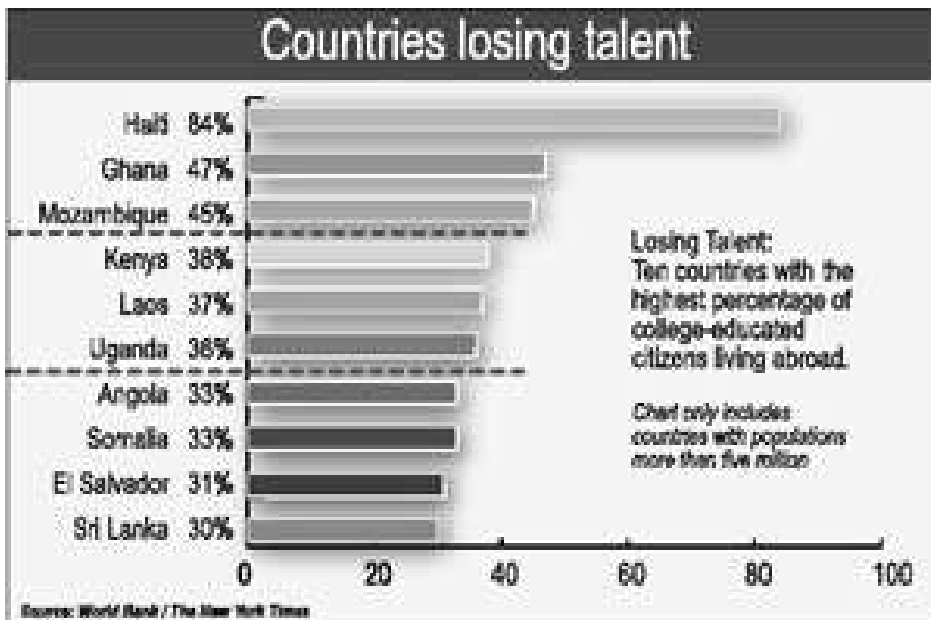


Introduction

The World Bank estimates that there are currently 200 million people living in countries where they were not born (Russel, n.d.). The global mobility of skilled workers has increased in recent years due to the expansion of the knowledge economy, the progressive globalisation of markets and companies, the growing demand for scarce skills, and wider political and economic issues. This increase in global mobility is a practical reality of the interdependence that affects us all and is not necessarily a problem except where critical skills needed by source countries are lost and are not readily replaced – a brain drain (Myburgh, 2002). Graph 1 shows that inevitably this is a phenomenon that afflicts third world developing countries.

Graph 1: Countries losing talent

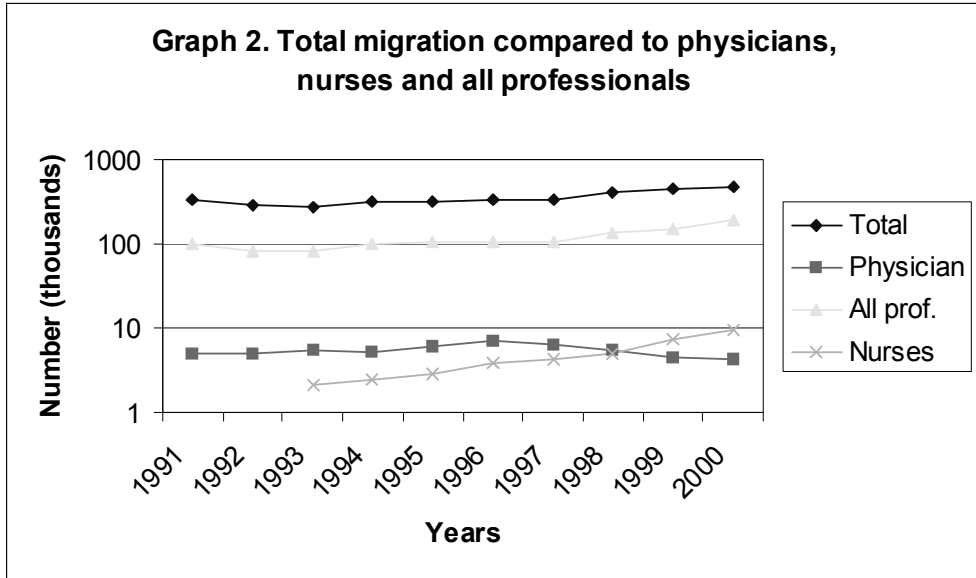


Source: General News of Saturday, 29 October (2005)

Graph 2 illustrates that health care professionals are no different from the rest of the skilled workforce. As the health care labour market becomes more globalised because of common and reciprocal qualifications, migration flows are likely to increase. Since the global demand for health care

professionals far exceeds supply, developed countries are increasingly relying on migrant health care professionals to cope with domestic shortages.

Graph 2: Total migration compared to physicians, nurses and all professionals



Africa is losing its best doctors and nurses in the greatest numbers at a time when it needs them most. The out migration of African health professionals is a source of growing concern and is perhaps one of the most profound challenges facing health systems throughout the continent (Stilwell, 2004). This, coupled with the inequitable distribution of those health personnel who are available, the burdens of poverty and under-resourcing, infectious diseases and the threats of HIV/AIDS, are causing public health systems on the continent to break down. The double crises of escalating disease and personnel shortages have refocused our attention on medical migration.

This human resource crisis requires an urgent, collective, continental approach if we are to successfully grapple with the challenges facing us. As nations bleed, Africa needs to militate against this loss by developing networked structures of knowledge and innovation that span borders, sectors and disciplines. In so doing, its entire people can appropriate and benefit from the enhanced knowledge pools that may be easier to access, more affordable and more appropriate for the demands of our continent.

This paper presents a framework for the systematic analysis of the causes and impacts of the emigration of African health care professionals. It also provides points of leverage for different policy options, with special emphasis on knowledge and innovation networks, in keeping with the theme of the conference. The outline of the document is guided by the interrelationships of the different variables, each of which is systematically dissected and analysed.

2. The Conceptual Framework

The international mobility of health care professionals derives from combinations of push and pull factors. The consequent emigration of health care professionals results in a reduced number of health care professionals in source countries. This impacts negatively on the ability of nations to provide health care to its citizens as well as its ability to train new professionals and produce knowledge. All of these have economic consequences.

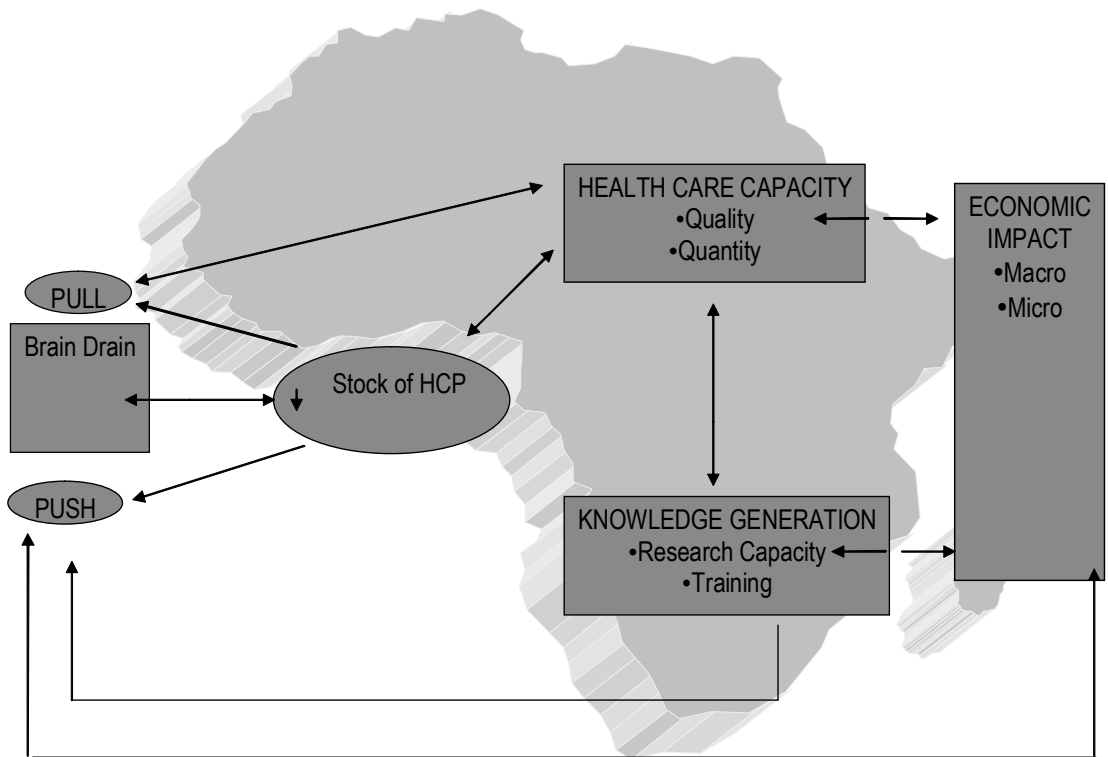


Figure 1: Conceptual framework for the analysis and management of the brain drain of African health care professionals (HCPS)

3. Emigration of Health Care Professionals - The Brain Drain

The health professionals' labour market is a global one with reciprocal qualifications for key health professions internationally. This has facilitated the accelerated brain drain in this sector which has now clearly become problematic for countries in Africa as out-migration of health professionals to Europe and North America is denuding the region of scarce skills at a time when Africa can ill afford to lose them. Developing countries are either unwilling or unable to meet health staffing needs for their expanding health services while source countries in Africa are unable to provide the resources needed to retain their health workers. At the same time, source countries have their own increased demand for services.

3.1 Volume and direction of flows

In general the migration of health professionals out of Africa appears to be substantial and on the increase in relation to the stock of health professionals available. Most of the information available is on nurses (who indeed make up the largest professional group in African health systems) and doctors, who though not numerically a large group, are probably the most expensive and arguably the most influential cadre. Some studies also suggest that there is a considerable flow and exchange of human resources between and within African countries.

Figure 2 illustrates the general movement of health personnel from areas of poverty and low social development to more highly developed areas. The flows follow a hierarchy of wealth resulting in a global conveyor belt of health personnel moving from the bottom to the top which also results in increasing inequity.

3.1.1 Doctor Flows

The losses are difficult to quantify accurately but existing data points to a difficult situation.

- ❑ Only 29.4% of graduates of Ghana Medical School were still on the medical and Dental Council register in 1996 and for a specific 10 year cohort studied (1985-1996), 37.4% of these were still on the register. The average cumulative annual loss was 50% loss in 4.5 years and 75% loss in 9.5 years (Dovlo, Nyonator, 1999). There are more Ghanaian doctors working outside Ghana than in Ghana.
- ❑ Frommel reporting on Zimbabwe (Frommel, 2002 cited in Stilwell et al., 2003) said that 840 of 1,200 doctors trained in the 1990s were lost to that country.

- ❑ Ethiopia and Zambia have lost about 50% of their physicians (Frommel, 2002) The Zambian public health system is said to have retained only about 50 of more than 600 doctors trained since independence though it is not clear whether the loss is entirely due to migration.
- ❑ UNECA estimates that Nigeria lost 21,000 doctors to the USA.
- ❑ In Sudan, an estimated 17 % of locally trained physicians and dentists left in the 1980s and 1990s (UNECA, 2000 in Huddart et al., Meeus 2002).
- ❑ The migration of skilled people, from other African countries, primarily to South Africa, Botswana and Namibia was sufficiently large to raise concerns about a regional brain drain. Approximately 80% of South Africa’s rural doctors are from Kenya, Malawi and Zimbabwe (Govender, 2004). In Namibia an estimated 90% of public sector doctors outside the capital were foreigners.

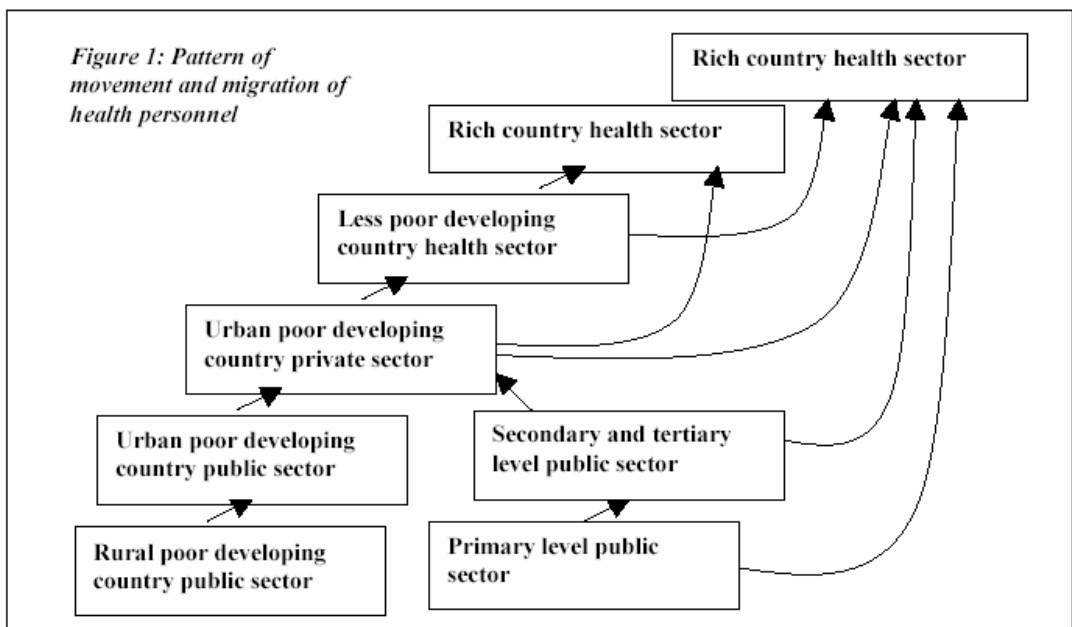
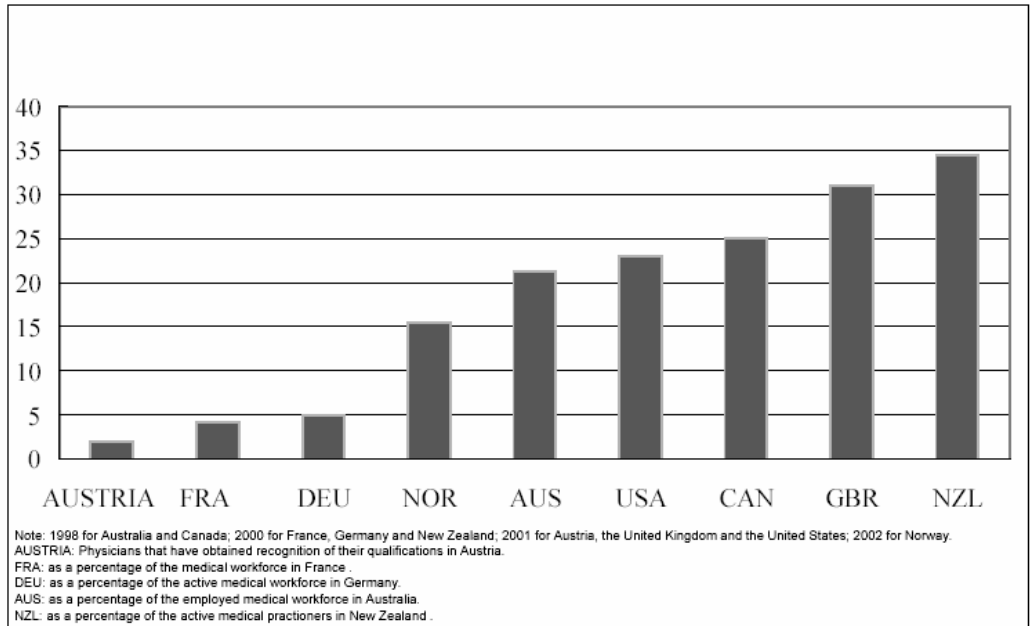


Figure 2: Pattern of movement and migration of health personnel

3.1.2 Destination countries

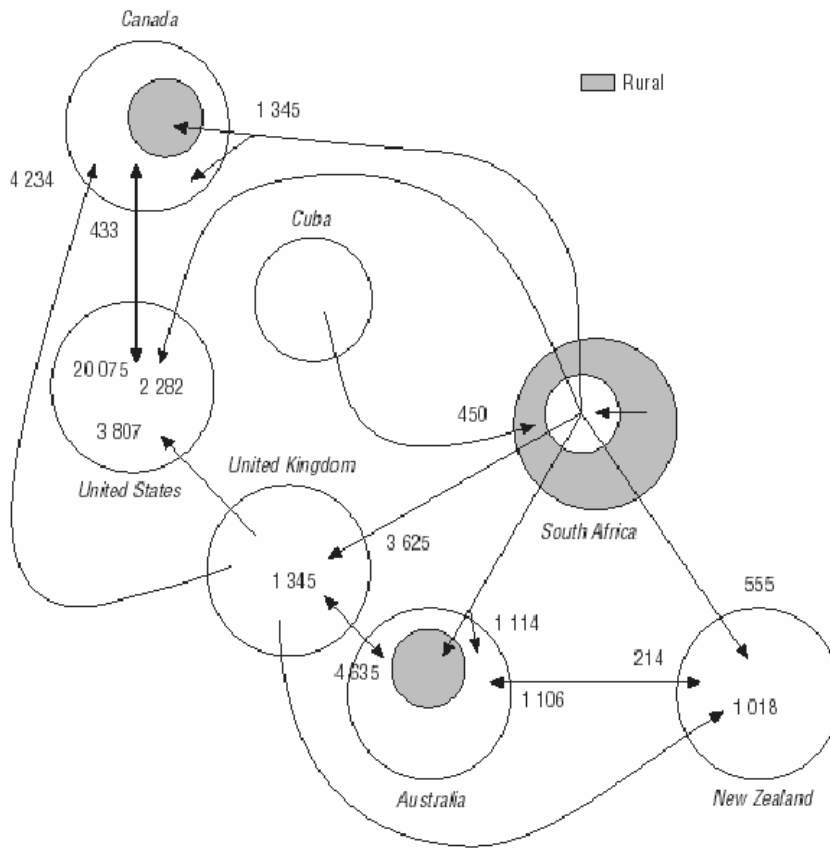
The UK and USA appear to be major destinations. The proportion of foreign trained health workers is particularly high in Anglophone countries, reflecting several years of net accumulation. The graph below shows that 23-34 % of physicians in New Zealand, the UK, Canada, the US and Australia are foreign trained.

Graph 3: Stock of physicians foreign trained

Source: OECD 2002 p 5

OECD data shows that some 600 South African doctors are registered in New Zealand and 10% of Canada's hospital physicians are South African graduates (OECD 2002). Six percent of the total health workforce in the UK is South African (OECD 2002). (see figure 3)

Of 489 students graduated from the Ghana Medical School between 1986 and 1995, 61% left Ghana. Of these, 54.9% were said to be in the UK and 35.4% in the USA. Intra Africa migration (mainly to South Africa) was 6.2%. OECD (2002) data show that the highest stocks of foreign medical graduates are in the English speaking member countries.

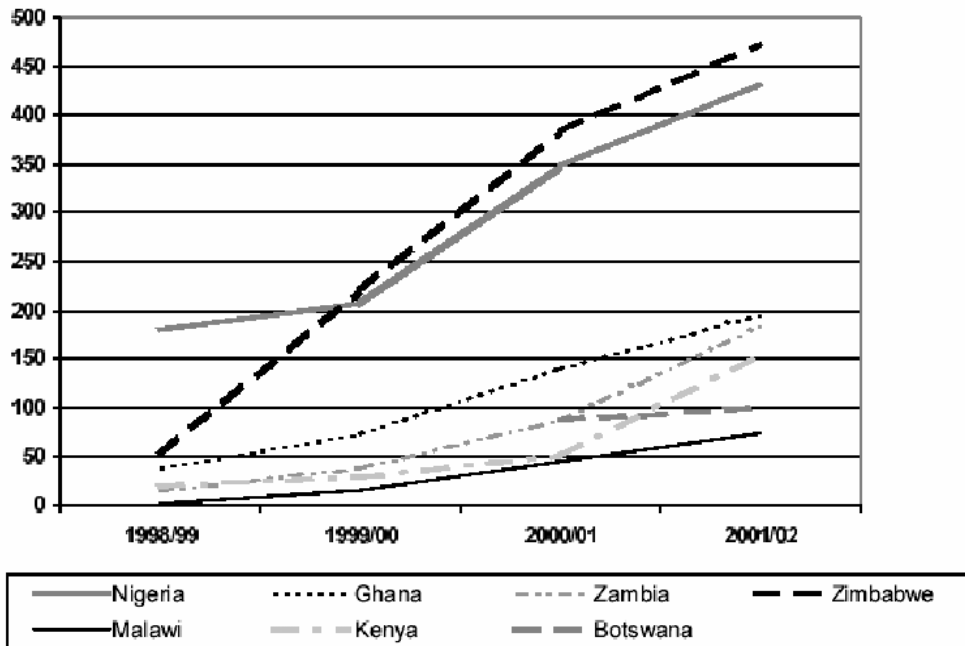


Dumont and Meyer 2004 p128

Figure 3: Principal axes of international mobility on health professionals between the old commonwealth countries, the United States and Cuba (by country of birth)

3.1.3 Nurses' flows

The migration stream of nurses appears to be accelerating especially in the last decade and although the percentage of foreign trained nurses may be lower than doctors in the workforce, the absolute numbers are higher. Over the three years from 2000 alone, more than 30,000 new registrants from overseas have been admitted to the UK nurses register (Bunchan, Parkin, & Scholski, 2003). Despite shortages of their own, emigration from a number of African source countries to the UK continues to rise as illustrated in Graph 4.

Graph 4: New registrants on UK nurses from selected sub-Saharan African countries, 1998-2002

Buchan et al 2003 p 47

Martineau , Decker, Bundred (2002) report that 114 nurses constituting 60% of the 190 registered nurses in a Malawi tertiary hospital left the country between 1999 and 2001 and Meeus (2003) reports approximately 18,000 Zimbabwean nurses left for the UK during 2000/2001 (Chikanda, 2001). DENOSA, the national nursing union in South Africa predicts that more than 300 specialist nurses leave the country every month. All these figures are quite striking for the source countries even if they represent small proportions in the recipient countries such as the UK.

Box 1: Other movements and distribution data - various sources

Some other movements and distributions data- various sources	
•	South Africa to UK- 2.114 in 00/01 (nurses)
•	South Africa and Nigeria to USA- accounting for 7.45 of the 26.506 application for RN license between 1997 and 2000 (nurses)
•	Nigeria to UK- rising trends of new registrants c. 180 in 98/99 to 430 in 01/02
•	Zimbabwe to UK- rising trend of new migration c. 50 in 98/99 to 460 in 01/02
•	Ghana, Zambia, Malawi, Kenya rising trend of new migration 98/99 and 01/02(nurses)

source: Dovlo, 2004

3.1.4 Destination countries

Some information exists on destination countries for nurses. Buchan et al. (2003) show that nurses from Ghana are mainly recruited to the UK and to a lesser extent to the USA. Most South African nurses also appear to go to the UK. However, between 1997 and 2000, South African and Nigerian nurses accounted for 7.4% of the 26,506 applicants for RN licensure in the USA. Nigerian nurses registering in the UK also increased from 180 in 1998/99 to 430 in 2001/02; those from Zimbabwe from 50 in 1998/99 to 460 in 2000/01 (Chikanda, 2001). Many other sub-Saharan African countries show similar trends including some countries with relatively small stocks of nurses.

In the absence of specific data on migration of nurses, requests for “verification” are an indicator of at least an intention to move that also shows the recipient countries for which requests were made. Buchan and Dovlo (2004) show how Ghanaian verifications between 1998 and 2003 showed significant increases in requests to the UK as illustrated in Table 1.

Table 1: Ghana nurses verification: country verified for and year

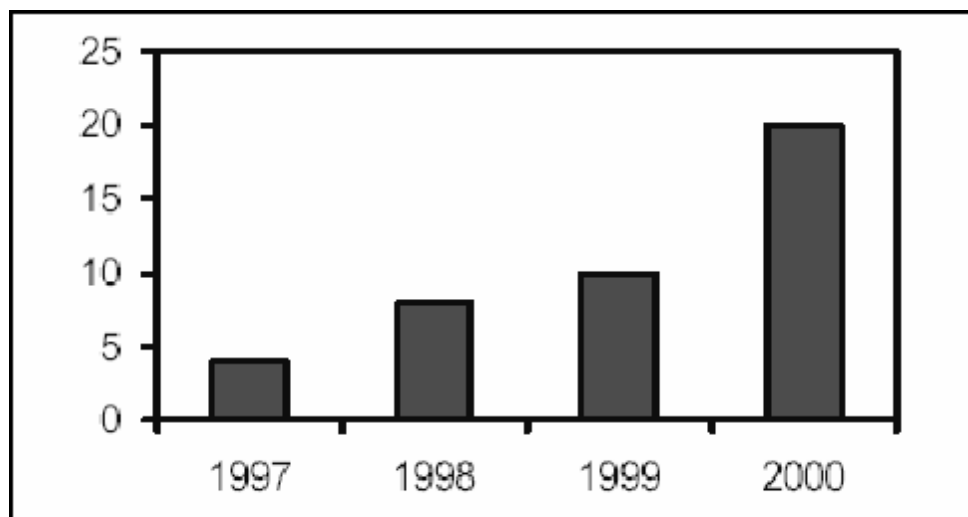
Destination Country	% of Total	Number & Year of Seeking verification						
		1998	1999	2000	2001	2002	2003 ^{xi}	Total
USA	50	42	44	129	81	80	426	13.80
UK	97	265	646	738	405	317	2468	79.95
CANADA	12	13	26	46	33	10	140	4.50
S-AFRICA	9	4	3	2	6	-	24	0.77
OTHERS	4	4	8	8	5	-	29	0.94
Total:	172	328	727	923	530	407	3087	
<i>Compare Annual Tra Output</i>			386	486	357			

Source NMC Ghana 2003

Nurse migration is thought to be less permanent than doctor migration. The UK register of 1995 reports that more than half of foreign nurses did not stay longer than three years and 85% of departures occur within four years of entry to the UK (Buchan; O'May, 1999)

3.1.5 Pharmacist flows

Recent Pharmacy Council of Ghana data (2000) showed that the number of Ghanaian pharmacists seeking clearance (Certificates of Good Standing) to work overseas (mostly in UK) was relatively small compared with nurses. However, the impact on pharmacy services is expected to be quite significant, given the small number of public sector pharmacists (only 162) in Ghana Health Service in 2002 (Dovlo, 2004). The recent steep rise in numbers (as seen with nurses) is a major concern (Graph 5). Very little data were found on pharmacists from other countries in the sub-Saharan Africa region.

Graph 5: Requests: confirmation of registration of Ghanaian pharmacists (1997-2000)

Source: Pharmacy Council, Ghana, 2000

3.1.6 *Flows of other health care professionals*

Most of the data concentrates on nurses and doctors though it is recognized that all health professionals with exportable qualifications were likely to migrate. In a recent study (Martineau et al., 2002) the majority of a cohort of physiotherapists graduating from the University of Pretoria were leaving South Africa to the UK without even practising. Active foreign recruitment of health professionals such as x-ray technicians and radiographers has been reported in Ghana, Kenya, South Africa, Uganda, and Zambia using local papers, professional journals, and job fairs (Martineau et al., 2002). However, data on these healthcare professionals were much less available.

Health personnel from South Africa appear to make up the bulk of the total number moving and migrating out of Africa, although smaller numbers lost from other African countries may represent a larger share of the overall personnel numbers from those countries. Because of the lower production volumes of doctors in the smaller African countries, the loss of even a small number of doctors can have a disproportionately large impact. The burdens of health personnel losses across the region thus need to be mapped in relation to the capacity to produce and replace personnel.

The causes of medical migration are complex and are propelled by factors often termed 'Push' and 'Pull' factors. Differences in the level of their influence in source and recipient countries create a gradient that influences the decision to emigrate. Some of these are discussed below.

4. Reasons for Migration

Pull factors result from influences arising from recipient countries which attract and facilitate the movement of health workers to that country. Push factors refers to influences that originate in the source country that create an impetus to leave. Pull and push factors interact with each other and some of these factors will be the converse of the other (for example, low pay in source country as compared to higher pay in recipient countries). These factors can be either exogenous (outside the health system) or endogenous (directly related to the health system), (Briggs, 2000).

4.1 Pull factors

4.1.2 Endogenous pull factors

Remuneration

For individuals, the financial advantages of working in a country that pays considerably higher salaries is a major pull factor and a number of studies reviewed cite the importance of pay. South African nurses in the United Kingdom for example can earn (South African Rands) R256,000-448,000 a year, and in Saudi Arabia, earn a tax-free salary of R228,000-360,000 per annum in contrast to an experienced nurse working in an intensive care unit or theatre in South Africa who can only earn between R84,000 and R96,000 per annum.

The two most often reported factors for working in the UK for nurses were professional development and pay (Buchan, 2003). To the individual nurses (or any other professional for that matter) personal financial gain outweighs larger national perspectives.

A recent WHO-AFRO study on migration indicated that reasons given by health workers wanting to leave Cameroon, for example, were better salaries (67.8%), better quality and opportunity for education and training (66.6%), conducive working environment (64.2%), better management of healthcare (54.9%) and a peaceful social environment (48.4%).

Career development opportunities

In some studies career development is highlighted as an important pull factor (Sanders, 2003; Dovlo, 2003) and gaining international fellowships for study abroad often becomes the first step in migrating. There are many instances of fellowship recipients not returning to their home countries. Only 30% of persons awarded WHO fellowships in Lesotho returned (Stephen, 2003). Whilst this opportunity for international specialist training appears to be a pull factor for doctors, nurses may not

necessarily seek additional qualifications and career development. For example, whilst UK employers of Filipino and South African nurses highlighted career development as an important secondary pull factor, there was little sign of nurses making a temporary move to improve their skills for use back home(Dovlo, 2003).

Meeus (2002) indicates that career development is used by several OECD countries as the attraction for highly qualified persons whose training gives them familiarity with rules and conditions of the respective recipient countries. This goes beyond just the fact that foreign tuition fees received is good for training institutions, and the acknowledgement that many such students do not return home (OECD, 2002). The scholarships tenable in industrialized countries for health professionals create similar results.

Language traditions encourage and facilitate incoming migrants, given that training in many developing countries takes place in the former colonial languages, and there exist migrant professional communities from the source country,. In addition, perceptions of better technology and hence professional satisfaction enhance the other pull factors (Commonwealth, 2001).

Demand driven recruitment

Demand is caused by under-production as well as the demographics of aging, advances in labour intensive health technology, shifts towards nuclear family structures and changes in consumer demand. This results in active recruitment and the facilitation and support of the emigration process.

- ❑ The US has 100,000 vacant nursing posts. By 2010 one million more nurses will be needed to meet the needs of an ageing population
- ❑ Canada predicts a shortfall of 78,000 nurses by 2011, and Australia 40,000 by 2010

Employers have used international recruitment agencies which either help employers to recruit from specific countries, or initiate the recruitment process themselves with “batch” recruitment.

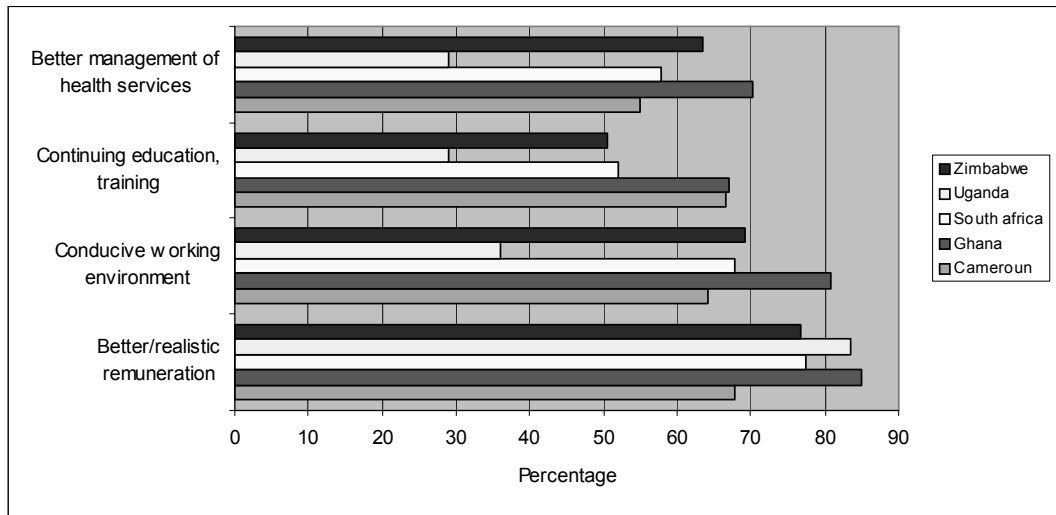
The Department of Health in England has enacted a “Code of conduct on international recruitment” which states that NHS employers should not “actively recruit nurses from developing countries”. However, passive arrangements will mean that the code may not be entirely helpful in moderating losses from developing countries.

Graph 6 illustrates the consistency in the perceptions of the different endogenous pull factors by health care professionals from different African countries.

Exogenous pull factors

Many of the countries that are able to offer a higher quality of life, freedom from political persecution, freedom of speech and educational opportunities for children will naturally be attractive to health personnel from many other countries. In addition, there is a greater likelihood of people emigrating to countries where fellow citizens relatives and friends are already based (OECD, 2002).

Graph 6: Factors affecting the motivation of health workers in five African countries



Source: Awases M, Gbary A, Nyoni J. and Chatora R, Migration of health professionals in six countries: Report, Brazzaville, WHO Regional Office For Africa, 2002

4.2 Push Factors

4.2.1 Endogenous push factors

Pay and benefits

Pay and other benefits for health workers are low in many sub-Saharan African countries. Studies by Dovlo (1999) and Vijić, Zurn, Diallo, Adam and Dal Poz (2002) for selected African source countries illustrate some of the salary levels found in African countries which were generally very low compared to remuneration in developed recipient countries (see Tables 2 and 3).

Table 2: Average monthly salaries of health professional in different African countries

Cadre	Ghana	Lesotho	RSA	Namibia	Malawi	Zambia	S.Leone
Junior Doctor (<5 years)	\$199.35	\$1058	\$1242	\$1161	\$1199	\$200	\$50
Senior Doctor (>10 years)	\$272	\$1430	\$1818	\$1445	\$2670		\$200
Junior nurse (<10 years)	\$92.80	\$503pm	\$661	\$916	\$761	\$100	\$40
Senior nurse (>10 years)	\$148.43	\$865	\$1030	\$916	\$1326		\$150

Source Dovlo 1999.

These estimates (though based on actual salaries) are basic pay estimates and exclude other benefits and privileges. Changes in remuneration levels may have occurred since 1999 but the differentials between these pay levels and those of industrialized countries remain very significant. The study by Vujicic et al. (2004) showed that nurse wages in recipient countries such as Australia and Canada were 25 times the wage in Zambia, 14 times that in Ghana and twice that of South Africa. The situation is similar with physicians.

Table 3: Monthly wages of nurses from source country and host countries in US dollars, purchase parity pay estimates (most recent data from each country)

Source country	Monthly wage	Destination countries	Monthly wages
South Africa	\$1.486	United States	\$3.056
Trinidad & Tobago	\$913	Australia	\$2.832
Cote d'Ivoire	\$530	Canada	\$2.812
Malawi	\$489	United Kingdom	\$2.576
Sri Lanka	\$407	France	\$2.133
Philippines	\$380		
Ghana	\$206		
Zambia	\$106		
Uganda	\$38		

Source: Vujicic et al., 2004

However, the much lower differentials for South African nurses, for example, appear from other data not to have mitigated the level of migration.

Pensions in many African countries reflect the low salaries earned during one's working life and thus retirement can be a difficult period. The relatively good social support systems in Namibia have been cited as reasons for better comparative retention of professionals compared with Lesotho (despite similar salaries) because the former provide more generous end of service payments, subsidized housing and car ownership schemes (Dovlo, 1999).

Work associated risks

The ILO suggests that health work is one of the most dangerous jobs with many risks ranging from violence and sexual harassment, sickness, even death and infections, especially with the HIV. Statistically, health care professions have to be classified among the most dangerous professions. As economic and then working conditions in African countries deteriorate, health workers are aware of the increased hazards in their workplaces and a perceived lack of occupational protection may well influence decisions to migrate.

Lack of job satisfaction

Health workers may also become dissatisfied and therefore more open to migration for a variety of non-financial reasons such as feeling demotivated by poor healthcare infrastructure and bad health management. Working environment problems are worsened by bureaucracy that seems to overwhelm civil/public services in Africa. New recruitment of scarce professionals can take up to 30 months from application to receiving first pay. Centralized public sector personnel management with recruitment approval that involves several government departments contributes to this situation. For example in 1998, the Ministry of Health and Social Welfare in Lesotho was unable to employ its output of trainee nurses in 1998 despite having vacancies, because of the very lengthy process (Stephen & Kinoti, 2003).

Workload

The AIDS epidemic and its resultant workload increase may also contribute to the push. At a recent meeting of Commonwealth African Countries on human resources (Commonwealth Secretariat, 2003) it was reported that fear of contracting HIV/AIDS and burnout from workload may be contributing to losses from the health workforce from Botswana and Malawi. Similarly, nurses were also avoiding or refusing postings to labour wards perceived as high-risk areas.

Workload increases in the African public sector are partly due to shortages of health professionals from migration but also, particularly in southern Africa, to the increases in patient load created by the AIDS pandemic. Workloads for Zimbabwean nurses, midwives and pharmacists were said to have worsened significantly between 1995 and 2000.

Others countries (for example, Uganda) suggested in recent meetings that structural adjustment policies and insistence by lending institutions on retrenchment of public service workers had led to serious workload and motivation problems (Lynos, n.d.).

4.2.2 Exogenous push factors

Social, political and economic factors

Social and political unrest have hampered some sub-Saharan Africa countries such as Sierra Leone, Liberia, Congo (Kinshasa), Angola, Rwanda, Burundi, Cote d'Ivoire and Zimbabwe. Large numbers of ordinary citizens and professionals have become refugees. In South Africa, crime is thought to be responsible for high white middle class migration (including many doctors). An estimated 96% of emigrants from South Africa were said to have cited criminal violence as a reason for leaving the country (Economist, 1999).

Lack of educational opportunities for children

One of the reasons why many professionals migrate is not because of reasons that are relevant to them, but because of aspirations they may have for their children.

5. Why Doctors Stay

Despite the strong push and pulls factors experienced, some health workers give reasons for not leaving their countries, which are in line with stick factors suggested by Padarath et al. (2003). These include high levels of morale, the presence of rewards and incentives, and placing a high value on family, social, cultural and patriotic values. The costs of migration (re-qualification, relocation, language, time) may also be a barrier in some cases.

Once people have moved or migrated to work abroad, they may choose not to return because of a variety of “stay” factors (Padarath et al., 2003). These include the development of new social and cultural bonds, the risk of disruption to the education of children, reluctance to disrupt new lifestyles and inadequate knowledge of job opportunities at home.

The conceptual framework in Figure 4, proposed by Padarath et al. (2003), illustrates the forces that influence where health care professionals work. It provides us with an approach to understanding the determinant of health personnel distribution and flows.

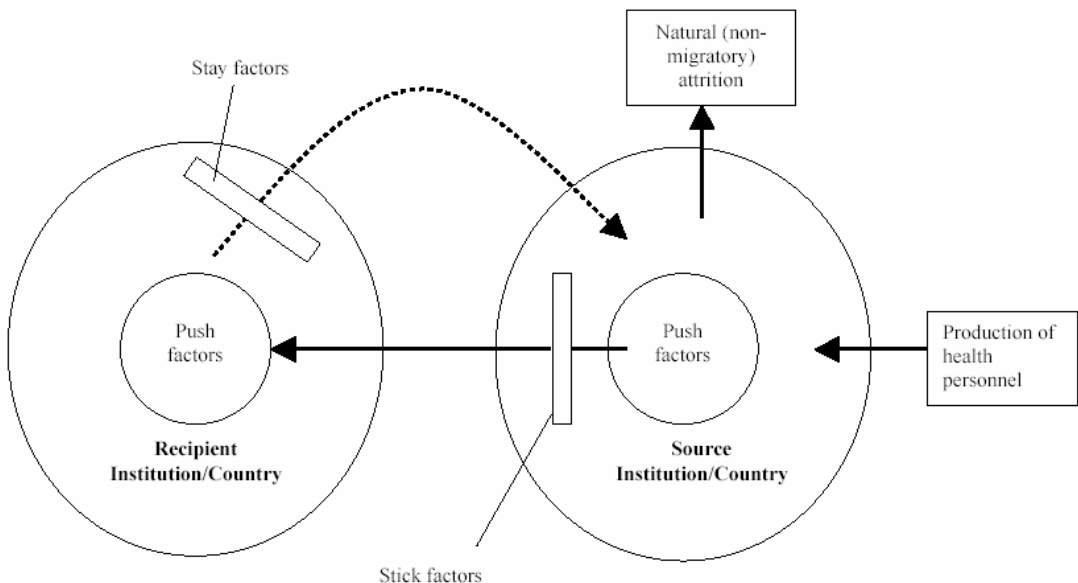


Figure 4: Factors influencing the availability and movement of health personnel

6. The Stock of Healthcare Professionals

By far the most significant component of any health care system is its health personnel. Without a foundation of skilled human resources, health care systems cannot function adequately or effectively. In the year 2000, the world had about 8.5 million doctors and 15.2 million nurses giving an average world density of 1.4 doctors and 2.6 nurses per 1,000 people.

Countries in the African region report major shortfalls of health professionals (especially in the public sector), as opposed to those in Europe and North America. Africa averages only 1.4 of these skilled workers per 1,000 in comparison to Europe's density of 10.3, a seven fold increase (WHO, 2004).

Graph 7: Worker density by region



Source: (WHO, 2004)

A recent estimate suggests that sub-Saharan Africa is approximately 700,000 doctors and 700 000 nurses short of the staffing requirements necessary to meet the Millenium Development Goals

(Kurowsky, Wyss et al., 2004), and according to the WHO, 31 countries in Africa do not meet the "Health for All" standard of a minimum of one doctor per 5,000 people. The situation is continuously deteriorating and sub-Saharan Africa is the only world region to show declines or stagnation in the ratio of doctors to population between 1970 and 1997 (JLI, 2003; Sanders et al., 2003). In the late 1990s the doctor population ratio in Malawi, Mozambique and Tanzania was 1:30,000 or more and in Angola, Lesotho, Zambia and the DRC this ratio stood at 1:20,000. Hence, within Africa itself there is considerable variation in health personnel availability.

Table 4: Doctor-population ratios for different African countries.

Country	Number of People per Doctor		
	1970	1990	1995-7
Angola	23 725	NA	20 000 (1997)
Burkina Faso	97 120	57 320	29 412 (1995)
Cntr. Africa Rep.	44 740	25 930	28 571 (1995)
Chad	61 900	30 030	30 303 (1994)
Ethiopia	86 120	32 650	33 333 (1995)
Ghana	12 910	22 970	16 129 (1996)
Kenya	8 000	10 130	7 092 (1995)
Lesotho	30 400	24 095	14 285 (1995)
Malawi	79 580	45 740	NA
Mozambique	18 860	36 225	28 571 (1997)
Niger	60 090	34 850	28 571 (1997)
Rwanda	59 600	72 990	NA
Uganda	NA	22 399	20 000 (1996)

Source: WHO 2004)

These country-level indicators conceal the considerable inequities in health personnel within African countries. The main disparities of the internal distribution of staff occur between the public and private sectors, between urban and rural areas or between tertiary and primary levels of the health system. This means that for a large number of people, the availability of health personnel is even worse than the figures shown in Table 4.

Of all the countries in sub-Saharan Africa, South Africa has for long had the highest proportion of private for-profit providers. Nigeria and Kenya also have substantial private sector services. In Kenya, only 600 of its 5,000 registered doctors working in the public sector and only 12% of Nigeria's 30,000 doctors are estimated to be working in the public sector (WHO, 2004).

Cameroon experienced a 75% increase in doctors working in the private sector between 1991 and 2000 and similar increases were noted for nurses. In Zimbabwe the percentage of doctors working in the public sector fluctuated between 40% and 47% between 1995 and 1998. The number of

pharmacists in Senegal's public sector shrunk from 14% in 1993 (35 of 245) to only 5% in 1996 (WHO, 2004).

Attempts to assess the stock of health professionals from local health council data are also complicated by a paucity of statistics as well as two additional factors. First, many who leave maintain local registration with councils and second, some who register no longer practice or practice on a part-time basis. The statistics quoted above therefore need to be interpreted in the light of these possible discrepancies.

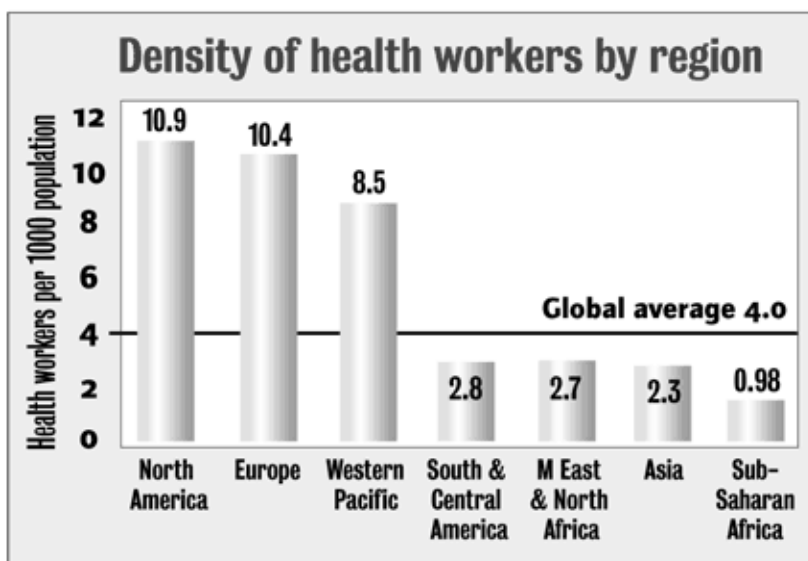
7. The Impact of Migration on Source Countries

The impact of migration in source countries can be seen from various perspectives including the ability of source country to deliver health services effectively, effects on training and innovation capacity of source countries, and impacts on the national economy at both macro and micro levels.

7.1 Impact on health service delivery

Every state has an obligation to create conditions that would assure its citizens of medical services and attention in the event of sickness, and to prevent, treat and control diseases. Without adequate numbers of trained health personnel, both the quality and quantity of health services that a health system can deliver are reduced, limiting the number of people who receive care, and diminishing the quality of care for those who are able to receive it. Recent studies reveal a significant negative correlation between health worker density and mortality rates (Anand and Baenighausen, 2003), and a positive correlation between quality of care and healthcare outcomes, and the availability of health personnel (Mercer, Da Poz, 2002).

Graph 8: Density of health workers by region



Source: WHO report, *Addressing Africa's Health Workforce*, December 2004.

Health systems in Africa face a variety of health personnel problems which include overall lack of personnel in key areas of the health sector, an inequitable distribution of those who are available, and a significant attrition of trained personnel from the health sector. The availability of health personnel in Africa is considerably worse than in other regions of the world as revealed in Graph 8, and is one of the stumbling blocks to the delivery of adequate healthcare (WHO, 2004).

Staff shortages in health facilities limit the number of people able to receive care, and diminish the quality of care for those able to receive it. Waiting times are often long and some facilities, especially rural ones close because they have no one to run them. Often, facilities are staffed with unqualified personnel and even patients seen by qualified personnel are put at risk due to time constraints and provider fatigue.

Health personnel shortages can also prevent a country from scaling up interventions to achieve certain health goals (Aids targets, Millenium Development Goals) and are limiting countries' abilities to meet tuberculosis targets (WHO, 2003) and immunization coverage targets (Brown, 2003). The shortages are also directly related to high infant and child mortality (Chen & Boufford, 2004).

These are indirect measures of migration, because shortages, especially in public institutions may also be caused by losses to the private sector. However, the effect of migration is not only in terms of numbers as the loss of a few highly specialised cadres that are scarce can lead to complete collapse of a particular service in a country.

Moreover, migration of certain types of health personnel can have very significant 'knock-on' effects which are often not captured as part of the costs and effects. These may include the overall malfunctioning of the health services and hence increases in morbidity and mortality. The loss of institutional memory also results in a duplication of work and wastage of resources as a result of reinventing disease management strategies and an inability to refine strategies based on experience.

7.2 Knowledge generation

The impact of the brain drain on associated areas of the health labour market such as academic, research and medical school staff is also important. Whilst their relative numbers per se may be small, the impact of their loss is much more widely felt. The brain drain of academic and experienced personnel weakens the offer of research and health services by impacting on the future supply of doctors not only in numbers but also on quality of trainees as well as the supervision and support of remaining practitioners.

According to the most recent available data on the academic workforce in RSA (CSIR, 2005), there is a sluggish growth amongst permanent academics, an increase in the proportion of academics aged 55 and above, and a decline in the percentage of academics with doctorates at universities.

Concomitantly, student numbers continue to rise astronomically resulting in marked increases (33%) in lecturer: student ratios (see tables 5 and 6).

Table 5: Permanent academic professionals at universities and technikons in 2000 and 2003

Permanent Research/ Instruction Professionals	2000	2003	Change
Universities	11 220	11 263	+43
Technikons	3 722	3 713	-9
Total	14 942	14 976	+34
Student numbers	2000	2003	Change
Universities	387 361	487 741	+100 380
Technikons	202 792	230 052	+ 27 260
Total	590 093	717 793	+127 700

Source: CSIR report 2005

Table 6: Number and proportion of academics with PhD's

	2000		2003		Change	
	Total	%	Total	%	Total	%
Universities	4 469	40.9 ¹	4 134 ²	37.3	-335	-3.6
Technikons	202	5.4	258	6.9	+56	+1.5
Total	4 671	31.2	4 392	29.3	-279	-2.1

Source: CSIR report 2005

Similarly, in Ghana the average age of Ghana Medical School lecturers was said to have risen from 36 to 55 (Martineau et al., 2002). This is seen as a reflection of reduced intake of younger staff, possibly due to emigration.

Data on the research and development (R & D) workforce in South Africa also show a significant decline in both higher educational institutions as well as in government employ. The total number of medical researchers in the South African public sector declined from 189 in 2002 to 136 in 2003. Of these, 116 were based in the most urban provinces (HST, 2004).

Placed in an international context, South Africa also has less than one researcher for every thousand members of the workforce compared with five in Australia and ten in Japan (CSIR, 2005). Given that "technology and innovation walk on two legs" these demographics represent a critical state of affairs. Although these data do not offer a historical or sociological basis for the explanation of the state of the academic workforce, they suggest that the main challenge relates to promoting the retention of academics.

Table 7: R&D workforce (1991 – 2001/2) full time equivalents

Sector	Categories	1991	2001/2
Higher Education	Researchers	5 984	3424
	Technicians	289	217
	Support staff	260	231
	Total	6 533	4042
Government (incl. Science Councils)	Researchers	3 629	2134
	Technicians	2 384	1344
	Support staff	3 437	1842
	Total	9 450	5171
All Sectors	Grand Total	15 983	9 213

Source: (1991) SA science and technology indicators and R&D Survey 2001/2

Long-term analysis of South African scientific output shows that overall, total outputs as well as those in ISI publications have been stagnating for the past 10-15 years (see Graph 9). However, in world output, this has meant a decline in proportion of world share from 0.7% in 1987 to 0.49% in 2000. Cumulatively Africa’s share of global scientific output has fallen from 0.5% in the mid 1980’s to 0.0.3% in the mid 1990s.

Graph 9: Trends in scientific output in South Africa

