croissance. Au cours des dernières décennies, les épidémies de maladies contagieuses et de « nouvelles » maladies non contagieuses se sont intensifiées. Parmi celles-ci figure le SIDA, qui pose un défi majeur. Or, le nombre

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des travailleurs de la santé demeure de plus en plus faible du fait de leur migration vers les pays développés. Cette communication analyse le phénomène de « fuite des cerveaux » touchant les professionnels de la santé, sur la base des données récoltées au Ghana et dans d'autres pays africains, en exploitant les données indirectes pour déterminer les données directes inexistantes. L'arrêt de cette « hémorragie » est devenu un véritable défi. De même le système de formation dans ce domaine a donné des résultats peu probants. Il n'existe que très peu d'études sur la manière dont les parties prenantes, parmi lesquelles figurent les institutions de l'enseignement supérieur, suppléent aux effets du phénomène de fuite des cerveaux. D'un point de vue économique, l'Afrique subsaharienne n'a pas les moyens de rivaliser avec les pays industrialisés, sur le marché du travail de la santé. Cette communication présente la manière dont les systèmes d'éducation et le secteur de la santé peuvent collaborer pour atténuer les effets de la migration des professionnels du milieu, et améliorer la qualité des services de santé, (a) grâce à de nouveaux modes de sélection des professionnels du milieu, (b) en mettant en place de nouveaux programmes plus adaptés, (c) en formant de nouveaux cadres motivés à rester dans le pays, et (d) en mettant en place un système de contrats d'engagement et de services communautaires, pour mieux retenir les professionnels du secteur.

Introduction

Africa faces a health crisis occasioned by a number of important factors that have arisen over the past two decades. Perhaps the most important is the HIV/ AIDS epidemic; however, according to Sanders et al. (2003) the re-emergence of old communicable diseases such as tuberculosis and malaria, development, and the apparent paradox that changing lifestyles has resulted in concurrently increasing levels of noncommunicable disorders rather than improved health have also increased the disease burden considerably. In addition, perennial problems stem from the economic difficulties of countries in sub-Saharan Africa, which affect health systems through low funding and a deterioration of the infrastructure of health systems.

Sanders et al. (2003) further provide evidence to show that substantial improvements had indeed occurred in health in sub-Saharan Africa in the period following independence but they suggest that the past two decades have witnessed serious resurgences of the 'old' communicable diseases (e.g., tuberculosis, malaria and cholera) in addition to 'new' epidemics in HIV/AIDS and to such diseases of the 'epidemiological transition' as cardiovascular ailments. The net result is that these combined problems have eroded the health gains made in earlier decades. Indeed seventeen of forty-eight countries in sub-Saharan Africa experienced a reduction in life expectancy between 1981 and 1999.

Central to this difficult scenario is the health professional, who is a critical part of the health system and perhaps the most essential of the resources needed for a fruitful health sector. However, in sub-Saharan Africa, human resources remain in short supply and, even where available, are poorly motivated and are increasingly attracted into the wider international labour market. Statistical information from the World Health Organization (2003b) shows wide global variations in health professional availability, ranging for doctors from 2.3 to 664 per 100,000 population; but of the lowest fifth of countries in this range, twenty-eight of thirty-seven are sub-Saharan African countries.

Defining the Problem: A Link Between Brain Drain and Education?

The brain drain of health professionals from African (and other developing) countries has recently become a topical issue, especially in the face of serious health challenges facing the continent. Several factors influence the state of health professionals' retention; and Africa, like many other countries, faces many of these challenges.

Brain Drain

Brain drain is described by Lowell and Findlay (2001), as the emigration abroad of tertiary-educated persons at such levels and for such lengthy durations that their losses are not offset by their remittances home, by transfer of technology, or by investment or trade from the recipient country. This description however skirts the issue of permanent versus temporary migration and re-inforces the fact that it is difficult to discern the true intentions of migrant professionals. Health professionals in Africa often specialize in countries other than their own, spending long periods of time in post-graduate professional training which often leads to continued residence in the country of training. In this paper, brain drain is considered to have occurred once a professional is not in the employ of the home or source country. Return may occur when conditions change at home, but such movement in and of itself does not give clear-cut indications of migrants' intentions.

Health Professional

The term "health professional' in this paper refers to mostly tertiary-trained (meaning training at the post-secondary university level) persons and generally includes doctors, pharmacists and graduate nurses.

Push/Pull Factors

'Push' factors were used by Meeus (2003) and Dovlo (1999) in some studies on the brain-drain phenomenon to describe factors within source countries that compel professionals to emigrate whilst "pull' factors arise within recipient

countries and attract intellectuals into their own systems. Padarath et al. (2003), however, describe a system of push factors that exist in both source and recipient countries but which are mitigated in recipient countries by what they described as 'stay' factors and in source countries by 'stick' factors.

Most health professional education in Africa is provided and subsidised by governments, and professionals are produced for the health sector by publicly funded universities and colleges managed by the education sector. It was suggested at the World Health Organization/World Bank (2002) conference on 'Building Strategic Partnerships in Education and Health in Africa' that a disconnect existed between health reforms and policy formulation on one hand and the education of the health workforce on the other, which may well influence matching the professional to the community's needs. Such a situation would exert a push factor.

Stalker (2001:21–22) recently defined the influencing factors in terms of individual and structural approaches to migration. The structural approach refers to factors outside the control of the individual professional such as the political and social problems within a country. The individual or 'human capital' approach emphasizes those factors that constitute personal motivation and incentives to migrate.

The Roles of Education

The education of health professionals may be said to interface with their retention and motivation in a number of ways. Boelen and Heck (1995) proposed that medical schools have social accountability to the communities served, suggesting that medical schools must adapt so that they respond to or proactively help shape the future of their health systems. They also suggest this definition for medical education: 'It is the art and science of (1) preparing future medical graduates to function properly in society and (2) influencing the environment in which these graduates will work, to the greatest satisfaction of the health consumers, the health authorities and the graduates themselves'. Thus, it may be extrapolated that medical education has a role to play in creating the systems that ensure the retention of its graduates to serve its communities. Furthermore, the value of medical schools will be enhanced by their relevance, quality, cost-effectiveness and equity responsiveness. For example, Lehman, Andrews and Sanders (2000) show that deliberate equity criteria used in selecting candidates for medical education in South Africa has changed the profile of students and that students selected from deprived communities were more likely to remain in those communities for longer terms of service (personal communication from Professor Steven R. Reid, Center for Rural Health University of Natal, South Africa, April 2004). Translating these tenets into

the true retention and mitigation of the brain drain of health professionals remains a major challenge.

This review is based on an analysis of the factors influencing the brain drain of health professionals in Africa. It undertakes a qualitative evaluation of various pieces of evidence on the status of the brain drain, especially the strategies that various countries have adopted to mitigate the effects of brain drain. It attempts to elicit what roles the education of health professionals can play in these strategies. Whilst health professionals encompass a wide range of people with skills working in health, the main focus of this paper is on the medical profession.

Magnitude of the Problem

The numbers of African health professionals joining the brain drain appear to have increased in recent years in response to the high demand from developed countries; however, Dovlo and Nyonator (1999) show that Ghana, for example, also loses professionals (especially physicians) to other developing countries, especially to South Africa. However, the main demands have come from demographic changes in industrialised countries that have resulted in aging populations and a reduction in the availability of young people to recruit into the health workforce. For African countries, the loss of health professionals, combined with increased internal demand for health professionals due to the health crisis described earlier, threatens the entire development process in sub-Saharan Africa and its ability to meet health-related millennium development goals. Kurowski (2003) estimates from staffing norms (based on the requirements with which Latin American countries reached infant mortality rate targets) that low-income sub-Saharan countries will require about 720,000 doctors and 670,000 nurses to achieve the same results.

Even with current low baseline staffing levels, evidence adduced from studies by Dovlo and Nyonator (1999) and Buchan and Dovlo (2004) indicate that staff vacancy estimates from public health services in Ghana, for example, have increased by 100 per cent for nurses between 1998 and 2002. Doctors' vacancy rates increased from 42.6 per cent in 1998 to 47.3 per cent in 2002 despite supply rates of over 100 doctors per annum. Studies on migration of doctors trained by the University of Ghana Medical School show that, in the ten years between 1986 and 1995, 61 per cent of the output of the Ghana Medical School had left the country.

Table 1: New Registrations of Doctors in the United Kingdom, Based on Place of Primary Medical Qualification

Full Registrants	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
United Kingdom	3,675	3,657	3,710	3,822	3,920	4,010	4,242	4,214	4,462	4,288
EEA*	1,188	1,444	1,779	2,084	1,860	1,590	1,392	1,192	1,237	1,448
Overseas	2,500	2,539	3,327	4,047	3,678	3,580	2,889	2,993	3,088	4,456
Total	7,363	7,640	8,816	9,953	9,458	9,180	8,523	8,399	8,787	10,192

Source: United Kingdom General Medical Council
*European Economic Area

Data on the registration of health professionals in the United Kingdom show the problem as it emerges in a recipient country. The new annual registration of overseas doctors by the General Medical Council of United Kingdom in 2002 was 38 per cent above the 1993 figures (Buchan & Dovlo 2004). Martineau and Decker (2002) quote estimates showing that England alone will need 25,000 more doctors by 2008 than it did in 1997, making changes in health professional demand unlikely in the short to medium term.

A further analysis of 'overseas' registrations (Table 2) illustrates the increasing level of recruitment of doctors to the United Kingdom from selected source countries including three African countries. These three African countries alone supply 7,873 general duty doctors and 1,384 specialists registered in the United Kingdom. The number of Ghanaian doctors and specialists on full registration represents about 20 per cent of the stock in public service in Ghana.

The situation is worse with the nursing profession. Currently about 45 per cent of all new entrants onto the UK nursing register are from international sources, compared with between 12 and 15 per cent in 1996. Table 3 shows the top ten countries of origin of nurses issued with work permits in 2002 in the United Kingdom. It includes six African countries, including some with relatively small health professional stocks such as Mauritius.

Table 2: Registered Doctors by Registration Status and Country of Qualification – Selected Developing Countries, 27 May 2003

Country of Qualification	Full Registration Only[a]	Full & Specialist Registration[b]	Limited Registration [c]	Provisional Registration[d]
Bangladesh	562	71	62	—
Barbados	150	—	—	50
Burma	526	64	79	—
Egypt	1,644	512	154	—
Ghana	207	71	46	—
India	14,252	2,473	3,842	24
Iraq	955	400	198	1
Jamaica	732	66	—	19
Nigeria	1,248	324	350	—
Pakistan	2,939	621	707	8
South Africa	6,418	989	—	80
Sri Lanka	1,427	450	211	1

Source: United Kingdom General Medical Council. Data excludes a small number of temporary registrations.

a Persons allowed unrestricted rights to practise in the United Kingdom.
b Persons with specialist qualifications who are fully registered to practise their specialty.
c Persons registered for specialist training purposes, research, etc., for a limited period or activity.
d A temporary measure to allow for certain restricted professional activities.

As an indicator of intent to migrate, Buchan and Dovlo (2004) studied nurses seeking verification of their qualifications from the Ghana Nurses and Midwives Council to work in other countries. Some 3,087 Ghanaian nurses sought verification between 1998 and May 2003; their main destination was the United Kingdom, followed by the United States. Comparatively, Ghana's outputs from nursing training schools from recent supply data (2000–02), averaged only about 50 per cent of verification requests (See Table 4).

Table 3: Top Ten Countries from Which Applicants for Nursing Work Permits Originate (2002)

Country	Number of Work Permits Issued
Philippines	10,424
India	3,392
South Africa	2,835
Zimbabwe	2,346
Nigeria	1,501
Ghana	528
Australia	503
Pakistan	385
Kenya	354
Mauritius	351
Other	2,983
Total	25,602

Source: Work Permits United Kingdom.

Factors Influencing Migration

Dovlo (1999), Martineau, Decker, et al. (2002), Meeus (2003), Padarath et al. (2003) and others have discussed the reasons underlying the brain drain in various papers. A number of push and pull factors, have been cited as influencing the decisions of health professionals to leave their countries of origin. Push factors refer to events in the country of origin that motivate professionals to leave whilst pull factors are the deliberate and/or unintended actions from recipient countries that attract health professionals to their health services. Examples of push factors include low remuneration, poor working conditions, low job satisfaction, lack of professional development and career opportunities and political and ethnic problems including civil strife and poor security.

Table 4: Ghana Nurses Seeking Verification and Country Verified For

Destination Country	Number and Year Verification Sought						Per Cent of Total	
	1998	1999	2000	2001	2002	2003*	Total	Per Cent
USA	50	42	44	129	81	80	426	13.80
United Kingdom	97	265	646	738	405	317	2,468	79.95
Canada	12	13	26	46	33	10	140	4.50
South Africa	9	4	3	2	6	—	24	0.77
Others	4	4	8	8	5	—	29	0.94
Total	172	328	727	923	530	407	3,087	
Compared Training Output			386	486	357			

Source: Nurses and Midwives Council, Ghana
*Dovlo (2002)

Poor governance of health services and the lack of technology and equipment to perform professional tasks are also important factors. Pull factors are caused by increased demand for health professionals in developed countries and include attractive remuneration, new career and personal development prospects and active recruitment by those countries. The common use of a professional language such as English and similarities in professional training and systems arising from the colonial experience of African countries are also thought to enhance the pull factors.

An individual's threshold decision to migrate probably arises from a combination of both push and pull factors, and it has been suggested that these are reflected in terms of gradients or tensions in the influence of these factors between source and recipient countries (Dovlo 2003). The key influences are:

1. Income gradient, or the difference in remuneration and living conditions between the home and recipient countries. For example, Vujicic et al. (2004) has calculated that income gradients may range from two times for nurses in South Africa to twenty-two times for nurses from Ghana.

2. Job satisfaction gradient. The perception of a good working environment and professional and technical proficiency that allows for international peer recognition is important for tertiary-trained professionals.
3. Organisational environment/career opportunity gradient. This factor expresses how fair and accessible opportunities are for career advancement and for professional specialisation. It is also related to governance, politics and ethnicity as factors in demotivating professionals.

The governance gradient involves differences in the efficiency with which health services are managed, including the amount of administrative bureaucracy. Other factors include corruption, nepotism and political instability.

The protection/risk gradient means that the lack of protective wear at work coupled with a perception of increased occupational risk arising from the HIV/AIDS epidemic makes the receiving country more appealing to some health professionals deciding to work abroad.

The social security and benefits gradient is concerned with security after retirement. Retirement and pension benefits are thus important motivation factors. In Ghana, one of the reasons that nurses give for their decision to work abroad is so they can save money for housing and sustenance for retirement (Buchan & Dovlo 2004).

Whilst data on the impact of the loss of health professionals are lacking, some reports from a recent meeting in South Africa sponsored by the Commonwealth Secretariat (2003) described some of those effects: a decline in quality of care caused by increased workloads and the loss of support and supervision of experienced professionals. A net economic loss also occurs as most health professionals in sub-Saharan Africa are trained at public expense. Nayak (1996:3) estimated that India alone must have lost US$3.6–5.0 billion in terms of the costs invested in training an estimated 83,000 doctors who have emigrated since 1951. The United States with its estimated total of 130,000 foreign medical graduates has gained an estimated US$26 billion in training costs saved. Between 1986 and 1995, Ghana lost an estimated US$5.96 million in tuition costs alone from the 61 per cent of medical graduates who emigrated from a single medical school (Dovlo & Nyonator 1999). Hidden costs may well include costs of preservice training investment (primary and secondary education), loss of professionals' contributions to the gross domestic product (GDP) and taxes of their home countries, the costs of illness/morbidity caused or aggravated by shortages of professionals and the costs incurred from substituting less qualified staff, having to increase the training of new professionals or having to import expatriates to fill vacant posts.

How Have Countries Coped?

Countries in Africa have attempted to mitigate the problems created by the brain drain in health through various means, which are discussed below.

Incentive and Motivation Systems

Remuneration levels are probably the most important factor in retention. A conference of Commonwealth African countries (Commonwealth Secretariat 2003) elicited a variety of local and general incentives tried by countries, though many have not met with significant success. For example, participants from Botswana suggested that significant rises in allowances for nurses did not slow migration. Indeed, at times the perceived unfairness of incentives and disparities between what is paid to different professions appear to fuel the migration of the cadre at a perceived disadvantage. For example, Ghana introduced additional duty hours allowance (ADHA), which increased incomes significantly for doctors but less so for nurses and other professionals. Consequently, despite a net increase in incomes, such initiatives have apparently resulted in nurses' increased de-motivation and an migration. In South Africa, the Department of Health recently instituted new 'skills and location incentives schemes targeting highly needed skills and deprived areas' aimed at providing incentives to retain certain specific highly demanded specialties within the country and to retain staff in unpopular work locations (South Africa Department of Health 2004).

The role of incentives and incomes is, however, mixed. A recent WHO Africa Regional Office study on migration showed that Uganda, which had much lower pay levels than South Africa, appeared to have had better retention success, with many fewer staff members expressing intentions to migrate compared to the wealthier country (Awases et al. 2003).

International Recruitment and Inter-Country Arrangements

As mentioned earlier, richer African countries such as Botswana, Namibia and South Africa have recruited health professionals from other countries. Dovlo (1999) reports that in 1998 some 27 per cent of doctors registered in South Africa were non-citizens. In rural Kwazulu Natal Province, for example, the proportion rises to 78 per cent. South Africa recently developed an arrangement with Southern African Development Community (SADC) countries to limit the flow of their medical doctors into their country. On the other hand, many countries in Africa have had agreements with Cuba and have received groups of doctors especially for rural and deprived-area work. Ghana and Jamaica in the mid-1990s had arrangements that allowed agreed numbers of nurses from Ghana to work for specified periods of time in Jamaica.

Bonding and Compulsory Service Schemes

Bonding health professionals to work in public services has not worked well due to the poor efficiency of human resource (HR) management systems; however, several African countries have such policies. Such policies require new graduates to work in assigned locations for a number of years (usually two or three) before becoming fully registered, becoming eligible for specialist training or becoming fully certified to practise. Often there is lack of agreement between the tertiary-education sector and health policymakers about how to implement such arrangements. South Africa implements a 'community service' program that requires two years of service in underserved areas before the health professional can attain full professional registration; however, Reid (2001) has noted some reservations about this program in terms of the support and supervision availed to such young professionals.

Skills Substitution and Delegation

A number of locally designed health professionals can be found in Africa. These cadres do the tasks normally undertaken by internationally recognised professionals. For example, Malawi and Zambia have 'clinical officers' and Mozambique has 'surgical and medical technicians' who are permitted to perform major surgery. In Tanzania 'assistant medical officers' also perform surgical, obstetric, and orthopedic operations that are usually reserved for physicians. Generally, the established health professions have been reluctant to accept these 'substitutes', due to concerns about quality of care. However, Pereira et al. (1996) and Vaz et al. (1999) compared the performance of obstetric and surgical technicians respectively to that of physicians in Mozambique and found only minimal differences in the outcomes to clients. In addition, these cadres were well retained within their countries and are considered less expensive to train and remunerate.

Management of Migrants' Return

The International Organization for Migration (IOM) has collaborated with some countries to encourage citizens in the diaspora to return to their countries of origin. The IOM instituted a program termed Return of Qualified African Nationals (RQAN) in the early 1990s, which has now been replaced with the Migration for the Development of Africa (MIDA) program. MIDA is coordinating with the New Partnership for Africa's Development (NEPAD) and other organisations to facilitate the temporary return by professionals to offer their skills in specialised services and investments (International Organization for Migration 2000). These activities include part-time teaching and service

delivery by specialists in the diaspora as well as co-ordinating the establishment of technology resource centres.

Export Management

It may be argued that migration has brought benefits to source countries in the form of remittances and investments. Several African countries indicate that financial transfers made by nationals living abroad now constitute a major foreign exchange source. The Africa Union's Labour and Social Affairs Commission data show that remittances are now beginning to rival foreign direct investment and overseas development aid in some countries. Nigeria, for example, received about US$1.3 billion in remittances compared with US$152 million in Official Development Assistance (ODA) between 1995 and 1998 whilst Eritrea, which operates a system that requires its international citizens to pay a 2 per cent income tax, received US$172 million in remittances, or approximately 85 per cent of Official Development Assistance (African Union 2003).

Extended Retirement Age

Some countries have changed (or plan to change) the official retirement age in order to extend the working life of health professionals. In Ghana, professionals can routinely work beyond the official 'compulsory retirement' age of sixty until they become sixty-five. Southern African countries such as Malawi and Lesotho are reconsidering their policy of compulsory retirement at age fifty-five with a view to utilizing qualified staff for some additional periods. Such extensions to the official retirement age help to fill losses in critical skills such as those of trainers and high-level specialists.

Coping Strategies in Educating and Training Professionals

A number of strategies that relate to health professionals' training and profiling have been proposed in some countries to stem the outflow of health professionals and to mitigate shortages. Some are discussed below.

Profiled Selection of Training Candidates

The use of quotas or geographical criteria for selecting candidates for health professionals' training have been proposed in some countries. Pure academic merit has been faulted for producing elitist professionals, because candidates coming from deprived communities with poor educational infrastructures are simply unable to compete with candidates from the elite urban schools. Lehman et al. (2000) profiled medical schools in South Africa that target candidates from the previously disadvantaged communities with good results in changing

the mix of entrants into medical education. What may need to be confirmed is whether the selection profile translates into the retention of professionals, especially in the deprived rural areas. Dr. Suwit Wibulpolprasert, Deputy Permanent Secretary of Ministry of Public Health (MOPH) in Thailand, in a personal communication, asserts that the emigration of health professionals from Thailand declined significantly once training was conducted entirely in Thai, and not English, thus reducing the health professionals' attractiveness for the key recipient countries.

Using New Community-Based Curricula

A number of medical schools in Africa, (including Yaounde, Cameroon; Ile-Ife, Nigeria; Jimma, Ethiopia; Transkei, South Africa, etc.) have adopted innovative student-centred, problem-solving and community-based approaches to health professional education and have been praised as producing professionals with locally relevant skills and a community service orientation. A key constraint, however, is an unmet need for the re-orientation of medical educators away from existing traditions that emphasised the 'international' standards and methods of medical education (Ndumbe 2004).

Tertiary Education's Involvement
in Training 'Substitute' Professionals

As mentioned previously, Tanzania, Mozambique, and Malawi produce 'assistant medical officers', 'surgical technicians', (and other staff-run services in rural hospitals) who carry out many of the tasks of doctors. These cadres are usually not university trained and medical education has not shown significant interest in their development. They are country-specific professionals who are not internationally tradeable and are retained especially in rural areas. Some studies (e.g., Vaz et al. 1999) have shown that little difference existed in outcomes of care given by these cadres and that given by doctors. However, medical education appears reluctant to be involved in training these cadres.

Increasing the Output of Training Institutions

Increasing the supply of health professionals has often been the immediate response of countries to brain drain and shortage of personnel. Expanding production of trained human resources without an improvement in retention incentives, however, cannot be an effective response. An aspect of brain drain is the loss of tutors which may affect training quality in the face of an expanded intake. Whilst the number of professionals leaving already reflect a pressing problem, the loss of key trainers and specialists undermines the capacity to respond to the brain drain. The Ghana External Health Sector review

in 2003 showed that the recently doubled intake of trainee nurses barely reaches 50 per cent of the requests received from nurses to work abroad (Ghana Ministry of Health, 2003). Incentives targeted towards strengthening the training system and retaining trainers should be a necessary aspect of any policy on health professional migration.

Conclusions

The health crisis in Africa has intensified with the advent of the HIV/AIDS epidemic. The plans to extend anti-retroviral treatment to 3 million sufferers by 2005 proposed by the World Health Organization (2003a) will further expand the demand for well-qualified health professionals. Creating a critical mass of retained health professionals to meet these huge tasks will be a tremendous challenge, and fairly drastic remedial measures need to be taken, in much the same way that industrialised countries have taken steps to recruit health professionals from poorer countries to meet their health demands. The heavy loss of health professionals poses the threat of collapsed health services and major risks to the lives of Africa's poor.

As suggested by Boelen and Heck (1995), the health and education sectors in African countries need to consult and co-operate in order to devise strategies that will help countries to benefit from the health professionals they produce. The Ghana Health Service held a forum on Human Resources for Health that made certain suggestions. These recommendations included re-instituting bonds for health trainees and withholding qualification diplomas and certificates until a certain number of years have been served in the country. Such remedies require political will, agreement and collaboration from the training institutes and education authorities.

Changing educational methods and curricula to reflect better relevance to conditions in Africa also requires intensive consultation, consensus building and the re-orientation of educators, many of whom may have difficulty relating to the realities of the economic and health problems of Africa because of their own training in the developed countries.

Most of the health professionals emigrating from sub-Saharan Africa go to a few recipient countries, mainly, the United Kingdom and the United States. This direction of flow should make it relatively less complicated to establish inter-country arrangements to manage migration. However, bilateral agreements in Africa so far have been among developing countries with little involvement by the major recipient countries. Developed recipient countries have to temper the economic realities of migration with moral imperatives to ensure that recipients of African professionals assist source countries to restore and

maintain health services through increased investment in the education of health professionals.

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