Not enough there, too many here: understanding geographical imbalances in the distribution of the health workforce

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Abstract

Access to quality health services is a critical factor for the improvement of many health outcomes, such as those targeted by the Millennium Development Goals (MDGs) adopted by the International community in 2000. The health related MDGs cannot be achieved if vulnerable populations do not have access to skilled personnel and to other necessary inputs. This paper focuses on the geographical dimension of access and on one of its critical determinants, the availability of qualified personnel. The objective of this paper is to offer a better understanding of the determinants of geographical imbalances in the distribution of health personnel, and to identify and assess the strategies developed to correct them. It reviews the recent literature on determinants, barriers, and the effects of strategies that attempted to correct geographical imbalances, with a focus on empirical studies from developing and developed countries. An analysis of determinants of success and failures of strategies implemented, and a summary of lessons learned is included.

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Abbreviations and Acronyms

BRAC	Bangladesh Rural Advancement Committee
CHW	Community Health Workers
FSU	Former Soviet Union
FTE	Full-time Equivalent
HRH	Human Resources for Health
IOM	International Organization for Migration
MAG	Multidisciplinary Advisory Group
MDG	Millennium Development Goals
NGO	Non-governmental organization
PAHO	Pan American Health Organization
PHC	Primary Health Care
PSAP	Physician Shortage Area Program
TB	Tuberculosis
TBA	Traditional Birth Assistants
TUFH	Toward Unity for Health
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNHCR	United Nations High Commission for Refugees
UNI	Uma Nova Iniciativa (Kellogg Foundation Program in Latin America)
WHO	World Health Organization
WHO-AFRO	World Health Organization African Region

Introduction

Access to quality health services is critical for the improvement of health outcomes, such as those targeted by the Millennium Development Goals (MDGs) adopted by the international community in 2000[1]. For example, the reduction of maternal mortality by 75% in 2015 depends on access to skilled care at birth and during the pregnancy [1,2]. But often, services are not available at a reasonable distance; or they are available, but people cannot afford them. Or, they are not accessible for some organizational reason, like limited hours of presence of staff, unfriendly behavior towards users, cultural barriers, and so on. Accessibility of health services is a multidimensional concept [3], which refers to geographical, economic (affordability), organizational, and cultural (acceptability) factors which can facilitate or hinder utilization of services. This paper will focus on the geographical dimension of access and on one of its critical determinants, the availability of qualified personnel. There are many examples of poor countries with a good coverage of their territory with health facilities, and yet with a limited access to services because facilities lack the personnel needed to function normally. A well-balanced distribution of infrastructures needs to go hand in hand with a well-balanced distribution of health personnel to be worth the investment, let alone to have an impact on the health of the population.

Geographical Imbalances: a widespread problem

Unbalanced distribution of health personnel between and within countries is a worldwide, longstanding and serious problem. Both, developing and developed countries, typically report a higher proportion of health personnel in urban and wealthier areas. In Nicaragua, around 50% of the countries' health personnel are concentrated in the capital Managua, which comprises only one-fifth of the country's population [4]. In Mexico, it is estimated that 15% of all physicians are unemployed, underemployed or inactive. Yet, despite this apparent surplus, rural posts remain unfilled [5]. Indonesia's vast size and difficult terrain presents an enormous obstacle for the delivery of health services and for a balanced distribution of health personnel. Doctors and nurses are resistant to relocate to remote islands and forests location with poor communications with the rest of the country and little amenities for health professionals and their families [6].

In Bangladesh, the metropolitan areas contain around 15% of the country's population, but, in government positions, they have 35% of doctors and 30% of nurses. Since there are virtually no doctors or nurses in the private sector outside the metropolitan areas, the geographical concentration of these providers in the metropolitan areas is even greater [7].

In Brazil, in 1995, the number of medical doctors per 1000 population by region varied from 0.52 and 0.66 in the poorer regions of the North and of the Northeast to 1.75 and

[1] United Nations Millennium Declaration, 5 September 2000, resolution 53/239 (see http://www.un.org/millennium/). The health-related MDGs are (1) Reduce by two thirds, between 1990 and 2015, the under-five mortality rate, (2), Reduce by three quarters, between 1990 and 2015, the maternal mortality ratio, and (3) Have halted by 2015 and begun to reverse the spread of HIV/AIDS, and (4) Have halted by 2015 and begun to reverse the incidence of malaria and other major diseases.

2.05 in the states of São Paulo and Rio de Janeiro, in the richer Southeast region. The average for the whole country was 1.19. This gap in favor of richer regions is smaller than it was 25 years earlier, thanks to efforts to expand the coverage of the population by public services. But "the low incomes of the population have discouraged the settlement of doctors" in the poorer regions [8]. The Government of Brazil has introduced, in 1994, an ambitious program ("Programa de Saúde da Família"[2]) to bridge that gap and has been fairly successful at improving the deployment of personnel.

In Ghana, in 1997, 1087 of the 1247 (87.2%) general physicians worked in the urban regions, although 66% of the population lives in the rural areas [9][3]. At a recent OECD meeting of experts on human resources planning, the 20 countries represented reported maldistribution problems [10]. But contrary to poor countries, richer ones can mitigate the effects of maldistribution through strategies like transfer by air or telemedicine.

The imbalanced distribution of health personnel can contribute to great disparities in health outcomes between rural and urban population. In Mexico, life expectancy for the rural population is 55 years, while in urban areas it is 71 years. In the wealthier, northern part of the country, infant mortality is 20/1,000 compared to 50/1,000 in the poorer, southern states [11].

Urban areas are more attractive to health care professionals for their comparative social, cultural and professional advantages [12]. Large metropolitan centers offer more opportunities for career and educational advancement, better employment prospects for health professionals and their family (i.e. spouse), easier access to private practice (an important factor in countries where public salaries are low) and lifestyle related services and amenities, and better access to education opportunities for their children [6,13,14]. In addition, the low status often conferred to those working in rural and remote areas further contributes to health professionals giving preference for settling in urban areas, where positions are perceived as more prestigious [15,16]. While it is in the most remote and underserved areas that health problems are more prominent, this being particularly true for low-income countries [6][4], urban, wealthier areas often report having too many staff, particularly doctors, like in Ivory Coast where some doctors remain unemployed in Abidjan [17]. Overstaffing in urban areas can lead to underuse of skilled personnel while increasing the total cost of health care system. Paradoxically, instead of encouraging movement of staff towards rural areas, excess number of health professionals in urban areas often promote external "brain drain", as professionals start leaving for working opportunities abroad.

In the last 15 years, as they engaged in reform initiatives aimed at addressing issues of equity in health care and improving the health status of the poor, policy makers faced the

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[2] The program is described at : http://portal.saude.gov.br/saude/visao.cfm?id_area=149 (in Portuguese only)

[3] For information on Ghana's efforts in Human Resource for Health, refer to Ghana Health Services site: www.ghanahealthservice.org

[4] J. Tudor- Hart (1971) described this phenomenon in England and formulated his now famous "Inverse Care Law" which states that the distribution of health services is inversely proportional to the distribution of needs.

challenge to ensure that remote and poorly served areas are staffed. Few countries, with notable exceptions (Brazil, Cuba, Iran, Thailand), however, addressed the issue in a systematical and comprehensive manner, and piecemeal interventions have produced rather disappointing results.

The objective of this paper is to offer a better understanding of the determinants of the geographical the distribution of health personnel, and to identify and assess the strategies to influence it. It reviews the recent literature on determinants, barriers, and the effects of strategies that attempted to correct geographical imbalances, with a focus on low and middle income countries, but also on lessons from richer countries. An analysis of determinants of success and failure of strategies implemented is included. The research for this paper relied on (1) internet search of websites and publications on health professionals worldwide, and (2) a review of recent documents, publications, and unpublished reports on distribution of human resources for health (published after 1995).

This paper also attempts to develop a conceptual framework aimed at clarifying the ways in which the geographical distribution of health professionals is determined and how it can be influenced. It is expected that by raising awareness of the broad range of complex influences, this can help policy makers view geographical distribution issues in a more integrated and pragmatic manner.

Approaches to understanding geographical Imbalances

Two main perspectives to understand the geographical distribution of health personnel have been identified: economic and normative [10]. From an economic point of view, the distribution of health professionals is a function of the health care labor market. Imbalances arise when there is a disequilibrium between supply and demand for labor in a given geographical area [10]. From this perspective, as real wages increase, more health professionals will be willing to be employed and more people will be entering the medical professional, leading, in the long-run, to a new equilibrium and a more balanced distribution of health professionals. This theory predicts that imbalances of health professionals can be prevented by establishing a competitive labor market [10]. However, it has been shown that economics is just one factor affecting a health professional's decision on where to locate his/her practice [18]. Professional, personal, educational, and social/lifestyle related factors can greatly influence job-related decisions. It has also been shown that the health care labor market is not a competitive market since there usually are substantial entry regulations, information asymmetries and other market failures [10, 19].

The normative view defines imbalances in terms of comparison of a certain staff density with some standard or social norm [10]. It leads to emphasizing the role of planning in achieving a balanced distribution of human resources for health (HRH). The norm of reference can be one defined by professional organizations, by government policy, or simply by using a certain region as a comparator. From that perspective, variations in professional density across a geographical area from the defined standard are considered imbalances. By definition there is subjectivity involved in establishing these standards [10], as well as methodological problems such as the definition of what is a doctor, or

even more complex, what is a nurse[5]. Normative approaches usually use full-time equivalent (FTE) doctor, nurse, etc., to population ratios, which also has serious limitations as it says nothing about the productivity of personnel nor about the needs of the population, two variables which can show huge differences between countries and within the same country. Far from being contradictory, the normative and the economic perspectives complement one another. While the normative view focuses on the need and supply side of the health labor market, the economic view tackles the demand and financial incentives necessary so that demand will match supply [20].

Standard location theory has been used to predict and explain choices of practice location by health professionals [10,21,22]. It uses the concept of utility function to describe locational preferences of health professionals [21]. The utility function assumes that a number of different factors can affect the relative attractiveness of a certain area and play a role in a professional's decision to locate his/her practice [10], a choice decided on the basis of the alternatives that maximizes one's utility (Bolduc 1996). Income is only one variable at work. Dionne [21] has found that quality of leisure, distance to central cities, average income, and presence of a hospital, significantly increase the probability of having at least one physician in a given town. A study in Norway found that younger physicians tended to prefer leisure to higher income [23]. The same study found that physicians who reported high workload stated a desire to move to an area where workload was lower, while physicians with fewer patients did not express desire to move [23]. The implications of the interdependence of factors affecting job-related decisions is that the distribution of health professionals may not follow demand, but also amenities.

The geographic dispersion of health professionals has also been studied through the analysis of average distance circles that maps professional's changing mobility over time [24]. This model uses structuration theories, which assume an interplay between individual factors to locate practice and a given structure (e.g. medical education). This space-time model indicates that people may be bound by a general structure, but may influence that structure over space and time in the course of a lifetime through locational decisions [24]. This model can help understand the implications of community-based trainings on ability to retain personnel, changes in the mobility of male and female providers, and career trajectories for different health professions [24].

The determinants of variations in the geographical distribution of HRH

Variations are the result of a mix of decisions by individuals, communities, and governments, which are in turn influenced by personal, professional, organizational, economic, political, and cultural factors. Rural-urban inequities, inadequate medical education systems, migrations, public-to-private brain drain, and inadequate payment incentives are just some of the factors that have been identified as contributing to an imbalanced supply of health personnel. These factors often interrelate and affect one another in many ways. For example, inadequate remuneration and working conditions result in personnel resisting to redeployment, as well as promoting rural to urban migration [25]. As health professionals concentrate in urban areas and seek career

[5] Definitional issues arise from variations in the way different jurisdictions define the scope of practice of health professionals.

advancement there, they may soon opt to work in the private sector, which may be the reason to move to an urban area in the first place. Consequently, rural-to-urban brain drain is compounded by public-to-private brain drain [25]. Ultimately, the inequitable socio-economic development of rural compared to urban areas presents the main constraint for achieving a balanced distribution of HRH [12].

Bilodeau and Leduc [26], when discussing factors affecting retention of health personnel in rural and remote areas, define three categories of factors affecting health personnel's motivation to practice in these locations: personal (age, gender, education, etc.), professional (specialization, working hours, incentives, etc), and contextual/environmental (community amenities, quality of life, population's educational level, etc). The authors further define three distinct decisional phases affecting the retention of health professionals in rural and remote areas: attraction, installation, and maintenance. Attraction is defined as "a positive attitude regarding the exercise of medicine in rural and isolated areas, which does not necessarily conducts to installation." Installation consists in the realization of attraction, and the decision to practice in a determined area. Maintenance of practice takes place as a result of experiencing living and working in a given area. Bilodeau and Leduc [26] argue that in each decisional phase, various personal, professional and contextual/environmental factors play, shaping the individual's experience and consequently, the decision to relocate.

In our literature review, we identified at least 5 categories of determinants that affect geographical distribution: individual, organizational, and factors related to the health care and educational systems, institutional structures, and the broader social-cultural environment. These will guide our presentation of determinants and will be further discussed in the final section which tries to build an explanatory framework.

Individual Factors

Determinants at this level include a person's social background, ethnicity, age, gender, education, values, beliefs, etc. Growing up in a rural community has been associated with higher probability to practice in rural areas [18]. Women are less prone to accept rural posts and are underrepresented in rural areas [27]. Younger individuals have less family responsibilities, and are more prepared to move or migrate. The presence of family members in rural and remote areas increases the probability that an individual will consider these areas for the establishment of his/her practice [26]. The decision of where to practice is also influenced by an individual's expectations and career advancement plans.

As more females enter the medical profession, the need to understand gender-related differences in terms of specialty preference, geographic location of practice and other characteristics becomes increasingly important. An increasing female medical workforce may not result in more physicians working in rural areas. Comparisons between male and female physicians in the US have shown that women tend to prefer urban locations,

where they have access to salaried work in institutional settings [6] [28]. A study in Bangladesh found that female doctors rarely live in the same village as their assigned post and have higher overall absentee rates. The study suggests that married women doctors will likely live where their husband's jobs are [29]. With women being less likely to accept positions in remote areas, the changing gender composition of health professions has the potential to affect the supply of personnel to rural areas and alter the impact of strategies developed to correct imbalances. In addition, this gender differential has important policy implications as in many places in the world women are not allowed to be seen by male doctors, making an already skewed availability of health care services even worse for rural women [29].

Organizational Environment

Management style, incentives and career structures, salary scales, recruitment, posting and retention practices are some of the organizational factors that can influence the geographical distribution of personnel. In poor countries, remuneration is usually low and working conditions unsatisfactory. Remuneration, in particular, seems to constitute the most basic influence on retention of health professionals [30]. In order to fulfill professional and material expectations, health workers often resort to coping strategies, or alternative approaches, to overcome unsatisfactory remuneration and working conditions [31,25]. Private sector practice is one of the many strategies health workers resort to in order to supplement their income and increase job satisfaction [25]. Urban areas offer greater opportunities for private practice, partly explaining preference for working in large metropolitan centers. Teaching, attending courses, supervision activities, and research are some alternative legitimate strategies utilized by health personnel to complement their income [13], which are all less available in rural areas. A large study in Bihar, India, found that three of the four medical officers assigned to a health post were not present in the month of the researchers' visit, but still withdrew their salaries. Two doctors did not live near the post location and reported to be busy with their own private practices elsewhere. The officer in charge did not complain because the presence of other doctors would interfere with his own private practice [32]. In Angola, in the mid-1990s, doctors could earn the equivalent of their weekly salary in one hour of private work [33].

It has been proposed that the low numbers of physicians in rural area has more to do with retention than with recruitment [34], as heavy workloads and professional isolation act as stimuli to look for better working conditions. In Ontario, Canada, those who select to practice away from major centers are faced with work conditions in which "too few physicians, are doing too much with too few resources" [34]. In Australia, average weekly hours worked are higher for rural practitioners [14]. In Indonesia [6] and Thailand [35,36], rural development plans successfully placed health centers and hospitals in most districts. However, lack of concomitant efforts to deploy and retain personnel to new facilities resulted in work overload for doctors working in rural districts, further pushing them to urban areas or outside the country.

[6] The same study shoed that women cluster in a few specialties (pediatrics, psychiatry, pathology, preventive medicine, physical medicine and rehabilitation, and anesthesiology), have lower productivity and income than male physicians,

On the other hand, appropriate numbers of health personnel are useless without proper facilities, equipment and supplies [5]. Imbalances between investments in human resources, maintenance of infrastructures, and provision of facilities and supplies can create important barriers to satisfactory deliver health care services [5]. Lack of necessary inputs can have a negative impact on workers' motivation and performance. In addition, poor infrastructure can act as a deterrent for health professionals to accept positions in rural and underserved areas. Lack of appropriate facilities was a primary reason cited by medical students for not practicing in rural Pakistan [16].

Lack of transparency and of due process in the management of postings and promotions, is also an incentive to avoid working in remote areas where one gets forgotten.

Health Care and Educational System Determinants

Education and Training Processes

The way health workers are educated can affect the distribution of health personnel in a given area. Resources invested in education and training, role models and contents of training have been linked to the distribution of health professionals in many ways. The location, structure, recruitment methods and criteria of medical schools, for example, have been shown to influence the choice of specialty and location of practice [37].

Pre-service education

The formal education of health professionals, particularly of highly skilled staff, often does not reflect the actual needs of the population they are expected to serve [5]. The still predominantly urban-based, curative-care and hospital centered model of medical education is not consistent with needs and disconnected from the health sector reform goals. This seems to be the case in Africa, when medical training is based on European curriculum and standards [38]. Emphasis on specialization has increased considerably over the years, resulting in an overall decrease in general practitioners [13], although in some countries, like Canada [39] and Brazil[7], have successfully reacted to reverse that trend.

Specialization has a direct impact on the composition of the physician workforce and preferred location of practice. Those who select specialized disciplines opt for urban practices in greater proportion, if only for securing access to the infrastructures they need to conduct their practice and to the pool of potential clients [37]. In the USA, those specializing in family medicine are more likely to select small and isolated areas for practice than those specializing in any other medical discipline [37].

The location of a medical school has also been associated with specialization and choice of location of practice. Graduates from medical schools located outside the major urban areas are more likely to practice in rural areas and to select a primary care specialty, like family medicine [37].

[7] See Programa Promed (http://www.saude.gov.br/sps/depart/cgprh/projetos/promed/promed.html)

Continuing education and in-service training

Health professionals practicing in remote areas often complain of the lack of opportunities for continuing education and career development. Health professionals are not motivated solely by present working conditions and income. They are also influenced by what they believe those conditions will be in the future and what their opportunities for career development are. In order to increase one's career prospects, continuing education and training are necessary to keep skills in line with current knowledge and advances in technology [5]. This is illustrated by the example of Ghana, where doctors serving in rural areas were less well prepared for the required "Post Graduate Entry Examinations," since those who remained at the teaching hospitals had better access to amenities such as libraries, internet, publications and journals, as well as supervisory support to prepare for the exam [30]. The lack of opportunities for continuing education and training in remote and isolated areas results in negative attitude towards these locations, consequently affecting job-related decisions [5].

In the context of health sector reforms and changing national needs, education and training of health professionals are an essential component for the development of human resources [40].

Health Care System

Size and Composition of the stock of health workforce

The characteristics of the stock of trained health personnel, such as its volume (number of individuals), its composition by sex, age, and occupation, and the dynamic of its evolution, are critical factors in balancing their geographical distribution. Whether there is a surplus or a shortage[8], the gender composition, the generalist-specialist distribution, the doctor-nurse ratio all play a role. Shortages of health personnel, measured by the number of unfilled positions, exist both in developing and developed countries. In the United States, 126,000 full-time positions for registered nurses remain vacant and the national shortage is expected to increase to 400,000 by 2020 [41, 42]. Shortages are also reported in the United Kingdom and Canada [13]. In these countries, shortages are greater in rural areas [10] and this initiates a "domino" effect phenomenon when countries recruit foreign workers to fill in rural positions; in the exporting countries, professionals leave rural areas to fill in the gaps in the cities. Some of these countries then import personnel from poorer countries to compensate. As the UK and Canada are recruiting from South Africa, because their own personnel migrates to the USA, South Africa has been importing from the neighboring countries (where salaries are much lower). This was until the country adopted a policy of not recruiting from African countries and started recruiting from Cuba [43]. Ghana has also recruited from Cuba recently.

[8] Rutkowski (2003) discusses labor shortages, or understaffing, as the difference between the supply and demand of labor, expressed by positions offered. He points out that a discrepancy between the desirable –in terms of personnel needed to meet a population's health needs- and available workforce, however important from a social perspective, may not be a shortage from the economic perspective, but rather a "needs gap".

Countries such as Oman and Saudi Arabia have continuously recruited foreign workers to fill in critical gaps [5], also contributing to shortages in poor countries, such as Bangladesh, which have sent part of their production of doctors and nurses to the Gulf for many years. These policies are now being gradually reversed, because their long-term sustainability cannot be assured anymore [44]. The problem is of particular concern in Africa, where shortages have amplified in the last years. Shortages of doctors have been described in Ghana [45], and shortage of nurses in Burundi, Kenya, Mauritania [13], and Zimbabwe [46].

Pull factors from outside are not the only factors explaining shortages. There are many endogenous factors at play: the expansion of career opportunities for women can partly explain the declining interest in nursing [13], as nursing shares the characteristics of female dominated occupations: low pay, low status, poor working conditions, few prospects for promotion and poor education. Many young women who would have chosen a career in nursing are now opting for managerial and other professional occupations. [13]. The ageing of the nursing workforce has serious implications for the future of the nursing labor market [47], especially as it combines with declining enrollments in nursing schools, resulting in less young women entering the registered nurse workforce and with nurses leaving the health sector. Low salary is only one reason why nurses quit their job. Many studies suggest that dissatisfaction with promotions and training opportunities has a stronger impact than workload and pay for nurses quitting their job [48].

A special reference should be made to the impact of HIV/AIDS in exacerbating shortages of health professionals. HIV/AIDS threatens to overwhelm medical services and to reduce the supply of productive labor [49]. The problem is particularly serious in Africa. In Malawi, data for 1999 shows that half of nurses who left the Ministry of Health during that year had died, most of them probably of AIDS [30]. Evidence from Africa suggests that as much as one-fifth of employees from Ministries of Health, Agriculture and Education may be lost to HIV/AIDS in the years to come [50]. HIV/AIDS can affect HRH by reducing the supply of health providers through death, reduced performance or from professionals leaving the health sector, and by increasing demand for services which result in increased workload [50].

A diminishing stock increases demand in the cities and then contributes to the rural-urban migration. It triggers a vicious cycle through increasing the workload of those who stay and encouraging them to look at migration as a strategy to improve their lot.

HRH Policy Formulation Process

The failure to correct imbalances or at least to prevent their occurrence is frequently blamed on the lack of a favorable economic environment and of political commitment to do so [51]. Another explanation connected to the latter argument relates to the HRH policy formulation and strategy development process itself [51]. HRH planning has often not received adequate attention even in countries committed to health sector reform [30]. In many countries, progress has been made in recent years to develop national policies for HRH; however, the implementation, monitoring and evaluation of these policies have often been slower and more difficult [51]. In Africa, few countries have comprehensive

human resource for health policies and plans. Where there is one, funding does not always follow and issues of retention and remuneration remain unaddressed [30].

"Bureaucracy" seems to be the major barrier to efficiency in public services. Usually human resource management systems and procedures, are highly centralized involving several ministries and departments, with consequences such as observed in Ghana, where health professionals returning from overseas training can be waiting for over a year for a new appointment [30].

WHO is increasing efforts to assist countries to develop HRH policies and plans. It has developed an analytical framework to help categorize contextual factors and the resulting health and HRH policy [51]. WHO-AFRO developed a regional framework for HR development in Africa which should lead to initiating country-specific action plans [52]. At the international level, WHO, UNESCO and the World Bank proposed to establish an African HRH development task force to assist countries in developing strategies and building consensus [52]

Institutional Environment

The structure, organization and role of national institutions such as Civil Service, Ministries (Education, Finance, etc), are also shaped by a mix of external and national influences. In turn, they influence what happens in the health sector, including the distribution of the workforce. At a broader level of the policy environment, changes such as administrative and political decentralization, or civil service reform shape the context in which health services function, including how its personnel is allocated. In the health sector itself, the human resources policy process, the education and training process, the size and composition of the stock of health workforce, the organizational environment and practices, all influence the geographical distribution of personnel to some degree. These will be reviewed below.

Box 1. Will Civil Service reform help reduce the HRH imbalances in Ghana?

In Ghana, the centralized civil service pay structure maintains a rigid staff salary and grading system that does not recognize variations in workload in deprived, remote districts. The system also discriminates against staff in remote areas who have restricted access to the headquarters. The country is undergoing a health sector reform, named Vision 2020, to address these issues, including strategies to develop multi-purpose health workers, schemes to improve personnel administration systems and provision of new incentive mechanisms. Much effort is being placed on building capacity of local governments so to empower communities to make better health-care decisions [53]. Vision 2020 has resulted in significant improvements in rural conditions, including improvements in transportation, and provision of water and electricity. However, studies indicate that migration rates are still very high, and professional associations remain suspicious of changes. Therefore, addressing human resources issues is essential for the successful implementation of Ghana's health sector reform [53]. The "Five Year Program of Work" established increased investments in infrastructure and expansion of services in order to achieve improved equity and access. However, the plan also included

a reduction in the salary component of recurrent costs from 55% to 33% [30]. The consequences of this policy remain to be assessed.

Decentralization and civil service reform

In recent years, many countries have moved towards decentralization as part of their health sector reform. In principle, the transfer of power, resources and responsibilities from central agencies to local units could substantially improve health service delivery [54]. In practice, decentralization also poses important risks and challenges, as it often has to be combined with efforts to reform obsolete and bureaucratic civil service structures.

Whether decentralization will work is greatly influenced by the degree to which political and administrative power is transferred, how the new roles are defined, what skills are available at the local level, and what administrative links are established between the different management levels, as well as between the central health authority and the other central government offices with decision power over resource allocation [55]. Political will is also central for the success of any decentralization effort. For instance, in Ceara, a poor state in the northeast of Brazil, following decentralization and market-oriented reforms, the State's government implemented a program of nurse-supervised auxiliary health workers teams serving 84% of the districts. The program has been associated with a rapid decline in infant mortality, a rise in immunization rates, identification of bottlenecks limiting the utilization of medical resources, and timely interventions in time of crisis [56]. The Brazilian program is today seen as model.

However, negative experiences with decentralization efforts have been more common. In the Philippines, the formally centralized national health system had the ability to allocate and distribute health personnel to and from different parts of the country. Local governments are unable to do the same. Local governments in rural areas face difficulty recruiting local health personnel as these prefer to work in urban areas. In addition, as prior efforts to create incentives for rural practice had increased salary, benefits, and improved the status of the rural practitioner, decentralization resulted in tighter budgets and inability of local governments to recruit health workers at existing high level salaries [57].

Decentralization has the potential advantage of enabling a closer interaction between health service providers and consumers, which could lead to health services being better targeted and tailored to local needs. If well implemented, decentralization should foster an increased and systematic participation of citizens in decision-making processes related to health policy planning and implementation. On the other hand, decentralization can be quite disruptive and often faces strong resistance from different sectors. Health care staff, for example, may fear a loss of power, benefits and status as a result of a breakdown on employment mechanisms [54, 57]. In Indonesia, the slow progression of the decentralization process has been partially blamed on the hesitation of central officials in delegating powers to local governments, perceived as their rivals. Officials are also concerned about interfering with the private service provision health staff engage in, which is often quite lucrative [54].

Social-Cultural Environment

The broader environment encompasses the set of economic, political, social and historical parameters in which the state, governments, social groups, and individuals operate. This level contains a national and an international component. Broader environment determinants affect where health professionals will practice by defining basic and fundamental structures and conditions that can either facilitate or hinder a balanced distribution of professionals. Some of these are discussed below.

Resources

Community and local resources, conditions and opportunities can either draw or repel health professionals to or from a given area. While more resourceful communities have the ability to pull healthcare resources and better professionals, poorer communities struggle to do so and are usually unable to do it without external support. Access to lifestyle amenities has been associated with choice of practice location [6]. Access to social, cultural, educational and professional opportunities, increase preference to settle in particular areas [12]. A study conducted in Bangladesh, where unannounced visits were made to health clinics, found that absentee rates are particularly high for doctors. At larger clinics, absentee rates for doctors is 40%, while at smaller sub-centers with a single doctor (mainly rural centers), the rate was 74%. Important determinants of absenteism rates were whether the provider lives near the health facility, access to a road, and rural electrification [29].

Low prestige of primary care providers/ general physician

Value placed by society and family on a profession can impact an individual's choice of a career. In many countries, nurses, primary care providers and general physicians enjoy lower prestige and are less socially valued than other health professionals. Yet, these are those more likely to accept to work in remote areas. On the other hand, discrimination against staff in remote and rural areas is common. In Ghana, health workers are considered as being of a higher social class than their clients. As a result, clients resist to use health facilities and complain about staff attitudes towards them [53]. Professional prestige is often associated with becoming a specialist and working in a hospital. Former Soviet Union (FSU) countries, where medicine is considered an "honorable" profession, report an excessive number of specialists, while not being able to provide adequate coverage for their rural population (Laura Rose, World Bank, personal communication).

Gender Imbalances

Gender imbalances exist in many sectors of the health workforce, with some occupations dominated mainly by females, and others, usually the more qualified, by men. These reflect imbalances in the society in general. Often, women appear at the bottom of the hierarchy in terms of authority, remuneration and educational preparation. In Sri Lanka, for example, 80% of the nursing workforce is composed by women [59]. A study conducted in Bangladesh found that women accounted for only one-fifth of the health services, and were mostly nurses. The study pointed out that women were conspicuously absent of decision-making positions, which could result in lesser recognition of gender-

specific concerns [60]. In Ghana, cadres such as midwives and public health nurses are statutorily restricted to women [30]. Socio-cultural factors often preclude women from accepting positions in rural, remote areas for extended periods of time. In addition, in countries that impose rural compulsory service as a requirement for graduation and professional certification, women may not be able to graduate or exercise their professions.

Urban-bias

Movements towards modernization and industrialization during the 1950's and 1960's, have led many poor countries, particularly those with newly acquired political independence, to concentrate investments in urban areas, despite the fact that a large proportion of their population was still rural. This form of development resulted in an "urban bias," which in particular brought a concentration of medical schools and health facilities in urban areas. This overconcentration of resources in major centers attracts health professionals in search of better salaries, working conditions and career opportunities. In Thailand, high technology equipment is concentrated in urban hospitals, where most of the 900 physicians annually produced in the country remain [5]. In Pakistan, although urban areas contain less than 30% of the population, the government has heavily invested in urban health facilities at the expense of rural areas. As a result, while nearly all urban populations have access to health institutions, only 32% of the rural population has access to similar facilities. Zaidi (15) attributes the urban bias in Pakistan to a urban-based, hospital-oriented, curative-care model in which policies are based on political priorities, rather than on need, by a dominant, ruling urban class.

Box 2. Preference of doctors for urban locations

Indian doctors ranked interaction with colleagues and access to equipment and materials that allow them to make use of their training as the most important determinants of job satisfaction [61]. These are much more likely to be present in urban hospitals.

In Pakistan, a survey conducted among medical students determined that reasons for not practicing in rural areas were lack of facilities, lack of opportunities for themselves and their family, low salaries [16]

Women tend to prefer urban locations. The 1986 American Medical Association Physician Masterfiles showed that the proportion of generalist female physicians practicing in rural settings was significantly lower than the proportion who practice in urban locations [27]

A 1990 survey conducted at Gonder College of Medical Sciences in Ethiopia indicated that only 10.2% of the medical students were willing to work for more than two years in rural areas after graduation. Even though students acknowledged a greater need for physicians in rural settings, continuing education, school for children, and private practice were cited as being better in urban areas [62].

Role of other critical actors

A wide array of social actors are involved in the health sector, including NGOs, churches, charitable organizations, consumer groups, the media. In a rapidly changing environment, their role in the provision of health care is often not clearly defined, yet may be critical to where health professionals will opt to work.

NGOs, charitable organizations and traditional practitioners can be a significant source of health care delivery in many countries. In Bolivia, churches provide important services especially in areas of extreme poverty and marginal urban areas. In some areas, churches are sole providers and almost every rural or marginal urban area has some kind of traditional practitioner. The Bolivian health system is gradually moving to incorporate these practitioners into their networks [63]. The organizational structures of these organizations, such as their means of recruitment, styles of management, and incentive packages can also be an important determinant of which professionals will be available at certain locations.

Private sector development

The last decade witnessed a great expansion of the private health care sector in various parts of the world, where it was previously almost inexistent. Rapid economic growth promoted the development of the private sector, often supported by government policies and foreign loans, as in Thailand [35,36]. The private sector offers new opportunities for professionals to engage in work in their home countries at a higher salary [64]. In countries where the health sector was primarily public, budget constraints resulted in health care personnel leaving the public service for the private sector [13].

In South Africa, a higher proportion of all types of health personnel, with the exception of nurses, work in the private sector [38]. In 1998, 52.7% of all general practitioners and 76% of all specialists were in the private sector, which catered to less than 20% of the population. By 1999, these numbers have jumped to 73% of general practitioners working in the private sector [38]. In Thailand, the rapid growth of urban private hospitals provoked an internal brain drain from public rural districts and provincial hospitals [35,36]. In Ethiopia, Gonder Medical Science College was forced to close five departments as a result of the departure of skilled medical staff. The dean of the college affirmed that higher pay offered by private clinics, along with migration to other countries accounted for most of the losses [65]. In other cases, the economic crisis resulted in rapid declines in private sector hospitals, clinics and job opportunities. As a result, some countries observed a reversed brain drain of professionals back into public service [35,36]. In Kenya, a major increase in public service salaries, brought 300 doctors from the private sector to apply for government jobs within weeks (mentioned at the WHO Workshop on Human Resources and National Health Systems: shaping the agenda for action, 2-4 Dec. 2002)

Emigration

Globalization has led to greater mobility and freer movement of the workforce in general. Even though the mobility of health professionals is still generally constrained by regulations at entry[9], migratory flows from poor and middle income countries to richer ones seem to be increasingly growing. Besides the search of new career development opportunities, many qualified students choose to train overseas and often decide to stay in the country where they train [5]. In fact, many developed countries are reviewing rules that require foreign students to return to their countries right after graduation, allowing them to prolong their stay [67]. A variety of pull and push factors influence the movement of health personnel. Push factors within health care systems are low remuneration, work associated risks (i.e. TB and HIV/AIDS), heavy workloads, poor infrastructure and working conditions. Push the factors outside the health care system are political insecurity, crime, taxation levels, repressive social environments, Pull factors include aggressive recruitment by recipient countries, search for better quality of life, educational opportunities and higher pay [38].

Even though the migration of health professionals to richer countries can result in some benefits, it contributes to shortages of health personnel in exporting countries [30; 68] and consequently affects the capacity of rural areas to attract and retain health personnel.

Large numbers of trained health personnel have left African countries in the recent years [45; 13; 66; 69]. The Kenyan Medical Association warned that the brain drain of medical professionals is threatening the sustainability of the country's health services delivery system and contributing to the deterioration of medical services offered to the general population [65]. High demand for doctors and nurses [41] from industrialized countries opened great opportunities for highly trained health personnel to migrate. Countries such

[9] Exceptions are the agreements on the mobility of health personnel in the European Union –which do not seem to have triggered much migration [69] and recent agreements between countries in Europe and Latin America on mutual recognition of medical certification and qualifications (Dussault and Rigoli 2003).

as the US, Canada and Australia, have been shifting their immigration legislation, for example by creating temporary visas and expanding availability of work permits, towards increasing their supply of skilled workers [67]. This external brain drain of health personnel affects most developing countries, but is particularly exacerbated in Africa. The International Organization of Migration (IOM) recently stated that brain drain of highly skilled personnel from Africa creates considerable barriers to economic growth and poverty alleviation efforts in the region [64]. In Ghana, it is estimated that 298 out of 489 doctors who graduated between 1985 and 1994 are living outside the country [45]. It is also estimated that, between 1985 and 1997, 50% of each graduating class in the country will emigrate within 4.5 years, mainly to the US and UK [45]. The Ministry of Health in Ghana estimated that between 1996 and 2002 the number of doctors in the country shrunk from 1,154 to 964 [70]. Zambia had 1600 doctors in the 1980's. Today the country counts with only 400 doctors [64]. It has been reported that there are more Sierra Leonean doctors living the Chicago area then in Sierra Leone [65]. In Ethiopia, of every 100 professionals sent overseas for training between 1982 and 1997, 35 failed to return [65]. Besides staff shortage, recent trends in migration result in developing countries facing the financial losses related to the investment in education and training of these professionals [66]. In South Africa, 45% of medical graduates produced by Witswatersrand University in the last 35 years have left the country [64]. A recent study in Portugal shows that the percentage of qualified health personnel from Portuguese-speaking African countries immigrating to Portugal raised from 2.7% of all immigrants in 1998 to 7.1% in 2001 [71]. In the Philippines, the high demand for health professionals in the Middle East, Asia and Europe continues to be a major factor in keeping high enrollment rates in careers that will increase the chances of getting a job abroad [57], while not solving the shortage problem in the country. This loss of highly skilled personnel can further impact future generations of professionals, as many academic staffs are among those who leave the country. One study in Ethiopia found that half of the 135 academics teaching at Addis Ababa University in the early 1970's had left the country by mid-1980's [65].

Some benefits arise from migration as well. Temporary migration can help to increase the level and quality of care provided in exporting countries as returning migrants can bring updated scientific knowledge acquired in international institutions, and share new knowledge, technology and techniques with their national colleagues [69]. Workers remittances can be a significant source of revenue for exporting countries. Remittances account for 24% of Nicaragua's GDP, while in Turkey, remittances are four times larger than the country's inflow of foreign direct investment [72]. The UNHCR[10] (2001) concluded that emigration also represents a significant transfer or resources from poor to rich countries. Migration can improve the geographical distribution of the health workforce, in receiving countries and to a lesser extent in poor countries which receive emigrants. Thirty one percent of the UK healthcare workforce is from overseas, and 25% of Canadian hospital-based physicians are foreign [38]. In the U.S., foreign doctors tend to practice in rural and underserved areas of the country [57]. Cuban doctors have successfully established practice in rural areas of South Africa [35]. Absorption of

[10] For more information on the United Nations High Commission for Refugees see: www.unhcr.ch

foreign workers, however, does not happen without problems. Cultural and language barriers are often reported. In fact, language capabilities and ability to communicate with patients and other colleagues can be an important determinant of migration flows [69]. Professional associations also raise concerns about a possible lowering of the quality of services provided, as well as the impact on the national labor market (57, 41).

Measures to address geographical imbalances

Many strategies have been tried to prevent or to reduce the maldistribution of HRH. Most have focused on reforming the medical education system and on creating incentives to attract health professionals to otherwise unattractive locations. Financial incentives alone usually have not been sufficient to ensure that remote and underserved areas are and remain adequately staffed. Here we examine some of the measures tried to improve the geographical deployment of health professionals.

Educational Reforms

Strategies at this level range from subsidies, review of structure and content of curriculum, the adoption of new pedagogical methods, and changes in admission criteria. Decentralization of the location of training institutions has also been proposed, but more rarely implemented. In many countries, medical schools are reforming their curriculum with a view to producing graduates better prepared and more willing to work in underserved areas. Most reforms emphasize the production of community/family doctors, shifting training towards a primary health care approach. Since the adoption of the "Health for all by the year 2000" goal in 1978, WHO has encouraged a shift of emphasis from hospital-based curative care towards community-oriented preventive and curative care [73]. Community medicine departments have multiplied in medical schools throughout the world but with important regional variations.

Educational subsidies to individuals are commonly proposed as a tool to augment the number of students where recruitment is difficult [13]. In the US, a newly signed bill expands loan-repayment programs for nurses [74]. However, training more individuals may not be the right answer for improving the distribution of health professionals. Trained individuals may migrate, leave their original profession to work in another area, or withdraw from the labor market, especially women. [13]. In Nepal, the opening of new medical schools created an oversupply of doctors in the country, respective to its capacity of absorption. It was believed that overproduction would lead to professionals gravitating to rural areas. Even though the program achieved some success, in general, it led to increase emigration of graduate students [75]. This suggests that retention strategies should be combined with increased production.

Another common strategy has been the establishment of rural field residencies or internships as a requirement in medical training. Compulsory rural training has achieved some success. In Ghana, rural experience lengthened rural practice [35]. Data from one medical school in Thailand showed that two-thirds of the graduates continued their rural placements after compulsory training [36]. Educational reforms also tried to change the balance between specialization and general practice. In Quebec (Canada), training in general practice has been formalized and made more attractive for students. In addition, an agreement between the government, which heavily subsidizes medical training, and faculties of medicine has defined the number of places for specialty training, with a view of bringing the generalist/specialist ratio close to one [39].

Control of access to specialist training has also been tried. In Thailand, where students who intend to specialize need to complete residency in rural areas, at least one year of practice is required for some specific specialties (i.e. pathology, psychiatry). Rural doctors have special quotas for access to specialization, under the condition that they return to their district positions. Restriction of specialist training has faced strong resistance from medical schools and professional associations [35,36]. Redirecting postgraduate students training to other areas of specialization that focus on practical skills geared at community level practice with a shorter training period has been implemented in Ghana. The country's ophthalmic nurse training program effectively improved geographical access to eye care [53].

Where there is only advocacy for reorienting training towards general and primary care practice, health professionals are not responding and, in many countries, the number of specialized physicians is indeed growing [57].

A strong case has been made for investments in in-service training and continuing education to stimulate the retention of HRH in targeted areas. These programs should aim the integration of formal education, subsequent continuing education and actual service provision, therefore ensuring that training has strong practical foundations while continually exposing service providers with latest knowledge and technology [5]. Other strategies aimed at preparing students for medical careers. In Malawi, increased investments have been made into secondary education, particularly for the improvement of mathematics and science courses, in order to better prepare students for medical schools [38].

Use of Community Health workers

As countries shift towards stronger primary health care systems, innovative approaches working within resource constraints and which rely on minimally trained health workers have gained increasing relevance. Today, community health workers (CHW) are an integral part of many national systems. Programs involving CHW have been established in many different settings, from dispersed rural areas in Africa to inner cities in North America [76]. Community health workers are called by many different names, such as health auxiliaries, barefoot doctors, village health workers, health agents, among others. Their primary role is often to perform preventive medical services, provide basic curative services and to serve as a link between the community and the national health services.

In Bangladesh, community health workers have been incorporated in a tuberculosis control program initiated by the Bangladesh Rural Advancement Committee (BRAC) [77]. CHWs, mostly illiterate women, covered about 200 households under the supervision of paramedics. CHWs directed suspected patients for sputum tests and followed up on their treatment. When compared to the government run TB program, the BRAC initiative achieved the same satisfactory cure rates at 50% less cost. With the same budget, the BRAC initiative was able to cure three patients for every two patients in the government program [77].

The preventive potential offered by CHWs can affect the pattern of utilization of health services, reducing the number of medical consultations and hospitalizations [78]. Another

project utilizing CHWs in southeastern Brazil has been found to have considerably reduced the occurrence of morbidity and mortality among children under 5 years of age. When compared to similar areas that did not utilize CHWs, utilization of health services among children under 5 was 77% higher with CHWs [78]. However, the mere inclusion of CHWs may not be a guarantee of the success of an intervention. In Burkina Faso, utilization of CHWs was found to remain low. Household surveys indicated that severity of the disease and perceived effectiveness of the treatment were the most important determinants of health seeking behavior [79].

As a result, families tended to either provide the care themselves for mild diseases or bypass the CHWs and consult directly with a professional health worker in the case of a more serious disease [79]. Some of the problems pointed out in this project included the utilization of young male CHWs in a context where mothers are the traditional providers of care and low motivation of CHWs [79]. The use of traditional birth attendants (TBA) in interventions aimed at reducing maternal and perinatal mortality has been the subject of many studies. In Africa and Asia, use of TBA in the absence of back-up support did not decrease women's risks of dying in childbirth [2]. However, when well trained and provided with a appropriate support and strong referral system, TBAs have been found to effectively reduce maternal mortality ratios.

The effectiveness of CHW has been the focus of many discussions. In general, well-designed programs using well-trained CHWs, with proper support and supervision, and with a clear, defined role for CHWs have been successful [76-79]. CHWs projects need to take into account the culture, geography and socioeconomic context of the communities to which they are directed.

Rural Recruitment and Training

Rural recruitment has been promoted in some medical schools with relative success. In Thailand, the government projected to annually produce 300 doctors specifically for rural areas. Students are recruited through mechanisms which require them to sign contracts for residency with their provincial health office. Their contract mandates 2 to 4 years of public sector employment after graduation. A network of local health clinics and hospitals where students can train has been established to support the program. Schools are distributed throughout the country and students receive a highly subsidized education. Students conduct their practical training at the location where they will work after graduation, to familiarize themselves with their future working environment. The program considerably increased the proportion of students of rural origins [35,36]. Rural recruitment, however, also presents at least two problems. Rural students from poor families often have more difficulties in passing competitive examinations and in keeping up with the demands of medical education, and most rural students tend to come from the better-off local families [35,36].

Another example is from Cuba, where the "Escuela Lationoamerina de Ciencias Medicas" focuses on recruiting students from low-income families, indigenous communities and underserved areas in the Americas and Africa [57]. The effect of this strategy has not been measured though.

Box 3. The Pennsylvania Physician Shortage Area Program (PSAP)

To address the issues of geographical and specialty maldistribution of physicians in the US, Jefferson Medical College implemented the Physician Shortage Area Program (PSAP) which combines a selective medical school admissions policy and a special educational program [80]. The PSAP focus on selecting medical school applicants with rural backgrounds who intend to practice family medicine in rural and underserved areas. Students admitted into the PSAP program are awarded more financial aid than other Jefferson students. The program includes a family medicine faculty advisor, a required third year clerkship in family medicine in one of two non-urban areas and an internship in family medicine. Evaluations conducted in 1993 and 1999 [80,81] concluded that the PSAP successfully increased the number of family physicians practicing in rural and underserved areas of Pennsylvania. The 1999 evaluation [81] also demonstrated that the effects persisted over time. Of PSAP students who graduated 5 to 10 years before the 1999 evaluation, 87% remained practicing rural family medicine and 94% still practiced in underserved areas.

Integration of training, education and service

Calls for a broader responsibility of health education institutions in improving community health and building linkages with other community stakeholders have been made [73]. New approaches include community-based education (CBE), integration of primary health care and public health, multiprofessional education, and problem-based learning. Following WHO's "Health for all by year 2000" strategy, a group of representatives of health care educational institutions founded The Network: Towards Unity for Health (TUFH), which has become "a global association of institutions for educating health professionals to be committed to contribute, through innovative education, research, and service, to the improvement and maintenance of health in the communities they serve." [73]. The Network has 160 members from more than 80 countries.

The emphasis on community-oriented preventive and curative care requires changes in the education of health professionals. Many medical schools throughout the world are developing programs that integrate medical training, rural service and research. In Latin America, for example, the "Uma Nova Iniciativa" (UNI) project promotes cooperation between universities, health services and communities. The goal of the program is to promote concomitant changes in universities, health services and communities, as well as in their relationships [82]. This process involves four objectives: (1) changes in the process of education through curricular reform emphasizing inter-disciplinary approaches and real life experiences, (2) changes in health services to become effective, integrated and oriented towards the real needs of the population served, (3) strengthening citizenship and popular participation in order to increase the community's access to knowledge and technology, and (4) establishing more democratic, flexible and relevant relationships between institutions involved in the provision of health care [82]. Launched in 1993 in Brazil, the UNI project is now on its second phase with 23 projects

implemented in 11 Latin American countries [83]. In the last decade, the UNI project has been one of the most significant events in the field of health professionals' education. The project has been instrumental in defining a new paradigm for healthcare and community development in the region [82]. The UNI project has been recognized for promoting significant changes in the way health services are offered and utilized at the communities where it was implemented [84]. Some of the positive changes observed included increased user satisfaction, increased community participation - particularly in decision-making processes-, improved collection and utilization of information, more integration between hospitals and primary health care (PHC) centers. Training of health professionals has also been positively influenced by the program. Students experience earlier exposure to fieldwork, train in epidemiology, and dedicate more time to prevention and promotion activities. The impact of the UNI project on health outcomes and overall health status of the population has yet to be assessed [84].

New Educational Tools

The globalization of communications and advances in informational technology have greatly increased the scope of educational possibilities. Virtual universities, networks of institutions and professional associations, international standards of certification and distance learning are now possible avenues for improving a country's capacity to educate and train their health workforce [64] even when they practice in isolated areas. New technologies such as telehealth and telemedicine have the potential to increase the supply of health professionals to rural and deprived areas by facilitating professional collaboration and development, for example, by supporting continuing education and access to some services (interpretation of x-rays, specialist opinion). The use of videoconference technology has opened many good prospects for those working in rural and remote areas. Videoconference can be used as a treatment and diagnostic tool, as well as a mean to provide education and training over long distances. In Australia, a videoconference training initiative developed for professionals working with at-risk youth in rural and remote areas reported high levels of satisfaction among participants and a decreased feeling of professional isolation [85]. Taiwan is currently developing the Cyber Medical Center international collaboration project which aims to create a network system that will allow teleconsultations and online continuing education [86]. In Thailand, the launch of the country's first communication satellite allowed for the implementation of a nationwide telemedicine network by the Ministry of Public Health, currently linking 19 hospitals with health facilities all over the country [87]. The Pan American Health Organization (PAHO) launched in April 2003 a Virtual Campus in Public Health in collaboration with universities and schools. The relative cost and benefits of these new technologies are yet to be assessed, as well as issues related to the protection of privacy, service standards, licensure, and liability insurance coverage.

Decentralization of location of training institutions

Centrally located medical schools draw students and health care services to urban centers. So, the establishment of regional medical schools is expected to promote a more equitable distribution of health professionals and services. The Thai experience suggests that regional medical schools and focus on recruiting rural students can improve the distribution of health personnel in rural areas [36].

Opening of new medical schools

Increasing the supply of health professionals, even overproducing them can be seen as resulting in a better distribution in rural areas as the oversupply encourages workers to move to less crowded areas. Apart from being an expensive solution, it raises concerns about the ability of the country to absorb all professionals. In many cases, an oversupply can result in increased migration, or health professionals changing careers or leaving the labor market.

The experience of Mexico shows that an increased production of doctors was not sufficient to improve their distribution. It actually resulted in an oversupply of doctors in cities. It is estimated that 15% of all Mexican physicians are unemployed, underemployed or inactive and yet numerous rural posts remain unfilled [5].

FSU countries today report an excess of health professionals, particularly of specialized physicians. More than 50 medical schools have opened in Georgia since the transition and, between 1990 and 1997, there was a 45% increase in medical schools in the Kyrgyz Republic. These countries are now among those implementing measures to control their supply of physicians, while trying to improve their geographical distribution (Laura Rose, World Bank, personal communication).

Nepal experienced a spurt in new medical schools, nursing homes and clinics in different parts of the country. Four new private schools opened, when before only two institutions produced doctors in the whole country. It was also believed that private institutions would bring an economic boost to the country. Investments in new health facilities were expected to increase the demand for health professionals. The new schools offered a medical degree in basic community medicine aimed at rural students. Since the program was not universally recognized, it was expected that its graduates would more likely stay in the country. This sudden increase raised some concerns about the quality of the medical education provided by these institutions, as well as whether the country would be able to absorb the graduates produced. The Nepal Medical Council worried that an oversupply of doctors will lead to an underutilization of their skills in the years to come. In addition, the increasing number of private specialized clinics in urban areas are more likely to absorb these workers, leaving few to serve in remote areas. Another concern is that this oversupply of physicians is not accompanied by an increase of other health workers such as nurses, pharmacists, and technicians. This suggests that shortages of these professionals in the public service are quite likely to occur [75].

In some cases, the lack of a medical school in a country induces those wishing for a medical career to migrate. Portuguese-speaking African countries are the largest source of foreign health professionals to Portugal and, of these, the countries without medical school (São Tome and Principe, Cape Verde, and Guinea-Bissau) are the main contributors. After completing their studies in Portugal, most students do not return to their home country, and when they do, they many return to Portugal at a later stage of their careers [71].

Regulatory and administrative measures

Hometown placement after graduation

In Thailand, a system was implemented which gave preference for hometown placement to students from rural areas. The system however ran into many problems due to management difficulties. The system was terminated and the proportion of rural medical students dropped from 47% in 1983 to 23% in 1994 [36].

Compulsory rural service after graduation

Service contracts that require a certain number of years in public service, especially when training is state sponsored, have been implemented in the Philippines, Thailand, Tanzania and many Latin America countries. Students are to spend a variable number of years in a designed area or pay fines [35]. Overall, geographical distribution has been little affected by such policies [5].

Compulsory rural service in times of economic recession and little opportunities for private practice resulted in a rapid increase in the number of rural doctors in some countries [35]. In general, however, in times of economic expansion, most students prefer to pay the fines established by the government and break their compulsory practice. Many students resign from public services to engage in private practice, or to continue their education. Dissatisfaction with the location of their compulsory practice also results in resignation [35,36]. In Thailand and Mexico, failure to adjust to high inflation rates resulted in fines that can be easily paid. Increasing the fine or fees that will have to be reimbursed has met strong resistance from medical schools and professionals associations.

Some countries implemented high tuition fees for medical students. Those who cannot afford to pay are awarded educational loans from the government that can be paid back after graduation either in cash or by public service work. In Indonesia, South Africa, and Vietnam students only receive their diplomas after completing their public service period, which may entail practicing in rural areas.

Many Latin American countries implemented a system of compulsory rural internships for new graduates. Initially designed for physicians, the system was later extended to nurses, social workers and other health professions. Evaluation of these programs pointed to the low acceptability of the systems by the students which resulted in low productivity [57].

In many Francophone African countries, where access to the private market is still limited, new doctors used to almost automatically be employed by public services and assigned postings according to their grades. The best performing students were assigned city posts and remote and unattractive areas got those performing less well. In the mid-1990's when Ministries of Health stop hiring, in the context of structural adjustment policies, new graduates found themselves unemployed (or working on a voluntary basis) [17], as needs kept increasing, in particular as a result of the AIDS epidemics.

The prevention of emigration by establishing bonding measures has been tried in a number of countries in the hope to increase the number of health professionals in rural and remote areas. In general, the system has been considered unfair. Since other careers

do not require compulsory service, bonding may lead individuals away from medical education. In addition, it can be particularly problematic for women, who are often unable to accept remote positions [88]. In countries where a considerable part of the health workforce is composed by women, bonding systems can result in a significant portion of needed personnel not being able to complete their graduation requirements and to engage in professional practice [35].

The effectiveness of strategies of compulsory "social service", after graduation, in less attractive regions needs to be assessed. If the process of posting is not transparent, it opens the door to corruption and becomes ineffective. If it is rigorous, it can turn out to be an incentive to migrate out of the country.

Training new cadres of health workers

In an ideal world, training and skill profiling must be relevant and responsive to changing health needs. This would suppose a systematic assessment of current and projected needs and training strategies which permit a timely response.

As certain types of health professionals are more resistant to accept positions in rural and deprived areas, some argue that new cadres of health workers should be developed to take over some of the responsibilities normally held by doctors or nurses [5]. It is expected that multi-purpose health workers such as community health workers and medical assistants will be more willing to work in rural and remote areas, but this has to be verified. This strategy is often resisted by doctors, who do not agree that others than themselves be allowed to do certain procedures such as removal of retained placenta, caesarian sections, even drawing blood [57]. This monopoly of tasks contributes to limiting the availability of health services areas with high population/doctor, which is dramatic when it concerns emergency services.

But there are some exceptions, such as in Malawi and in Tanzania, where paramedical staff who are able to provide urgent surgical interventions have been trained [30]. In Argentina, lay nurses are receiving training to work as nursing auxiliaries [63]. In Ghana, a new curriculum has been developed for existing cadres. Community health workers are now trained to have midwifery skills and the "Life Saving Skills" project trained rural midwives with skills normally reserved to physicians [53]. Ghana has also created shorter specialist training programs [38]. Ghana's Health Strategy for 2002-2006 includes periodic reviews of professional training courses with view to making them relevant to country needs [70].

Even though staff retention may not be addressed by delegating skills to other health professionals, some greatly needed services can be ensured and sustained by these measures [30]. In Botswana, training more nurse practitioners and pharmacists has compensated the lack of physicians in some areas [51]. In Mozambique and Ethiopia, "field surgeons" and "clinical officers", provide a substantial amount of health services normally expected to be handled by doctors [30].

Laos Red Cross in Attapeu, under a grant from British NGO Health Unlimited, and CIDA (Canadian International Development Agency) provided training for 100 village health

workers, most of whom from to poor ethnic minorities. These village workers can now respond to health emergencies and provide basic first-aid to remote communities in mountainous parts of Laos, where health services are precarious [89].

Iran almost eliminated the differences between rural and urban rates of infant mortality between the mid-1970s (120 per thousand in rural areas and 62 in urban areas) and the mid-nineties (30 per thousand in rural areas and 28 in urban areas), by establishing a network of "rural health houses" (khane bedash), staffed by workers (behvarz) recruited from the community, trained to offer basic child services, to record health information and to refer more complex cases to rural health centers covering 5 health houses. This was done at low cost, using simple, but well managed tools, like an integrated Health Information system. Spectacular reductions of maternal mortality were also achieved: 120 to 24 deaths per 100 000 live births in urban areas, 370 to 55 in rural areas [90]. Even though the role of auxiliaries and community health workers in increasing coverage has been recognized, the use of alternative health professionals has meet strong resistance from some professional groups. In Ghana, the Village Health Worker system and the idea of training traditional birth assistance has been questioned and opposed by professional associations such as the National Registered Midwives Association. In response, the country is moving towards reducing and reprofiling existing cadres into multi-purpose health workers.

Financial and Professional Incentives

Multiple incentives to make working in unattractive areas more appealing have been proposed with variable success. More generous benefits, such as health insurance and vacation time are the most common incentives used. In addition, other recruitment benefits may include tuition reimbursement, flexible work hours, bonuses based on experience or length of commitment [13].

In Africa, strategies include the establishment of schemes to permit doctors in rural areas to take study and recreation leaves, employment opportunities for doctor's spouses, better accommodation facilities and improvements on educational institutions for doctor's children [38].

In Thailand, financial incentives started with special allowances for physicians working in remote district hospitals in 1983. Monthly allowances were US$ 88 for those working in regular districts and US$ 108 for those working in remote districts. The latter were restricted from accepting travel per diem or on-call payments. These restrictions were lifted in 1994, and a non-private practice allowance was established in 1995. Physicians who agreed not to engage in private practice received an extra US$ 400.00 per month [36]. However, these incentives still summed up less than what physicians could earn in private practice. In countries that impose compulsory rural service, it has been suggested that these incentives would only increase the income of new graduates, allowing them to save money to pay the fines and move to urban centers [35].

In the Philippines, the Magna Carta for Public Health Workers was created with the intention to make rural positions more attractive. The package included increased salaries and benefits, particularly for physicians. The program was further strengthened in 1993

with the launch of the “Doctors of the Barrios” program which doubled the benefits for doctors willing to relocate to remote areas. With the 1993 devolution of health services, most local governments found themselves unable to hire at the current high salary levels. As a result, professionals started moving back to urban areas and to apply for work through the national agency instead of local government offices [57].

Possibilities for doctors to work privately in public institutions are being offered in some countries to neutralize an ongoing drain of qualified staff from the public sector. This strategy is considered successful in Bahrain, but the experiences of Nepal and Ghana show that such incentive can lead to the diversion of scarce resources from public services and can induce professionals to end up opting for independent private practice [13]. In Indonesia, private practice is allowed as a means to make up for low salaries. The practice results in health professionals selecting positions in locations where the potential for private income is higher, usually in urban, higher income areas [88].

In Quebec (Canada), the government agreed with unions representing doctors on a mix of incentives to improve the regional distribution of the medical workforce. Fees are raised by 15% to 25% in regions considered as underserved and reduced by 30% in regions considered as having an oversupply. Some other benefits are offered to those accepting to work in remote areas, such as subsidies to settle a practice, access to continuing education [39]. This has been shown to improve the distribution of general practitioners, but has had less impact on the choice of location of practice of specialists, particularly those whose practice requires access to technology available only in specialized hospitals. It appears that economic incentives are not enough to influence re-deployment; they need to be supplemented by other incentives, mainly professional [26].

In Indonesia, graduates who work in the very remote areas receive a higher salary and the guarantee of a civil service career after the completion of the 3 years compulsory contract [6]. A civil service career is highly desirable since it allows for private practice in the evenings, as well as free access to specialist training [88]. This practice, however has been criticized for attracting the wrong type of health professional into rural areas. Those who are interested in specialist training often have no interest in public health work in remote areas and leave soon after the completion of the compulsory contract. In addition, by demanding completion of rural service before specialization, doctors are only able to complete training on their late thirties or early forties. Therefore, the practice significantly reduces the returns of the investment placed on their training.

However, closing the salary gap may not be a realistic option in some countries [25]. In many cases, solutions would need to be based on a combination of measures that address salary considerations, sound recruitment practices, the rebuilding of working environments, and the establishment of well functioning and transparent bureaucracies [25].

Redistribution of health personnel through a centralized agency, based on health needs criteria, resulted in reasonable success in some Latin American countries [57]. In Ghana, strategies to redistribute health personnel met strong resistance from professional associations [53].

In many countries, strategies to deal with inequitable distribution of HRH lie beyond the scope of the Ministry of Health. Major civil service reforms are necessary in order to better distribute health professionals in the public sector. In Indonesia, for example, the centralized budget allows staff to migrate to preferred locations in developed areas, without adequate control, planning or supervision at the provincial and district level [88].

Better national policies and international agreements

The government of Quebec, Canada, implemented a series of policies to control the growth and to modify the structure of the medical workforce, by controlling admissions to medical school, and defining quotas for specializations based on pre-determined regional needs [26]. Brazil, for instance, in the early 1990's developed a strategy to give access to basic services to populations in poor and remote regions, which now has been adopted by more than 80% of municipalities, covering 63 million persons[11]. "Family health teams," composed of a medical doctor, a nurse, an auxiliary and 4 to 6 community health workers " and aiming at dealing with 85% of health problems in the municipality, have been trained and deployed all over the territory, thanks to incentives attractive enough to convince health workers to join in. Thailand has engaged consistently and in a flexible manner in HRH policy for 40 years [36], which may explain its relative success in dealing with deployment issues.

Strategies to improve social and professional recognition for health professionals in remote areas have been devised and implemented [88]. They aim at improving the morale of rural doctors, encouraging them to stay in rural areas. In Thailand, rural doctors created their own society called "The Rural Doctor Society," which provides innovative programs to support rural doctors. The society was very well accepted by the public and the medical profession. In addition, public recognition awards were established, including an annual hardship award given to the best doctor in the most remote location, and the "best rural doctor of the year" award. Some doctors received honorary Master's and Ph.D. degrees from universities. At the national level, rural doctors have been recognized as "the model Thai of the year." [35,36].

Factors affecting success/failures of strategies dealing with geographical distribution of HRH

Key determinants of successful strategies have been how long these have been on the national priority agenda, long-term political commitment, integration of efforts with other social sectors such as education, and ability to reconcile different expectations from varied stakeholders. The importance of involving the key actors in the policy formulation and implementation process stands out as a critical element in the success of a policy (51, 91]. Emphasis needs to be placed on bringing together different stakeholders at the stage of developing policy options. Factors associated with negative outcomes are lack of resources, lack of understanding of cultural context, and resistance from professional or social groups. Decentralization and economic crisis can create conflicts between health organizations, political forces, unions and professional associations. Professional associations and workers unions can feel threatened by changes that impact long

[11] As of March 2004: see http://portal.saude.gov.br/saude/arquivos/pdf/planilhapsf_marco_2004.pdf

established privileges. These groups can be powerful enough to delay or reverse changes [57]. The need for a stable social and political environment can not be overemphasized. For example, in Ghana, during the years of 1977, 1984, 1995 no graduates were produced due to closure of university as a result of political unrest and lecturers' strikes [53]. This also happened in Mali in 1993-94 and in Senegal in 1986 and 1992.

Systems of incentives are often central strategies employed by governments to correct imbalances [92]. However, the degree of success of such incentives can depend largely on factors not directly related to the health sector. Poorly targeted financial incentives can also have undesirable effects as shown by experiences in Thailand and Mexico. In both countries, financial incentives for rural work resulted in an early departure of professionals from rural areas, by making it possible for them to pay the fine to break compulsory service. In some cases, complementary measures may add effectiveness to incentives. Bahrain, Ghana, and Nepal allowed after-hours private practices as a way to contain public to private brain drain. The measure however raised many concerns about the quality of care and effort dispensed in the public system. In response, the three countries implemented sets of standards and controls to prevent this negative effect from taking place [92].

Policy implications

The geographical distribution of health personnel refers to their spatial allocation. It is said to be imbalanced when some type of norm is applied, such as population/personnel ratios, or more sophisticated indicators which take into account the specific needs of the regions of a territory. The notion of "imbalance" is not derived from the language of economics, which rather focuses on supply and demand and therefore on shortages and surpluses, seen as mis-adjustments between demand and supply [20]. For the policy-maker, for managers of health service and for users, geographical distribution matters a lot, since it determines which services, and in what quantity and quality, will be available. Imbalances raise problems of equity (services not being available according to needs), of efficiency (surpluses / shortages) and of effectiveness of services, let alone of satisfaction of users. The health related MDGs cannot be achieved if vulnerable populations do not have access to skilled personnel and to other necessary inputs. A perfect balance is probably utopian, but it is conceivable to achieve a better distribution through strategies based on a good understanding of its dynamics. There is now enough information available to start building a conceptual framework which will help understand the process of geographical distribution of the health workforce and to help design and implement strategies that can prevent it from being too distorted.

Workforce issues are likely to become increasingly critical and acute as health sector reforms focus on decentralization and on new public-private partnerships, and as the commitment to achieving the MDGs brings more funds to health sector, which the debt alleviation process also does[12]. Coherent and well-formulated HRH policies and

[12] (see http://www.worldbank.org/hipc/)

strategies, as well as the ability to implement and monitor them are therefore crucially needed [55, 91][13].

At the policy level, one major question arises, whether the geographical distribution of the health workforce can be dealt with in isolation. From the country examples included in this paper, it is clear that strategies are often reactive measures in response to a crisis. They are often fragmented, uncoordinated, and sometimes inconsistent. They do not always take into account factors residing outside the domain of the Ministry of Health. For example, in Thailand, strategies to correct imbalances resulted in a system that could not attract doctors to the rural areas when there were strong economic incentives in the urban private sector [36]. Strategies need to be multifaceted, integrated and coordinated in relation to the health sector and to its environment. One major factor is the emergence of the private sector, both for-profit and nonprofit, which imposes great changes in the environment in which HRH issues are to be addressed.

Highly-skilled professionals, and institutions respond more to incentives than to control mechanisms. Professional incentives can be devised after having analyzed the expectations of providers, which are likely to be a mix of economic, professional, personal and family related ones. For instance, providers can be attracted to underserved areas by scholarships, income supplements, support for installation, guaranteed access to equipment and supplies, possibilities to maintain contact with their peers and to maintain/upgrade their competencies (telehealth and the internet are powerful tools to do that), future access to specialized training (as was the case in Indonesia) accelerated promotion, pension advantages, and so on. They can be deterred from settling in overcrowded areas by restricting access to public jobs, by income penalties, and by slower access to promotion.

In order to implement policies that promote worker motivation, there is a need to better understand motivational determinants and the potential of certain incentives to produce motivation [93]. In their discussion of what motivates workers in the health sector, Bennet and Franco [93] recognized that motivation is not solely influenced by specific incentive schemes targeted at workers, but also by the range of health sector reform that impact organizational culture and structures, channels of accountability, community feedback, etc. Another study conducted among rural health workers in Viet Nam identified motivating and discouraging factors for health worker performance, which encompassed both financial and non-financial incentives [94]. Motivating factors included appreciation by managers and the community, income and job stability, while discouraging factors were mostly related to low salaries and difficult working conditions [94]. These studies suggest that policies oriented at promoting worker motivation need to be in alignment with individual, organization and reform goals.

Financial incentives are usually not sufficient to improve the distribution of health professionals. Strategies that included efforts to increase social acceptance and recognition of rural health professionals have often been more successful. Examples

[13] This statement also applies to rich countries, according to a recent report on workforce planning: Bloor, K., Maynard, A., **Planning Human Resources in Health Care: Towards an Economic Approach. An International Comparative Review**, Canadian Health Services Research Foundation, Ottawa, march 2003

include the creation of social recognition awards, and support groups for rural practitioners. Social movements toward acceptance and appreciation of rural health personnel can effectively improve staff morale and retention in rural areas. Such strategies should be encouraged and supported in order to create positive images and motivate young graduates to envisage such postings.

It is important to emphasize that each country's health system and human resources situation is specific and HRH issues are multidimensional and interconnected. As such, contextual factors need to be clearly identified so that the complexity and interconnection of issues be taken into account when relating to each specific national context. Evaluation studies are thus crucial in order to understand interrelationships between determinants of geographical imbalances and strategies to correct them.

Rethinking the geographical distribution of health personnel

Figure 1 illustrates the links between the 6 groups of factors, which can be categorized as (1) individual, (2) health sector and (3) social environment factors. Individual factors have a more immediate influence on the geographical distribution of health personnel, whereas factors linked to the organizational and community environment have an intermediary influence between the broader environmental factors and individual decisions.

Actions to influence those factors to ensure that they produce the expected effects will be more complex and difficult, and longer, as we move from individual to social factors. It is easier to change the recruitment criteria at a medical school to alter the profile of future doctors than to change the incentive system –which might be under the control of an agency outside the health sector- or to change social attitudes towards women. Too often, strategies to address imbalances focus on more immediate determinants, for example by changing organizational environments, or creating conditions to influence individual and community-level determinants. These strategies tend to be reactive and not to be coordinated [57, 36] and they ignore that organizations and individuals operate within a broader context, which can enhance or reduce the ability of governments to implement corrective interventions. For example, low salaries and unsatisfactory working condition are often cited as reasons for not practicing in rural and remote areas [25,30, 31]. These are frequently considered to result from cumbersome and bureaucratic organizational and civil service structures [53, 55, 57). These are, in turn, deeply rooted in larger social, political and economic deficiencies such as political instability, dominance by small ruling classes, a culture of clientelism, poor institutional capacity, etc. To say that improved salaries and working conditions are the strategies to attract and retain personnel to remote areas is valid, but it is far from simple to implement since the problems of low salaries and bad working conditions have their roots in complex organizational and social problems which must be attacked at the same time. Another example would be gender imbalances, which refer to disparities in male/female representation in the health workforce [13]. They influence the geographical distribution because women tend to avoid rural and remote areas. These reflect socially and culturally defined roles for males and females [95] and will be corrected if and when these definitions will change. In other words, interventions that attempt to alter basic economic, political and social structures

are the ones likely to achieve long-term, sustainable results, but they are much more complex and take longer to produce results. Ultimately, only equitable socio-economic conditions for rural compared to urban areas, adequate investment in human resources, and stable and legitimate political institutions are the basis for achieving a balanced distribution of HRH.

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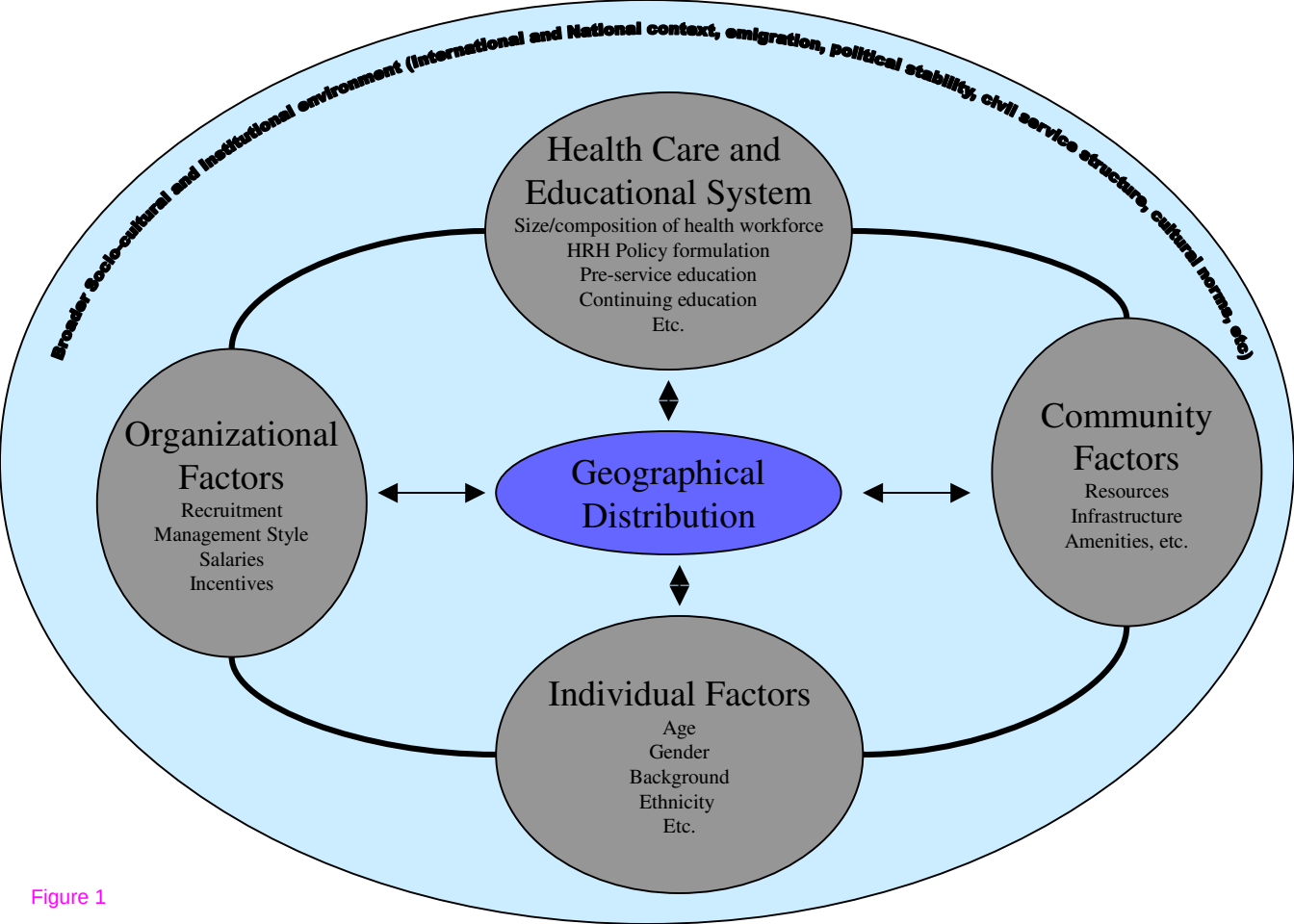
Broader Socio-cultural and institutional environment (international and National context, emigration, political stability, civil service structure, cultural norms, etc)
Health Care and Educational System
Size/composition of health workforce
HRH Policy formulation
Pre-service education
Continuing education
Etc.
Organizational Factors
Recruitment
Management Style
Salaries
Incentives
Geographical Distribution
Community Factors
Resources
Infrastructure
Amenities, etc.
Individual Factors
Age
Gender
Background
Ethnicity
Etc.

Figure 1