Reducing Geographical Imbalances of Health Workers in Sub-Saharan Africa

A Labor Market Perspective on What Works, What Does Not, and Why

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Negda Jahanshahi
Ellen Smith
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<thead>
<tr>
<th>Abbreviation</th>
<th>Full Form</th>
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<tbody>
<tr>
<td>DRC</td>
<td>Democratic Republic of the Congo</td>
</tr>
<tr>
<td>HRH</td>
<td>Health human resources</td>
</tr>
<tr>
<td>MDG</td>
<td>Millennium Development Goals (United Nations)</td>
</tr>
<tr>
<td>MGI</td>
<td>Medecine General Integral</td>
</tr>
<tr>
<td>SNNPR</td>
<td>Southern Nations, Nationalities, and Peoples’ Region (Ethiopia)</td>
</tr>
<tr>
<td>SSA</td>
<td>Sub-Saharan Africa</td>
</tr>
<tr>
<td>UN</td>
<td>United Nations</td>
</tr>
<tr>
<td>USAID</td>
<td>United States Agency for International Development</td>
</tr>
<tr>
<td>WB</td>
<td>World Bank</td>
</tr>
<tr>
<td>WHO</td>
<td>World Health Organization</td>
</tr>
<tr>
<td>ZHWRS</td>
<td>Zambian Health Workers Retention Scheme</td>
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</table>
Introduction

The human resources crisis in the health sector has been gathering attention on the global stage. To date, however, most of this attention has focused on shortages of health human resources (HRH) at the national level. At least as important are problems at the sub-national level. Massive geographic and skill mix imbalances are reflected in the perilous undersupply of HRH in most rural areas. Virtually all Sub-Saharan African countries suffer from significant geographic imbalances.

Very little substantive information or documentation exists on the problem. Even less is known about the lessons from policies aimed at addressing urban-rural human resource imbalances, let alone experiences of Sub-Saharan Africa countries, with such policies.

There also appears to be a disconnect between the objectives and efforts of policymakers on the one hand and the functioning of national health labor markets and labor market behavior on the other hand. This disconnect hinders policy effectiveness and the efficient utilization of resources intended to narrow urban-rural inequities. In Sub-Saharan Africa, government policies, often limited to the management of public sector vacancies, appear to be elaborated, prescribed, and implemented independently of labor market considerations. Partly as a result, they are unable to effectively address urban-rural imbalances, which are an outcome of labor market dynamics.

This report discusses and analyzes labor market dynamics and outcomes (including unemployment, worker shortages, and urban-rural imbalances of categories of health workers) from a labor economics perspective. It then uses insights from this perspective as a basis for elaborating policy options that incorporate the underlying labor market forces.

The goal of the study is to address undesirable outcomes (including urban-rural HRH imbalances) more effectively. The study draws on an extensive inventory of policy options relevant to urban-rural labor force imbalance in Sub-Saharan Africa and the experiences with these imbalances to date. Given the limited documentation available on this topic through formal channels, the review relies heavily on “gray literature” from policymakers in Sub-Saharan Africa and their development partners, especially the World Bank and the World Health Organization (WHO). The report is divided into five main sections. The first section focuses on economic policies related to HRH objectives. It argues that policymaking has ignored health labor market dynamics. The second section provides data showing the extent of urban-rural imbalances and describes how these imbalances affect health system outcomes. The third section uses a health labor market framework to explain these imbalances. The fourth section outlines policy options relevant to Sub-Saharan Africa for addressing market distortions and affecting labor market outcomes. It also reviews evidence on the policies, strategies, and programs designed to address geographic imbalances in Sub-Saharan Africa, highlighting what has been done, what has worked, and what has not. The last section provides a roadmap for policymakers.
Policymakers set health policy objectives (such as, for example, achieving the Millennium Development Goals for health). These health policy objectives are measured and monitored using health policy indicators.

Reaching the Millennium Development Goals requires that adequate numbers of health workers be in place to serve the population in urban and rural areas. Two indicators are generally used to monitor urban-rural health worker imbalances. The main indicator is a regional health worker density indicator (the number of health workers per person). The vacancy rate of rural health worker positions is a second policy outcome indicator. Even if an adequate number of rural positions are funded, it is likely that some of them will remain vacant.

Both indicators depend on the dynamics of the health labor market. Within these markets, the supply of human resources for health (HRH) (that is, the number of health workers willing to work at various compensation levels) equals the demand for HRH (that is, the number of employers able and willing to recruit health workers at various compensation levels). When labor market outcomes need to be adjusted, the government uses policy instruments to influence the supply of or demand for labor, changing the market outcome (figure 1.1).
To date most policymakers have mistakenly assumed that they have complete control over labor market demand and supply and hence on labor market outcomes. Based on this assumption, they have relied on the following policies to address urban-rural health worker imbalances:

- Allocating more budget funds in order to create additional health worker positions, especially in rural areas (that is, increasing HRH demand)
- Increasing capacity for training more health workers (that is, increasing HRH supply)
- Forcing health workers to work in rural areas (a practice known as bonding)
- Providing financial incentives for health workers accepting work in rural areas

Most of these policies have failed to deliver sustained results, because they have assumed that health workers have only two alternatives: working for the government or being unemployed. Although governments in most Sub-Saharan Africa countries probably did have monopsony power until the 1980s, other employers now compete for health workers who can (legally or illegally) work in the private sector, move to other economic sectors, or emigrate. Failing to take account of the fact that governments are no longer the sole source of demand for health workers leads to flawed policies.

Considering health labor market behavior helps policymakers identify (and measure) not only constraints but also opportunities for better policymaking. Health labor markets can also help identify key success (or failure) factors for some policies.
CHAPTER 2

Urban-Rural Imbalances: Extent and Consequences

Health Worker imbalances and regional inequities in distribution can be measured and are evident at the national and particularly the sub-national level. Several methods have been applied to capture the uneven distribution of health works. One popular method is the ratio of health workers to population, often used to measure HRH imbalances. Other methods to analyze and compare imbalances of health workers is through economic tools such as the Concentration index, alongside the Gini index and Lorenzo Curve (see Box 2.1 and more detailed description in Annex B).

National level imbalances

Although the majority of countries have health worker ratios below the 2006 WHO benchmark, seven countries have a combined density of physicians, nurses and midwives that is above the 2006 benchmark of 2.28 (see figure 2.1). These countries are Botswana (3.05), Gabon (5.45), Mauritius (4.79), Namibia (3.36), Sao Tome and Principe (2.70), Seychelles (9.44) and South Africa (4.85). Interestingly, a lot more countries reach the pre-2006 benchmark of 0.4 professionals per 1000 population. This would suggest that many countries in SSA are actually not as badly off in terms of health worker availability as often suggested. However, examining HRH to population ratios only at the national level can produce a misleading

Figure 2.1: Doctor, nurse, midwife per 1,000 population ratio in Sub-Saharan Africa

Source: WHO/Global Atlas
Countries that have acceptable national level HRH to population ratios may be experiencing health worker shortages or surplus in certain geographical areas. Urban-rural imbalances by country, profession, and gender

A disaggregated analysis of HRH to population ratios often exposes significant differences between urban and rural areas. In Kampala for example, by far the largest urban area in Uganda, the number of doctors is 4.5 times the minimum benchmark—and 45 times that of rural Kamuli district. In Sudan, the doctor to population ratio in urban areas is 24 times that of rural areas, and the nurse to population ratio is 20 times higher than in rural areas (table 2.1).

And stark and yet diverse inequities in the distribution of health workers in several countries in SSA can also be illustrated using a concentration index. Figure 2.2 reveals the
Table 2.1 Number of doctors and nurses per 1,000 people in rural and urban regions of Sub-Saharan Africa

<table>
<thead>
<tr>
<th>Country</th>
<th>Doctors</th>
<th></th>
<th>Nurses</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>rural region</td>
<td>urban region</td>
<td>rural region</td>
<td>urban region</td>
</tr>
<tr>
<td>Chad</td>
<td>0.222</td>
<td>0.549</td>
<td>ND’jamena</td>
<td>0.885</td>
</tr>
<tr>
<td>Congo, Dem. Rep.</td>
<td>0.175</td>
<td>1.449</td>
<td>Amhara</td>
<td>0.929</td>
</tr>
<tr>
<td>Ethiopia</td>
<td>0.167</td>
<td>Amhara 0.769</td>
<td>Addis 0.909</td>
<td>Amhara 0.752 Addis</td>
</tr>
<tr>
<td>Guinea</td>
<td>0.314</td>
<td>Moyenne Guine 3.774</td>
<td>Conakry 0.952</td>
<td>Moyenne Guinnee 3.333 Conakry</td>
</tr>
<tr>
<td>Mali</td>
<td>0.196</td>
<td>Koulikouro 1.852</td>
<td>Bamako 0.909</td>
<td></td>
</tr>
<tr>
<td>Mauritania</td>
<td>0.303</td>
<td>Gorgol 1.031</td>
<td>Nouadhibou 2.632</td>
<td>Gorgol 0.794 Nouadhibou</td>
</tr>
<tr>
<td>Mozambique</td>
<td>0.154</td>
<td></td>
<td></td>
<td>2.564</td>
</tr>
<tr>
<td>Niger</td>
<td>0.056</td>
<td>Tillabery 1.429</td>
<td>Niaey 0.556</td>
<td>Tillabery 0.833 Niamey</td>
</tr>
<tr>
<td>Rwanda</td>
<td>0.034</td>
<td>Gikongoro 0.588</td>
<td>Kigali 0.541</td>
<td>Gikongoro 0.617 Kigali</td>
</tr>
<tr>
<td>Senegal</td>
<td>0.069</td>
<td>Kolda 2.326</td>
<td>Dakar 0.615</td>
<td>Dakar 0.800 Dakar</td>
</tr>
<tr>
<td>Sudan</td>
<td>0.143</td>
<td>South 3.497</td>
<td>Khartoum 0.615</td>
<td>South 12.594 North</td>
</tr>
<tr>
<td>Kenya</td>
<td>0.006</td>
<td>Turkana 2.000</td>
<td>Nairobi</td>
<td></td>
</tr>
<tr>
<td>Uganda</td>
<td>0.100</td>
<td>Kamuli 4.545</td>
<td>Kampala</td>
<td></td>
</tr>
</tbody>
</table>

Source: Author’s calculations based on country status reports.

Source: Authors
degree of geographical imbalance of doctors and of nurses across seven SSA countries. The closer the concentration index is to zero, the more equal the distribution of a given resource (doctors or nurses in this context). Conversely, the closer a concentration index is to 1, the less equal is the distribution of a given resource. As the concentration indices reveal, in the majority of countries, the distribution of doctors is more and fairly equally skewed towards urban areas, whereas the distribution of nurses is much more variant and diverse.

**Figure 2.3: Distribution of health workers per capita by cadre in all districts of Tanzania**

![Graph showing distribution of health workers per capita by cadre in all districts of Tanzania](image)

*Source: Munga and Maestad 2009.*

The disproportionate allocation of doctors in urban areas can be generalized by speaking in terms of highly- and lowly-trained (or qualified) health workers. Health workers with more years of formal education, such as doctors, are heavily concentrated in urban areas and especially sparse in rural areas, while cadres with fewer years of education, such as nurses or auxiliary nurses, have a higher concentration (relative to population) in rural areas. An interesting example (see figure 2.3) is provided by the Tanzania case, where the density of health workers, by cadres, has been analyzed using concentration curves.

As shown in the figure, about 80% of the population in Tanzania (mostly in rural areas) is served by only 20% of the doctors (named “medical officers” in Tanzania). Rural areas have a higher proportion of mid-level cadres such as Clinical Officers (see the green line in graph) than urban areas. The Figure also shows that there is no cadre of which the
Reducing Geographical Imbalances of Health Workers in Sub-Saharan Africa

Figure 2.4 Male : female ratios among health workers in rural and urban areas of Zambia

<table>
<thead>
<tr>
<th></th>
<th>Rural areas</th>
<th>Urban areas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health</td>
<td></td>
<td></td>
</tr>
<tr>
<td>workers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Doctor</td>
<td>23.06%</td>
<td>30.05%</td>
</tr>
<tr>
<td>Female</td>
<td>76.94%</td>
<td>69.95%</td>
</tr>
<tr>
<td>Male</td>
<td>23.06%</td>
<td>30.05%</td>
</tr>
<tr>
<td>Health</td>
<td></td>
<td></td>
</tr>
<tr>
<td>workers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Doctor</td>
<td>12.63%</td>
<td>30.05%</td>
</tr>
<tr>
<td>Female</td>
<td>87.37%</td>
<td>69.95%</td>
</tr>
<tr>
<td>Male</td>
<td>12.63%</td>
<td>30.05%</td>
</tr>
</tbody>
</table>

Source: Herbst 2007

Disadvantaged districts have a larger share of the health workers than is suggested by their relative population levels (i.e. all concentration curves in Fig. 2.4 fall below the diagonal).

Furthermore, rural areas tend to have a higher proportion of health workers without formal training. These health workers include community health workers, health extension workers, and traditional health workers, and are predominantly found largely in poorer, rural areas. For instance, Lesotho, where more than 75 percent of the population is rural, has 8,600 healthcare workers. Only 44 percent of them have a formal education. The other workers—4,800—are community health workers, most of whom work in rural areas. Sierra Leone is home to only 3,736 conventional workers but also to 10,723 traditional birth attendants, who are mostly found in more districts.

Urban and rural healthcare workers also tend to have different gender profiles, with females more heavily concentrated in urban areas than in rural areas. For instance, of all healthcare workers in Zambia, 64.7 percent are female. Nonetheless, all cadres except nurses are majority male in rural areas. All cadres have a large female contingent in urban areas. This gender imbalance further exacerbates the discussed deficits of nurses and midwives in rural areas, since these cadres are largely made up of females.

Effect of urban-rural health worker imbalances on achieving health MDGs, reducing poverty, and improving health system efficiency

One reason why rural ratios below benchmarks are especially troublesome is that they signal a double burden on the poorest of the poor, many of whom live in rural areas and face greater public health needs than people in urban areas (table 2.2).

The most severe public health problems are often found in rural and remote areas, where mortality levels are higher. Yet, the lack of health workers in these areas greatly decreases the likelihood that the sick obtain treatment or that the healthy prevent infection. Greater exposure to health risks and inadequate access to healthcare in rural areas reduce the likelihood of achieving the MDGs, which depend on the expansion of coverage of key, high-impact interventions. It is difficult for rural areas without adequate access to the providers of these interventions to achieve the MDGs. A case-in-point is maternal mortality. Strong evidence points to a high coverage rate of skilled birth attendants as a critical input for reducing maternal mortality rates (Anand and Baernighausen 2004). The lack of specific professionals, such as midwives, in rural areas is strongly associated with the failure to achieve the maternal mortality MDG.
A frequent contention is that higher-level professionals (for example, doctors) are not in demand in rural areas. And that the urban-rural imbalance of higher-level professionals may actually reflect this apparent lack of demand for them. Community and traditional health providers may be more trusted and respected than formal health workers in some remote areas and, thus, considered a more appropriate solution. Furthering this argument is the apparently different utilization pattern of higher-level professional health workers by rural populations. When doctors are made more accessible in rural areas, however, the utilization pattern is not significantly different from that of the non-poor (Ouendo 2005). Many demographic and health surveys find that the poor have lower overall utilization rates of health workers, but when they do seek out health services, they choose the same combination of services and health professionals as do the non-poor. Thus, the apparent lower utilization of higher-level health workers may reflect the poor’s limited access to higher-level and qualified health workers rather than different preferences (for Tanzania, see Leonard, Mliga, and Haile Mariam 2003; Klemick 2007).

Urban-rural imbalances in health workers hinder the development of primary health care services, reducing the efficiency of the health system. Using urban referral centers rather than rural centers dramatically increases the costs of health care services for the poor for two main reasons. First, rural people incur costs in traveling to an urban area. This cost includes both the direct cost for transportation and the opportunity cost of taking a half-day or a day off. Second, when they reach their destination, they pay more for health care services, because urban health care services are usually more expensive than rural services. Sanders and others (1998) show that for the same medical case (that is, acute malaria fever), the length of stay and number of lab tests may be 10 times as great in an urban area than in a rural one.

Notes

1 This cost includes both the direct cost for transportation and the opportunity cost of taking a half-day or a day off.

2 A cadre that commonly has a skill set somewhere between that of doctors and that of nurses.
Labor economics theory provides an insightful framework to better understand the reasons behind this unequal distribution in HRH (see Appendix C for a detailed description). It offers two different types of explanations, which are basically related to the two key features of a labor market. These explanations are not exclusive and a given country can experience both.

(i) A first explanation is the reduced demand for HRH in rural areas. Such demand does not reflect needs-based demand for HRH, but the demand expressed by employers to hire health workers or by individuals willing to buy health services. It is important to note that there are always two kinds of employers: public ones (government-run health care facilities) and private ones (private health care facilities and patients paying user fees). Yet, demand for HRH in rural areas is usually not adequately funded, which contributes to the rural-urban imbalances of health workers.

(ii) A second explanation centers on reduced supply for rural areas. Indeed, even if there is enough funding and a significant rural demand for HRH, health workers may not be sufficient in number and or have some preferences and characteristics that make them reluctant to work in rural areas. Health worker numbers, preferences and characteristics lead therefore to a limited number of health workers in rural areas.

In many instances in Sub-Saharan Africa, the urban market is in unemployment or at best at a market-clearing equilibrium (although occasionally also in a shortage situation); whilst rural areas are often in shortage situations. As a result, the urban and rural markets together are usually in one of three different situations: urban unemployment equals rural shortage, urban unemployment is greater than rural shortage, or urban unemployment is less than rural shortage. Vujicic and Zurn (2006) find that Malawi experienced high vacancy rates and high underemployment of health workers, even in urban markets, although HRH needs are far from being met. Data from health facilities in Zambia in 2006 reveal health worker shortages throughout the country, albeit one that is much worse in rural than urban areas (table 3.1). The Republic of Congo suffers from twin urban unemployment and rural health worker shortages. A 2008 assessment of health worker distribution and urban-rural vacancy rates there finds that “a severely unequal distribution of human resources between urban and rural settings caused by a variety of problems has resulted in 302 rural clinics closing and an over-supply of workers in urban facilities” (Crigler, Boniface, and Shannon 2008). Rates of underemployment are high in urban areas in other countries as well. In Côte d’Ivoire, for instance, about 35 percent of doctors were underemployed while vacancy rates in rural areas remained significant (Loukou and others 2006). Comparable rates have been found in Mali and Madagascar.

Figure 3.1 below illustrates how urban employment versus rural labor shortages can be explained by the economics of demand and supply side behavior of actors within the rural and
Urban health labor markets. The differences in demand and supply, as well as compensation in rural versus urban areas, are discussed in the remainder of this chapter.

**Urban-rural differences in demand for labor**

Evidence shows that demand for HRH is lower in rural areas than in urban ones. This means that, all other things equal, at any given compensation level, rural employers will employ fewer healthcare workers than their urban counterparts. One of the reasons for this situation is, that because of low employer income and limited progress in fiscal decentralization in many Sub-Saharan Africa countries, rural health facilities are struggling to receive adequate funding. In Benin, for example, less than 40 percent of regional credits allocated for rural health centers actually reached them; the balance remained at regional levels (World Bank 2003). Disproportionate allocation of public funds to district health authorities has also been observed in Zambia. This fiscal centralization, coupled with the abolishment of user fees in several countries, has limited the income of local health facilities and decreased their ability to hire healthcare workers. Such limitations on rural health facilities’ budgets means that the demand curve, representing the number of HRH that employers want and can afford, is farther to the left in rural markets than in urban markets. HRH funding shortages in rural areas are probably significant factors explaining urban-rural imbalances.

**Urban-rural differences in the supply of labor**

The evidence suggests that the supply of labor is larger in urban areas than in rural areas, although not necessarily for all professionals. Some health workers are willing to work in rural areas given sufficient compensation. Others (for example, doctors, people with children, and people originally from urban areas) are less willing to relocate to rural areas, even with a comprehensive incentive package. The motivation for working in rural areas is thus different across subgroups of health workers. Graphically, this implies that the rural
supply curve may be slightly to the left of the urban supply curve, especially for health workers that are less sensitive to compensation levels.

There is some evidence that lower-level professionals are more amenable to working in rural areas than higher-level professionals. A study in Ghana finds that some lower-level professionals appreciate the exposure to a wide range of pathologies that comes with rural service. The reasons cited for preferring rural areas include the fact that they are given duties above their skill level; bond more tightly with staff, facilitate on-the-job learning skills (such as surgery); have more opportunities to manage teams, allowing them to develop management and leadership skills; and have higher social recognition in villages (they are sometimes called doctor) and receive gifts (Lievens and others 2007).

Evidence also suggests that younger health workers may be more willing to work in rural areas than older workers. A study in Ethiopia tracking the graduating nursing class of 2004 finds that 34 percent of graduating nurses were willing to accept a rural placement in 2004; by 2007, this proportion had declined to 18 percent (Serneels et al. 2005). In Niger, young doctors cite lack of opportunities for postgraduate training as a key reason for not accepting rural positions (Souleymane et al. 2005). In contrast, older doctors cite weak remuneration as their main reason for not considering rural positions. Older doctors face a higher opportunity cost for moving to rural areas, as the reputation they have built in the city often allows them to run a private practice. Anecdotal evidence from Benin and Niger indicates that doctors can more than double their salary by accepting private clients after hours. Given that moonlighting can make up a significant proportion of doctors’ incomes, moving to a rural area may indeed represent a considerable income decrease.

Evidence also points to a gender difference in willingness to work in rural areas, with men more willing to do so than women. Dussault and others (2006) suggest that female doctors are likely to live near their husband’s place of employment. In the Republic of Congo, as in many Sub-Saharan Africa countries, married couples are required by law to live together; providers assigned to rural areas, therefore, often marry and move to the city to be with their spouses (Crigler, Boniface, and Shannon 2008). There is anecdotal evidence that once a woman is assigned to a rural job, she tries to get married quickly in order to move back to the capital.

For nonnative women without family or friends in the region, locating to a rural area without support or protections can also create safety concerns. A 2008 HRH assessment of the Republic of Congo finds that “rural settings are also considered too dangerous for unaccompanied women, as they cannot ride buses by themselves or feel comfortable leaving their homes to work in the villages at night if needed. As more than 61 percent of health workers are women, this further complicates staffing rural regions” (Crigler, Boniface, and Shannon 2008). The fact that many female healthcare professionals come from more educated, elite, or urban backgrounds also makes them less likely to accept positions in rural or remote areas.

Evidence shows that health workers with rural or poor backgrounds are often more willing to work in rural areas than those from urban or wealthier backgrounds. Data from Ethiopia indicates that health workers from rural areas or less well-off backgrounds are more motivated and willing to work in rural areas (Serneels et al. 2008). Some of the willingness of lower level or alternative professionals may stem from the fact that a greater proportion of such people have rural backgrounds. Some health workers may be willing to work in rural areas for altruistic reasons. Among both nursing and medical students in Ethiopia, the most frequently cited reason for seeking a rural placement is “to provide healthcare where it is needed most” (this reason was cited more often by nursing students than by medical students; Serneels et al. 2005)—see figure 3.2. At the same time a follow-up cohort study three years later finds that altruism diminishes once workers gain experience and begin working as healthcare professionals (Serneels et al. 2008).
Urban-rural differences in compensation

There is strong evidence that urban areas offer higher monetary and non monetary compensation than rural areas. A study on Ethiopia illustrates this and finds that monetary compensation levels for doctors and nurses in the capital city (Addis) and rural regions (Tigray and SNNPR) are significantly different (Jack 2008), with compensation much higher in urban areas (figure 3.1).

Various studies, including the World Health Report 2006 (WHO 2006), also document the lack of career-related incentives, such as professional development and training opportunities, in rural areas. Lower rural net incentives also reflect the higher costs associated with working in rural areas. Inadequate management, lack of supplies, and
heavy workloads are only some of the factors disproportionately evident in rural facilities. A study of the Republic of Congo finds that “this [urban-rural] imbalance has many causes, not the least [of which] is the difficult working conditions providers encounter in rural areas, such as lack of infrastructure, roads, electricity, water, and housing” (Crigler, Boniface, and Shannon 2008). Opportunities for education and jobs for spouses are also limited, increasing the costs of living in a rural area. Workers who transfer to rural areas also may have to rent a house in the city for their children who remain there.

Notes

1 This low demand will depend on the employment arrangement in place in rural areas. This phenomenon will, of course, be present in decentralized systems, where rural health care facilities can directly recruit and pay some of their staff but have difficulties doing so because of limited (or delayed) budget and revenues. Conversely, in countries where recruitment and payment of salaries are still fully centralized, there is no public rural employer as such.

2 A large body of evidence indicates that professionals from rural area are more likely than professionals from urban areas to settle in remote areas (see Rolfe and others 1995; Dunbabin and Levitt 2003; Vries and Reid 2003). Easterbrook and others (1999) find that Canadian physicians who were raised in rural communities were 2.3 times more likely than those from non-rural communities to choose to practice in a rural community immediately after graduation.
A number of policies and interventions are available to policy makers to impact labor market dynamics and reduce geographical imbalances of health workers (table 4.1). This chapter focuses on the supply side policy options to address rural/urban imbalances and includes a review of the experience of countries with policies and their impact on the rural/urban distribution of health workers in countries in SSA. For each policy category except increasing demand for health workers in rural areas—a detailed discussion of which is beyond the scope of this study—it reviews theoretical insights and the evidence of success and failure, including key factors for explaining possible impacts. The chapter shows that many SSA have attempted to correct the rural urban imbalance—some with success—by directly influencing key labor market dynamics.

**Table 4.1 Policy options for reducing urban-rural imbalances in HRH**

<table>
<thead>
<tr>
<th>Policy category</th>
<th>Policy options</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increasing health worker demand in rural areas</td>
<td>Policy 1: Increase funding available to health centers so that they can hire more health workers (fiscal decentralization)</td>
</tr>
<tr>
<td>Reducing opportunity costs associated with rural jobs (through incentives)</td>
<td>Policy 2: Increase net compensation in rural areas (with a package consisting of both monetary and nonmonetary incentives)</td>
</tr>
<tr>
<td>Transferring urban health workers to rural areas through compulsory policies</td>
<td>Policy 3: Require graduates to complete a placement in rural areas (“bonding”)</td>
</tr>
<tr>
<td>Increasing the overall supply of health workers by scaling up education</td>
<td>Policy 4: Scale up education (by increasing the number of health graduates per institution or creating more institutions)</td>
</tr>
<tr>
<td>Improving rural orientation of existing education system (creating a “rural pipeline”)</td>
<td>Policy 5: Establish local schools for doctors and nurses in order to attract students from rural areas</td>
</tr>
<tr>
<td>Policy 6: Change curricula to better train students regarding clinical situations often experienced in rural areas</td>
<td></td>
</tr>
<tr>
<td>Policy 7: Implement a preferential admission policy in health schools in order to select more health workers with rural backgrounds (“rural pipeline”)</td>
<td></td>
</tr>
<tr>
<td>Creating alternative skill mixes for rural areas</td>
<td>Policy 8: Create alternative groups of professionals, such as midlevel professionals</td>
</tr>
<tr>
<td>Attracting health workers from abroad (through immigration policies)</td>
<td>Policy 9: Provide incentives or facilitate immigration for specific professions</td>
</tr>
</tbody>
</table>

*Source: Authors.*
Increasing health worker demand

Although demand side policy options are not discussed in detail here, they do warrant a brief mention. A first approach to strengthening the demand for health workers in rural areas is to increase the funding going to rural districts and facilities. This is increasingly done throughout SSA as more and more countries adopt and implement fiscal decentralization. Depending on the model adopted, funding for rural health workers wages is transferred to local governments in the form of block grants—as in Ethiopia and temporarily in Zambia— or earmarked transfers—as in Benin, Uganda and Mali-. In other countries funding for wages is directly transferred to facilities as in Rwanda. When the funds transferred are calculated in function of needs and poverty—needs based or equity formula—this contributes further to increasing demand for rural workers. (see Vujicic et al). A further and more extensive discussion of country experience with increasing demand in rural areas and information on some of the key successes and failures with doing so is beyond the scope of this study and will have to be addressed in future research.

Reducing the opportunity cost of rural employment: incentive policies

Increasing monetary and nonmonetary incentives is one of the most important policy options available to facilities or districts facing a shortage of HRH because they are unable to attract health workers from urban areas. Direct financial incentives include salaries, bonuses, hardship allowances, and any other monetary benefits. Indirect financial incentives include loan repayment schemes; scholarships; allowances for childcare, housing, and children’s schooling; health insurance; benefits; travel subsidies; and the right to moonlight or maintain a private practice. Nonfinancial incentives fall into three main categories: career-related incentives, such as professional development opportunities, training, and job security; incentives to improve the working environment, such as improved management, flexibility, availability of supplies and equipment, and reduced workloads; and family and lifestyle incentives, such as increased vacation time, provision of housing, and spousal employment.

In many environments, changing the wage rate (direct financial incentive) can be difficult, because wages may be set by the central ministry of health, frozen by budget constraints, or slow to respond to market forces. If wages cannot be changed, rural clinics must compensate by improving nonwage benefits, such as better working conditions,

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**Figure 4.1** Effect of various incentives on probability of doctors and nurses accepting a post in a rural area

![Graph showing the effect of various incentives on probability of doctors and nurses accepting a post in a rural area](source: Jack 2008)
Box 4.1 Using discrete choice experiments to elicit health workers’ preferences regarding rural jobs

Stated preference methodologies include conjoint analysis, contingent valuation, and other techniques for assessing the utility of alternatives for individuals. These increasingly popular methodologies have been used in several countries, including Ethiopia, Indonesia, Malawi, and Niger, to elicit health workers’ preferences regarding rural jobs.

In a discrete choice experiment, a sample of health workers is asked to choose between simple job descriptions, usually arranged in about 15 pairs (box table). Collected observations are then analyzed using econometric models. Figure 4.1 was produced through such a process.

Box table. Sample discrete choice set

<table>
<thead>
<tr>
<th>Choice Set A</th>
<th>Job 1</th>
<th>Job 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Place of work</td>
<td>City</td>
<td>District town</td>
</tr>
<tr>
<td>Net monthly pay</td>
<td>K10,000</td>
<td>K20,000</td>
</tr>
<tr>
<td>Availability of material resources (equipment, drugs and other supplies)</td>
<td>Usually inadequate</td>
<td>Usually adequate</td>
</tr>
<tr>
<td>Typical workload</td>
<td>Heavy: hardly enough time to complete duties, works two hours extra each day</td>
<td>Medium: enough time to complete duties, works one hour extra each day</td>
</tr>
<tr>
<td>Provision of government housing</td>
<td>Provided</td>
<td>Provided</td>
</tr>
<tr>
<td>Opportunity to upgrade qualifications</td>
<td>After 5 years</td>
<td>After 5 years</td>
</tr>
</tbody>
</table>

Source: Mangham 2007

The effects of such incentive policies vary significantly across professions (figure 4.1). Doubling pay increases the probability that a doctor accepts a rural job from 7 percent to 57 percent; doubling the pay of nurses increases the probability of accepting a rural job from 4 percent to 27 percent.

Provisions of basic housing, reduced payback time, and (for nurses) improved supervision also have positive, albeit smaller, effects on the likelihood of choosing a rural post. These analytical results were obtained from a discrete choice experiment (box 4.1).

A discrete choice experiment is more powerful than a normal questionnaire for two reasons. First, people are not good at assessing their own preferences. They can rank them (to some extent) along an ordinal scale, but they have difficulties assigning cardinal values to these preferences. For instance, given the choice among jobs located in the capital, 100 kilometers from the capital, and 200 kilometers from the capital, an individual could rank the choices ordinarily; however, a mere ranking does not reveal the utility associated with each distance.

Second, even if individuals can estimate their utility on a cardinal scale, they will still have difficulties assessing the tradeoffs between alternatives. A discrete choice experiment replicates actual choices and does not assume any ability of individuals to precisely estimate their preferences. It is currently the most reliable method for measuring tradeoffs and eliciting preferences.

Source: Authors
<table>
<thead>
<tr>
<th>Country</th>
<th>Type of monetary Incentives</th>
<th>Type of nonmonetary incentive</th>
<th>Health workers targeted</th>
<th>Impact</th>
<th>Quality of evidence/source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ghana</td>
<td>Additional monthly allowance of 20–30 percent of base salary paid to health workers working in one of 55 deprived areas</td>
<td>None</td>
<td>All health workers</td>
<td>Unknown</td>
<td>Low (Dolea et al. 2008)</td>
</tr>
<tr>
<td>Mali</td>
<td>Doctors setting up and maintaining a rural private practice receive financial aid for purchasing housing and basic medical supplies, retain 50 percent of user fees, and receive a base salary from local communities of $200 a month</td>
<td>Private doctors receive technical support for preparing their business plans and strong clinical mentoring</td>
<td>Young and unemployed doctors</td>
<td>Strong</td>
<td>Medium (Coulibaly et al. 2007)</td>
</tr>
<tr>
<td>Mauritania</td>
<td>Additional monthly allowance equal to about half the base salary</td>
<td>None</td>
<td>All health workers</td>
<td>Unknown</td>
<td>Low (Sy and Hamed 2006)</td>
</tr>
<tr>
<td>Niger</td>
<td>Additional monthly allowance of $40–$160 (7–30 percent of base salary)</td>
<td>None</td>
<td>Doctors who are already civil servants</td>
<td>Weak</td>
<td>High (Souleymane and others 2005, 2008)</td>
</tr>
<tr>
<td>Senegal</td>
<td>Additional monthly allowance of $370 for doctors (equivalent to 75 percent of base salary) and $290 for nurses (equivalent to 100 percent of base salary)</td>
<td>Motorcycles given to nurses in some rural provinces</td>
<td>All doctors and nurses</td>
<td>Medium</td>
<td>Low [AQ: source for Senegal info?]</td>
</tr>
<tr>
<td>South Africa</td>
<td>Additional monthly allowance of 8–22 percent of base salary</td>
<td>None</td>
<td>Doctors and nurses</td>
<td>Medium</td>
<td>Medium (Vujicic and Lindelow forthcoming)</td>
</tr>
<tr>
<td>Tanzania</td>
<td>Since 2005, all health workers willing to spend at least one year in a rural area may apply for a Mkapa fellowship</td>
<td>None</td>
<td>All health workers</td>
<td>Unknown</td>
<td>Low (Merkle and Prytherch 2007)</td>
</tr>
<tr>
<td>Zambia</td>
<td>Under the Zambian Health Workers Retention Scheme (ZHWRS), program participants receive additional monthly allowance of $250–$300 (equal to about half of base salary); end-of-contract bonus of $2,000–$2,500, paid upon satisfactory completion; allowance for purchasing basic medical supplies and equipment; $3,000 bonus for renovating a house; $1,500 annual subsidy for each child attending school; and preferred access to home and car loans</td>
<td>Preferred access to postgraduate Doctors education (if a doctor spends at least three years in a rural area) and clinical mentoring during installation of young doctors in rural areas</td>
<td>Doctors</td>
<td>Strong</td>
<td>Medium (Koot and Martineau 2005)</td>
</tr>
</tbody>
</table>

Source: Authors.
Box 4.2 Using incentives to recruit rural doctors in Mali and Zambia

<table>
<thead>
<tr>
<th>Rural private practices in Mali</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mali implemented a very innovative strategy to support young doctors in setting up rural private practices (Coulibaly and others 2007). Madagascar also recently implemented a similar program, about which little information is available. With the support of an NGO (Santé-Sud) and the Bamako medical faculty, young doctors interested in working in rural areas are identified before graduation. Those that are interested receive help in preparing a business plan that is in line with the incomes of the targeted population. Once they start their business, these doctors benefit from regular mentoring by seasoned doctors. They receive a small, fixed amount of money ($200 a month) and, sometimes, a house from the community; most of their revenues come from user fees, half of which they are allowed to keep. Very active rural doctors can earn about $1,000 a month, not much less than they would earn in urban areas. Since 2000, more than 100 doctors have been attracted to and retained in rural areas thanks to this program.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>The Zambian Health Workers Retention Scheme</th>
</tr>
</thead>
<tbody>
<tr>
<td>To address the issue of uneven distribution of doctors throughout the country, Zambia developed a new policy in 2003 based on a comprehensive incentive package. The package, known as the Zambian Health Workers Retention Scheme (ZHWRS), includes both monetary and nonmonetary incentives. Monetary incentives included a monthly allowance of $250–$300 (equivalent to roughly 50 percent of base salary); an end-of-contract bonus of $2,000–$2,500, paid upon satisfactory completion; an allowance for purchasing basic medical supplies and equipment; a $3,000 bonus for renovating a house; a $1,500 annual subsidy for each child attending school; and preferred access to home and car loans. Nonmonetary incentives consisted of preferred access to postgraduate education (if a doctor stayed at least three years in a rural area) and clinical mentoring during installation. Even though some of these incentives were not fully implemented, the ZHWRS attracted more than 50 doctors in rural areas within the first 14 months after implementation (Koot and Martineau 2005). The success of the program has prompted some hospital doctors to complain about the medical “brain drain” from urban to rural areas. The program, which was heavily subsidized by USAID, may not be sustainable, however.</td>
</tr>
</tbody>
</table>

Source: Authors
Niger’s financial incentive program for doctors, for example, where one of the few truly prospective evaluations of an incentive program was carried out, had no significant impact. The distribution of doctors remaining highly skewed to the benefit of the capital city, with the percentage of all doctors working in the capital remaining virtually constant before and after implementation of an incentive scheme (34 percent doctors in 2005, before the program was implemented, and 35 percent in 2008, after it was implemented) (Souleymane et al. 2005, 2008).

**Key success and failure factors**

The lack of success has generally been attributed to the level of monetary and nonmonetary incentive, which was insufficient to outweigh the opportunity costs associated with settling in rural areas. At a minimum, monetary incentives should offset the loss of private practice revenues (which are more difficult to generate in rural areas); the added cost of children’s education (as children usually live in the capital city, which entails transportation and lodging costs); and the loss of the spouse’s salary. Few programs analyzed these opportunity costs before setting the level of financial incentive, thus greatly increasing the chances of failure.

Younger doctors, who are usually unmarried, have no children, and lack enough experience to attract private clients, may face lower opportunity costs. They also highly value opportunities for learning, including clinical mentoring and preferred access to postgraduate training. Such nonmonetary incentives have not been included in most incentive packages.

More research is needed to evaluate the outcomes of incentive programs on rural shortages. The best policies may well be those that successfully combine monetary and nonmonetary incentives. Most incentive programs have targeted only doctors; little is known about their effect on other types of health workers. In situations where health workers are unresponsive to both monetary and nonmonetary incentives, other solutions (such as compulsory placement) may have to be considered.

Where incentives succeeded, their success was generally attributed to the fact that the incentive packages comprehensively addressed the needs and opportunity costs of doctors. In Mali, the needs and constraints of the targeted group of doctors were well researched and understood. In Zambia, the incentive package was not only financially attractive, it also took into account all the various opportunity costs faced by rural staff (technical support, children’s education, housing, transportation, and so forth) and included nonmonetary incentives for expanding learning opportunities for young doctors. In both cases, preparatory analysis was conducted to evaluate the specific types of incentives needed to motivate specific subgroups of health workers before the programs were put into place.

Neither country used sophisticated techniques for eliciting health workers’ preferences. Instead, they adjusted their policy through a long process of trial and error. Other countries could avoid this costly and lengthy process by using state-of-the-art techniques, such as discrete choice experiment.

Success is also related to some contextual factors, notably the dynamics between urban and rural labor markets. Attracting health workers to rural areas is easier when there is unemployment in urban labor markets—this factor may explain part of the success of the Malian experience. Because of fiscal constraints, the Malian government is able to hire only a small proportion of new medical graduates. As a consequence, there is a large pool of unemployed doctors in the capital city, Bamako. These underemployed doctors were explicitly targeted by the incentive program; many of them reacted favorably to the proposal to set up a private practice in a rural area.

Another contextual factor is the degree of decentralization in a given country. The Malian experience could not have been successful without the high degree of decentralization already achieved in the country. Local communities in Mali have substantial experience managing and outsourcing local services. Contracting private doctors was, thus, not a major challenge for these communities.
Another possible issue relates to civil service regulation of compensation. In many Sub-Saharan African countries, governments are still the main employer of health workers, whose remuneration is usually defined by national and multisectorial salary scales. Ministries of finance are leery of rural incentives for health workers, fearing the risk of spillover effects. In Niger, for instance, as soon as the government agreed to implement incentives for doctors, other health workers asked for (and obtained) similar advantages. Spillover can also extend beyond the health sector, especially to education, as teachers share health workers’ reluctance to work in rural areas. Several countries are trying to overcome this constraint by creating health worker categories outside the civil service system (delinkage). Evidence on this policy is mixed, with successes in Rwanda and failures in Benin and Zambia.

**Transferring urban health workers to rural areas through compulsory policies (bonding)**

Health workers can be moved from urban areas to rural areas through compulsory placement policy, also known as bonding. Creating a period of obligatory rural service for graduating health workers is one way of bonding. This option falls outside of labor market theory, as labor is no longer a commodity that health workers are free to offer or not offer according to the compensation level.

*Country experiences*

Many Sub-Saharan Africa countries have implemented compulsory placement programs (table 4.3). Although such policies may temporarily reduce short-term shortages, they have had little or no impact on long-term rural retention. Anecdotal evidence suggests that these programs are also difficult to enforce.²

*Key success and failure factors*

Interactions between policies and incentives may backfire on bonding policies. In the early years of Thailand’s compulsory placement program, young doctors used the financial benefits received from working in rural areas to pay the fines associated with not completing their obligatory rural service time (Wibulpolprasert and others 2003a). The unintended—and paradoxical—consequence of this rural policy package was that a significant number of doctors left remote rural areas thanks to rural financial incentives. Another fundamental factor in the failure of bonding policies is the fact that they do not compensate for the financial and nonfinancial opportunity costs borne by doctors serving in rural areas.

Sub-Saharan African countries that have this kind of policy have not been able to enforce it consistently. Most “displaced” health workers returned illegally to the capital city, sometimes after bribing ministry of health officials. Such a policy cannot be easily implemented if there is no shortage of health workers in the urban market. Conversely, when a health worker surplus is experienced in urban markets, the opportunity cost of “displaced” health workers is significantly lower.

**Table 4.3 Compulsory programs implemented in selected Sub-Saharan Africa countries**

<table>
<thead>
<tr>
<th>Country</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethiopia</td>
<td>Compulsory periods of work in rural areas as a condition for obtaining medical degree</td>
</tr>
<tr>
<td>Ghana</td>
<td>Compulsory two-year service in rural areas for new doctors entering civil service</td>
</tr>
<tr>
<td>Niger</td>
<td>Compulsory three-year service in rural areas for new doctors entering civil service</td>
</tr>
<tr>
<td>Zambia</td>
<td>Compulsory one-year placement of young doctors in rural areas</td>
</tr>
<tr>
<td>Zimbabwe</td>
<td>Compulsory program for entering civil service</td>
</tr>
</tbody>
</table>

*Source: Authors.*
Failure can also be attributed to the lack of support of key stakeholder groups, associations, and health workers themselves. Doctors in Zimbabwe, for example, went on strike in response to compulsory placement policies requiring medical students to work two years in rural stations (Mutizwa-Mangiza 1998).

Increasing the overall supply of health workers by scaling up HRH education

Increasing the overall supply of health workers does not target urban-rural imbalances as such, and is thus not discussed in detail here. It may however increase the numbers of health workers working in rural areas. Indeed, increasing the overall supply of health workers may address the problem that even if there is sufficient rural demand, and a potential willingness of some health workers to work in rural areas, the number of available health workers to spread into rural areas is simply too low. In theory, the more health workers there are, the larger the proportion willing to work in rural areas. To scale up the number of health workers, the capacity of the institutions that produce them must be scaled up as well. First assessments of current institutional and organization capacity must take place. To increase cost effectiveness relevant existing resources should be maximized. This includes faculty, material and infrastructural resources and systems that are currently producing well-qualified health workers. However, it is important to examine innovative approaches and lessons learned from other health systems to help improve national health worker production capacity. Finally, many countries may find that significant investment in physical, information and communication infrastructures as well as in knowledge management systems is necessary and cost-effective in the long run. Governments might also find that building partnerships across, institutions, sectors and borders is required to maximize the use of scarce resources and take advantage of learning from relevant experiences. (GHWA, 2008). On the whole thus, increasing the overall supply of health workers does not address rural-urban imbalances as such, but may increase the number of health workers that are available and willing to work in rural areas. It may thus be a policy option at least worth exploring as a requirement before designing other policies for addressing urban-rural imbalances.

Improving the rural orientation of the HRH education system

Rural pipeline policies combine several features to create a sustainable rural health workforce. Two education-related policy options address geographic imbalances. The first involves targeting potential students with the profile most likely to be amenable to rural postings (especially those with rural backgrounds)—by, for example, admitting many more rural students to existing institutions or establishing new institutions in rural areas. The second involves changing the health education curriculum so that it is more relevant to rural healthcare and exposes students to rural environments as a part of their formal education.

Several countries have designed curricula that are more rural-friendly. Such curricula include compulsory internships in rural areas, more training on community or rural medicine, and general surgery. Equatorial Guinea launched a postgraduate program—Medecine General Integral (MGI)—in 2000, in cooperation with Cuba. Students receive in-depth training in all necessary fields to face the most commonly found situations in rural areas (pediatrics, internal medicine, general surgery, gynecology-obstetrics).

Rural pipeline policies can be made up of a combination of the following elements:

- Admissions policies giving preference to or allotting a specific number of slots to applicants from rural regions
- Creation of regional rural medical and nursing schools
- Development of curricula with strong emphases on family or community medicine
- Compulsory rural internships
- Financial aid and scholarships for rural students
- Mentoring by experienced rural doctors for new health workers in rural areas.
Country experiences
A few Sub-Saharan African countries have implemented rural pipeline programs. Benin created a regional medical school in 2001 that trains only general practitioners. Niger established two nursing schools in rural areas in 2006 and Mali xx schools since xxx. Senegal created a regional branch of the medical school in Dakar in 2008. Ethiopia has established nursing schools not just in the capital Addis Ababa, but also in the south and west of the country. South Africa experienced good results from a scholarship program that required rural students to return to their districts after graduating.

Almost all empirical studies of such programs are from non-African programs (in Australia, Japan, Norway, Thailand, and the United States) where evidence of a strong impact is clear. Overall, rural pipeline programs in these countries have been very effective in attracting and retaining doctors in rural areas (see Murray and others 2006 and Rolfe and others 1995 for Australia; Rabinowitz 1999 and 2001 for the United States; Hsueh and others 2004 for Norway and Japan). Except in Thailand, none of these programs included a mechanism for obligating or creating special incentives to ensure that rural students returned to rural areas to work. Instead, most of the rural graduates chose to settle in rural areas, underscoring the potential power of the rural pipeline tool. South Africa has tested a rural scholarship program in the Mosvold district where scholarships are given to rural students on the condition that they return to their district after graduation. Rural students receiving the scholarship were three to eight times more likely to practice in rural areas after graduation. Such cross-national studies provide evidence that people with rural backgrounds are, indeed, not only more willing to work in rural areas but also more likely to do so voluntarily. Policies to recruit and train students from rural backgrounds are potentially a low-cost and sustainable part of the solution to the urban-rural gap in HRH.

Key success factors
Results from the most in-depth study of a rural pipeline program (Rabinowitz and others 2001) find that a preferred admissions policy and a revised curriculum are the most relevant factors in attracting rural students and influencing their decision to later settle in rural areas of Pennsylvania, in the United States. Rural internships and financial aid had little impact on student decisions.

Creating alternative skill mixes in rural clinics
Highly trained health workers with many years of formal education, such as doctors, are the most difficult to recruit and retain in rural health clinics. Consequently, rural clinics and ministries of health are now training lower level professionals to take on some roles of doctors and nurses. Because they are recruited locally, such professionals are more likely to stay (Dovlo 1994). Such task shifting does not increase the number of health workers in rural areas; rather, it increases the capacity to perform health interventions, which lies at the heart of the health worker shortage. Shifting some tasks to lower or midlevel health workers, such as auxiliary professionals, nurses, or community health workers, through in-service training is increasingly hailed as a potential way to increase the number of personnel qualified to carry out key health interventions in rural areas.

In principle, delegating additional tasks to lower level health workers is a feasible response to rural skills shortage. It can also serve as a key motivator by giving lower level workers more responsibility and scope for professional development, which may increase productivity and quality. Medical care knowledge and technology have evolved rapidly in recent years, allowing health workers without full medical training to perform some diagnoses and treatments that would have needed medical skills a few years ago.

There is much divergence across countries regarding which tasks it is acceptable for health workers of different levels to carry out. It is imperative that strategies focus on
## Table 4.4 Skill mix programs in selected countries in Sub-Saharan Africa

<table>
<thead>
<tr>
<th>Country</th>
<th>Task shifted</th>
<th>Targeted professionals</th>
<th>Training and supervision arrangements</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Botswana</td>
<td>Management of antiretroviral therapy</td>
<td>Nurses</td>
<td>In-service training</td>
<td>Miles and others (2007)</td>
</tr>
<tr>
<td>Cameroon</td>
<td>Prevention of maternal-to-child HIV transmission services, including</td>
<td>Rural birth attendants</td>
<td>Ongoing supervision by nurses</td>
<td>Wanyu and others (2007)</td>
</tr>
<tr>
<td></td>
<td>counseling, testing, and administration of nevirapine</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ethiopia</td>
<td>Counseling and testing</td>
<td>Community health workers</td>
<td>6-week in-service training</td>
<td>Mengistu (2008)</td>
</tr>
<tr>
<td>Ghana</td>
<td>Management of childhood diseases</td>
<td>Community health nurses</td>
<td>11-day in-service training</td>
<td>WHO (2006)</td>
</tr>
<tr>
<td>Kenya</td>
<td>Management of obstetrical complications</td>
<td>Nurses and clinical officers</td>
<td>In-service training</td>
<td>Thairu and Schmidt (2003)</td>
</tr>
<tr>
<td>Malawi</td>
<td>General surgery, including Caesarian sections (district-level)</td>
<td>Clinical officers</td>
<td>3 years</td>
<td>Chilopora and others (2007)</td>
</tr>
<tr>
<td></td>
<td>Antiretroviral therapy initiation</td>
<td>Nurses and community health workers</td>
<td>3-week intensive training</td>
<td>Philips (2008)</td>
</tr>
<tr>
<td></td>
<td>Evaluation of patient eligibility for highly active antiretroviral therapy</td>
<td>Basic level nurses</td>
<td>Standardized training on staging</td>
<td>Vaz (1999); Pereira and others (1996)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>HIV–positive patients using CD4 counts and WHO criteria</td>
<td>Gimbel-Sherr and others (2007)</td>
</tr>
<tr>
<td>Mozambique</td>
<td>General surgery, including Caesarian sections (district-level)</td>
<td>Medical assistants</td>
<td>3 years</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Evaluation of patient eligibility for highly active antiretroviral therapy</td>
<td>Basic level nurses</td>
<td>Standardized training on staging</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>HIV–positive patients using CD4 counts and WHO criteria</td>
<td></td>
</tr>
<tr>
<td>Rwanda</td>
<td>HIV/AIDS services, including prescription of antiretroviral therapy</td>
<td>Nurses</td>
<td>Ivers (2008)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>HIV/AIDS services, including diagnosis of opportunistic infections associated with HIV/AIDS</td>
<td>Community health workers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tanzania</td>
<td>General surgery, including Caesarian sections (district-level)</td>
<td>Assistant Medical Officers</td>
<td>Mbaruku and Bergström (1995)</td>
<td></td>
</tr>
</tbody>
</table>

*Source: Authors.*
matching the skills of workers to the local profile of health needs. Although the objective of training lower and midlevel professionals to deliver health care at the community level is to eventually delegate to them work normally reserved for high-level professionals, all professionals should continue to provide care they are uniquely equipped to provide.

Country experiences
Several types of skills-expansion policies have been observed in Sub-Saharan Africa (table 4.4). These activities focus on increasing the skill sets of lower and midlevel professionals as well as higher-level professionals, such as general practitioners.

The experience with shifting higher-skill tasks to lower-level professionals in rural areas has generally been successful. Alternative skill mixes can deliver positive results when they focus on a specific procedure, such as obstetrics or antiretroviral therapy. In Mozambique, the lack of doctors combined with the urgent need for emergency surgical care and skills for maternal health necessitated a reorientation of the training of health staff. A comparison of 1,000 consecutive Caesarean sections conducted by medical assistants, with the same number conducted by obstetricians and gynecologists, showed no differences in quality (Pereira and others 1996). In Malawi a 2007 study of more than 2,000 emergency obstetric operations performed by clinical officers found that postoperative outcomes were comparable to those performed by medical officers (Philips, Zachariah, and Venis 2008).

Key success and failure factors
Adequate training, monitoring, and support are key success factors of any alternative skill mix policy. Although concerns have been raised about the safety of services provided by lower and midlevel health workers, most of the evidence shows that, with appropriate training and support, such health workers can respond effectively to most emergency problems in general surgery and obstetrics.

There is little empirical evidence of precisely how much support, monitoring, and supervision are required in alternative skill mix schemes. Some observers argue that the new task distribution must be institutionalized in order for the programs to be sustained or expanded. If, for example, nurses are given the task of managing antiretroviral therapy, as in Botswana, their new position should be clearly defined so that there is no ambiguity, and their performance should be closely monitored (Miles and others 2007).

Some observers argue that an alternative skill mix initiative that permits treatment where people otherwise would get none at all should be viewed positively (Philips, Zachariah, and Venis 2008). The overall, but limited, picture from studies to date indicates that alternative skill mix is a viable option to provide support to the overstretched healthcare systems in many African countries; although, it cannot complete solve the region’s human resources problem.

Another factor in determining the success of alternative skill mix initiatives is the choice of which professionals take on which tasks. Two considerations are crucial: the professional must be able to take on the additional workload, and the professional should be considered appropriate to taking on the task in view of the local community's features and potential clients. The first consideration demands that the current workload and potential for its increase be analyzed before deciding if an individual is able to take on the new task. In Lesotho, a focus group study found that many people with HIV/AIDS had had unsatisfactory experiences with nursing staff, which affected their willingness to receive treatment (Patterson and others 2007). The participants in the study acknowledged that these experiences had occurred largely because the nurses were overworked and underpaid. The participants stated that they would be happy with nurses taking on additional tasks, such as prescribing antiretroviral treatment, as long as they received adequate clinical training and anti-stigma training.
The clients’ perceived view of the nurses’ attitudes underscores the second consideration: the importance of taking account of local social factors when assigning roles to specific workers. In some communities, women may prefer to receive treatment from women. Goodman and others (2006) raise the idea that, for simple public health interventions, tasks may even be shifted to nonmedical professionals. Their study finds that a program that trained shopkeepers in Kenya to treat childhood fevers was both cost-effective and sustainable.

These findings are consistent with those of other studies on the cost-effectiveness of alternative skill mix for the delivery of health services in both high-income and resource-constrained countries. Much of that evidence is from high-income countries; however, more work needs to be done to develop a clearer picture of these experiences in Sub-Saharan Africa. More studies are needed on the performance of lower-level professionals recently trained in higher-level interventions.

**Attracting health workers from abroad (immigration policies)**

Country-level shortages can be eliminated by encouraging the inflow of foreign health workers. Sometimes, this can be a political arrangement or exchange. When giving them a choice, however, workers tend to go where working conditions are better. Although income is an important motivation for migration, it is not the only one (figure 4.2). Other incentives include working conditions, career and training opportunities, and management quality. Political instability, war, and the threat of violence are also strong drivers of migration in many Sub-Saharan African countries. The reasons behind their migration serve as basis for creating contracts and incentive packages aimed at attracting health workers from abroad.

Several countries in SSA are already attracting immigrant health workers, formally and informally. Within Africa, migration is already common in some countries, particularly migration to Southern Africa (i.e., migration of Ethiopian and Cameroonian doctors to South Africa and Botswana). Furthermore, many West African countries have contracts with Cuba

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**Figure 4.2 Reasons for migration in Cameroon, South Africa, Uganda, and Zimbabwe**

![Figure showing reasons for migration](image)

for organizing extended stays of Cuban health workers in rural areas. Figure 4.3 shows that the number of Cuban doctors presently employed in Ghana has grown steadily since 1982, and today hovers around the 200 mark. Very little is known on the impact of these contracts (Dussault and others 2006); however, Ghana emphasizes the commitment and dedication, as well as low cost, of Cuban health workers. Other countries hire immigrant health workers on a case-by-case basis.

An advantage that immigration policies have over education is their time frame. Immigration policies allow a much quicker response to national shortages than education policies, at least for most categories of health workers.

Notes

1 In Mali, more than 100 doctors agreed to start private practices in rural areas (Coulibaly and others 2007). Under the South African Rural Allowance and Scarce Skills Allowance, 28–35 percent of rural health workers who received the 8–22 percent salary bonus believed it affected their career plans for the following year (Vujicic and Lindelow forthcoming). The Zambian Health Workers Retention Scheme attracted and retained more than 50 doctors in rural areas in less than two years (Koot and Martineau 2005).

2 Zambia’s compulsory one-year placement of young doctors in rural areas was not strictly enforced; when it was, many doctors resigned rather than work in rural areas (Koot and Martineau 2005). One exception to enforcement failure can be found outside the African region: Thailand was successful in enforcing a comprehensive package of benefits and incentives for rural health workers as well as a rural pipeline program (Wibulpolprasert and others 2003b).

3 In Nepal, a nationwide health worker surplus was intentionally created to overwhelm health labor markets. The underlying assumption was that such a policy would entail high unemployment in urban areas, which would create a natural incentive for health workers to move in rural areas. Evidence on results is scarce and, in most cases, disappointing.
The effectiveness of a given policy option depends strongly on the country context and the way in which the policy is designed. A roadmap for policymakers can nevertheless be proposed that may help them avoid major and costly blunders (figure 5.1). The first step is to evaluate and address any imbalance caused by insufficient resources (referred to here as a funding shortage). It is useless to try to attract more health workers to rural areas if adequate budgetary allocations and financial and management processes are not already in place with which to remunerate them. This step, which would increase...
rural demand for health workers, must be prioritized. This can be done through increased resources from governments as well as from users. Fiscal decentralization helps increase public resources for peripheral providers whether channeled directly to providers and combined with providers’ autonomy or as subsidies to demand side financing, including health insurance or cash transfers. Private resources can also be used more efficiently, for example, by pooling user payments into rural health insurance mechanisms that can contribute to increased utilization and, thus, resources for rural providers.

The second step is to address health workers’ willingness to work in rural areas. Choosing the right policy mix strongly depends on the labor market situation. Incentive and bonding policies are likely to be more effective if there is a surplus of health workers on the urban market and a pool of unemployed or underemployed health workers to draw from in urban areas. Consequently, an analysis of labor supply, rural and urban, is highly recommended before selecting the mix of policy options. (Appendix D provides a brief presentation of such an analysis.)

If health workers are available and underemployed and incentives or bonding policies emerge as promising options, policymakers must carefully estimate the opportunity costs associated with rural jobs. Many countries carry out feasibility studies in a very traditional way (that is, by administering a simple questionnaire). Stated preferences techniques (especially discrete choice experiment) are not more expensive and provide much more insight than traditional surveys. They should be carried out systematically before designing the package to attract health workers to rural areas.

If there is no health worker surplus on the urban labor market, incentives and bonding is unlikely to work. In this case, education and alternative skill mix policies are probably the best solutions. Rural pipelines are often needed to serve particularly remote and poor areas. Evidence from industrial countries suggests that this set of policies can have a strong impact. However, when alternative skill mix is implemented through in-service training, these policies are longer-term options. Creating midlevel professionals, such as medical or clinical officers, for example, requires waiting three or four years before the first class graduates. As health workers will live in the system for many years, this also has long-term consequences on the type of health system that is developed.

Most policy options can be combined, especially to take into account the fact that some are short-term and others longer-term solutions. Niger started to prepare its policy in 2004–05, when it decided to scale up the production of surgeons. Given that the first class would not graduate until 2008, two additional (short-term) policies were implemented: an incentive scheme for doctors and fast-track (one year) training in district surgery for a group of general practitioners. In Ethiopia, the recent scaling up efforts supports a combination of short-term solutions. The rapid training of 30,000 health extension workers trained in one year is associated with the increase in production of medical officers trained in four years as well as the creation of new medical schools in rural areas.

Policy options can be evaluated on the basis of two criteria: ease of implementation and potential impact (table 5.1).

Because country-specific conditions often dictate how policies work in practice, learning by doing is the best approach. Learning from experience requires the regular evaluation of the impact of implemented policies. Evidence on policy impact remains very limited in Sub-Saharan Africa. Enhancing data collection and analysis is a key priority for improving the geographical distribution of health workers within the region’s countries.
Table 5.1 Policy options for reducing urban-rural gaps in HRH

<table>
<thead>
<tr>
<th>Policy category</th>
<th>Ease of implementation</th>
<th>Potential impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increasing demand for health workers in rural areas</td>
<td>Requires an adequate fiscal space and, possibly, some fiscal decentralization</td>
<td>Strong if rural shortage is caused largely by funding shortage</td>
</tr>
<tr>
<td>Reducing opportunity costs associated with rural jobs (incentive)</td>
<td>May require some changes in civil service system (including delinkage); otherwise quickest policy to implement</td>
<td>Limited evidence; can have significant impact if opportunity costs and preferences associated with rural jobs are correctly measured and there is health worker surplus in urban markets.</td>
</tr>
<tr>
<td>Transferring urban health workers to rural areas through compulsory policies</td>
<td>Stakeholders' resistance is usually weak, because young health workers are targeted</td>
<td>No success story in Africa, probably because of weak capacity for enforcement.</td>
</tr>
<tr>
<td>Increasing the overall supply of health workers by scaling up education</td>
<td>Adequate fiscal space needed, as well as detailed assessment of needs for HRH education capacity</td>
<td>Evidence lacking; impact on rural shortage possible if funding shortage is large and addressed at same time. Because of cohort effects, impact appears slowly.</td>
</tr>
<tr>
<td>Improving the rural orientation of the existing education system (“rural pipeline”)</td>
<td>Stakeholders may view policy as a “two-tier” system (urban health worker professionals versus rural health worker professionals); otherwise easy to implement</td>
<td>Evidence on success limited, but potential impact is probably strong, given experiences in industrial countries.</td>
</tr>
<tr>
<td>Creating alternative skill mixes for rural areas</td>
<td>Stakeholders may view policy as “two-tier” system</td>
<td>Evidence on impact compelling; can emerge quickly if alternative skill mix is created through in-service training.</td>
</tr>
<tr>
<td>Attracting health workers from abroad (immigration policies)</td>
<td>Usually the last-resort policy</td>
<td>No evidence available; impact probably small.</td>
</tr>
</tbody>
</table>

Source: Authors.
Countries Reviewed

Forty-six Sub-Saharan Africa countries were analyzed.

<table>
<thead>
<tr>
<th>Some quantitative data on rural incentives found</th>
<th>Only anecdotal evidence on rural incentives found</th>
<th>No data on rural incentives found</th>
<th>Not reviewed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benin</td>
<td>Angola</td>
<td>Botswana</td>
<td>Burkina Faso</td>
</tr>
<tr>
<td>Ethiopia</td>
<td>Equatorial Guinea</td>
<td>Burundi</td>
<td>Cameroon</td>
</tr>
<tr>
<td>Ghana</td>
<td>Lesotho</td>
<td>Cape Verde</td>
<td>Chad</td>
</tr>
<tr>
<td>Côte d’Ivoire</td>
<td>Namibia</td>
<td>Djibouti</td>
<td>Comoros</td>
</tr>
<tr>
<td>Madagascar</td>
<td>Swaziland</td>
<td>Eritrea</td>
<td>Congo, Rep. of</td>
</tr>
<tr>
<td>Malawi</td>
<td>Zimbabwe</td>
<td>Gambia</td>
<td>Congo, Rep. of</td>
</tr>
<tr>
<td>Mali</td>
<td></td>
<td>Guinea Bissau</td>
<td>Gabon</td>
</tr>
<tr>
<td>Mauritania</td>
<td></td>
<td>São Tome and Principe</td>
<td>Guinea</td>
</tr>
<tr>
<td>Mozambique</td>
<td></td>
<td>Somalia</td>
<td>Kenya</td>
</tr>
<tr>
<td>Niger</td>
<td></td>
<td>Uganda</td>
<td>Liberia</td>
</tr>
<tr>
<td>Rwanda</td>
<td></td>
<td></td>
<td>Mauritius</td>
</tr>
<tr>
<td>Senegal</td>
<td></td>
<td></td>
<td>Nigeria</td>
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<tr>
<td>South Africa</td>
<td></td>
<td></td>
<td>Seychelles</td>
</tr>
<tr>
<td>Tanzania</td>
<td></td>
<td></td>
<td>Sierra Leone</td>
</tr>
<tr>
<td>Zambia</td>
<td></td>
<td></td>
<td>Sudan</td>
</tr>
</tbody>
</table>

Source: Authors.
Economists use a variety of indicators to measure the concentration or equitable distribution of resources, including the Gini coefficient, the concentration index, and the Lorenz curve. All three measures are used to measure equity, concentration, and the adequacy of targeted policy interventions.

The Lorenz curve

The Lorenz curve, generally used by economists to assess the equity of income distribution, is a cumulative frequency curve associated with the distribution of a specific variable (for

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**Figure B.1 Sample Lorenz curve**

Source: Authors
example, income). It shows the proportion of the distribution of a variable associated with the bottom X percent of values over which it is distributed (for example, population) (figure B.1).

The equal distribution is represented by a diagonal line. On this line, 20 percent of the population receives 20 percent of income, 40 percent of the population receives 40 percent of the income, and so forth. This line represents the most equitable distribution of income across population. The more the Lorenz curve deviates from this line, the greater the inequity.

The Lorenz curve can be below or above the diagonal, depending on the variable. When the variable is valuable to the population—as, for example, in the case of income, expenditure on health or education, access to health services or to water—the curve is below the diagonal line. When the variable is detrimental to the population, as in the case of accidents, injuries, or deaths, the curve falls above the diagonal line.

**The Concentration index**

The concentration index summarizes the information presented by the Lorenz curve. The distance between the Lorenz curve (the observed distribution of the indicator) and the “ideal distribution line” represents the degree of inequality. The number measuring the area between the two lines thus summarizes the degree to which the distribution is equitable.

The concentration index formula calculates twice the area between the Lorenz curve and the line of inequality. It ranges in value from –1 to 1. By convention, the concentration index is negative when the Lorenz curve is above the ideal distribution line (representing an undesirable indicator variable) and positive when the Lorenz curve is below the ideal distribution line (representing a desirable indicator).

**The Gini coefficient**

The Gini coefficient is an index that ranges from 0 to 1. It can be calculated in various ways. A simple formula was elaborated by Brown (1994):

\[ G = 1 - \sum_{k=1}^{n} (X_k - X_{k-1})(Y_k - Y_{k-1}) \]

The first step in calculating the Gini coefficient for HRH is to sort the geographic units by the health variable (for example, infant mortality rate) from the worst to the best situation (highest to lowest rate). The rates are then transformed into continuous variables and the cumulative proportion calculated for both variables. A figure showing the cumulative proportion for the health variable (Y-axis) and the cumulative proportion of the population (X-axis) is then prepared.

The Gini coefficient reflects the level of equity of the distribution of a variable. Comparing Gini coefficients of different distributions (say, over time) often provides useful interpretation.

To estimate the Gini coefficient and graph the Lorenz curve, it is first necessary to sort the health variable (infant mortality rate in India and Mali in figure B.2) from the worst situation (highest rate) to the best situation (lowest rate). The following steps are then taken for each country (or region within a country):

- Estimate the under-five mortality and live birth rates
- Calculate the percentage of the under-five mortality rate and the percentage of total live births observed in each population group ranked by wealth
- Calculate the cumulative percentage of each of the two variables for each group
- Calculate the Gini coefficient using the formula
- Graph the curve, using the X-axis for cumulative shares of live births by population groups and the Y-axis for the cumulative shares of under-five mortality rate
If the under-five mortality rate were completely independent of wealth, the lowest-earning 20 percent of the population of India would account for 20 percent of India’s under-five mortality rate. In this case, the Lorenz curve for India would fall along the equal distribution line.

The concentration index approach can be used to measure the unequal distribution of health workers in urban versus rural areas. As the variable of interest is the distribution of healthcare workers, the number of healthcare workers is the indicator variable. Because of data availability, and because doctors and nurses are usually the most educated and skilled health professionals, the analysis was limited to doctors and nurses (analyzed separately). The regions of the country are ranked on a rural-urban scale, as approximated by the population density (population divided by area of the region); the lower the population density, the less urban the region.

The steps for estimating a Gini-like coefficient for the distribution of doctors across regions are as follows. First, the regions of the country are sorted on a rural-urban scale, as approximated by the population density (population divided by area of the region). Second, the following steps are taken for each region of the country:

- Estimate the population
- Estimate the percentage of all doctors and the percentage of the population observed in each region (ranked by population density)
- Estimate the cumulative percentage of each of the two variables for each region
- Use the Brown formula to estimate the Gini coefficient
- Graph the Lorenz curve, using the X-axis for cumulative population and the Y-axis for the cumulative number of doctors

Figure B.2 Lorenz curve for under-five mortality rate in India and Mali

Source: Wagstaff 2008
APPENDIX C

Applying Labor Economics to Health Care

This appendix elaborates on the underlying analytical framework and the formalization of the dynamics behind labor market outcomes in three labor market situations. It then focuses on urban versus rural labor market forces and dynamics.

What is presented here is a generic and basic model built on a set of simplifying assumptions. In practice, country- and case-specific labor market characteristics need to be taken into account in determining the menu of policy options. For example, if, for certain categories of health workers, the public sector is the sole employer, this should be taken into account, especially in any reservation wage analysis (that is, analysis of workers’ next best alternatives). In practice, there are cases in which it is difficult to get simple general results from purely theoretical models. In such cases, conclusions regarding the menu of policy options must rely on empirical analysis. The main objective here is not to provide policy recipes but to illustrate the interconnectedness between government measures and labor market outcomes (that is, who works where and under what conditions).

Economists view the functioning of labor markets as similar to any other market, in that the dynamics of supply and demand determine price (the wage, remuneration, or compensation rate) and quantity (the number of people employed or the number of hours worked). The framework used in this appendix is a basic classical labor market model suitable for policy design and analysis. In these models, labor markets are assumed to clear, either through a simplifying assumption that markets always converge to a situation in which the quantity of labor supplied equals the quantity of labor demanded, or, given enough time, through a phased process of adjustments in remuneration, which presumes that wages are free to change. In simple terms, this means that markets tend to move toward wages or compensation levels that balance the quantities of labor supplied and the quantities demanded, such that the market will eventually be cleared of all labor surpluses (excess supply) and shortages (excess demand).

In principle, when there is excess demand for doctors in rural areas (which creates a shortage), doctors’ wages or remuneration packages in rural areas should increase. This increase results in doctors already practicing in rural areas working more in the short run and new doctors entering the rural labor market in the longer run. In the short run, the adjustment mechanism clears the shortage, establishing a new equilibrium in the rural labor market. A similar mechanism operates when there is a labor market surplus. In this case, the wage (or the value of the remuneration package) declines to end the excess supply. As a result of the decline, doctors in rural areas work fewer hours or days of work in the short run and some of them exit the rural labor market in the longer run.

This model assumes freely operating labor markets without imperfections or rigidities. Without these assumptions, “sticky” wages might be observed and markets will not necessarily clear. Some economists attribute what appear to be labor market imbalances to factors such as government policy, labor unions, and the like. Although not all economists adhere to the classical labor market model, many economists consider wage flexibility as
a plausible assumption for policy design and analysis, arguing that wages are not sticky forever.

In the health sector, the labor market is the economic space in which health workers sell their skilled labor and employers buy skilled labor. This market is made up of the supply of health workers (the number of health workers willing to work at various compensation levels) and the demand for health workers (the number of workers employers are willing and able to hire at various compensation levels). The interplay between supply and demand should determine the compensation level within a labor market.

Compensation is a multidimensional concept that takes into account many monetary and nonmonetary factors. Monetary compensation may be direct or indirect. Direct financial or monetary compensation is paid as a wage or salary, a financial bonus (for good performance or as an incentive to serve in a rural area), or as part of a supplementary income scheme. Indirect financial compensation offers goods and services that would otherwise have to be paid for. Examples include scholarships and loan repayments, childcare, housing, cars and motorcycles, health insurance, and education. Nonfinancial compensation refers to benefits that could not be paid for but are nonetheless considered valuable. Such compensation can be related to career (on-the-job training, experience, professional development opportunities, job security, career advising, networking); the working environment (availability of supplies, equipment, technology, better infrastructure, reduced workload, a flexible schedule); or lifestyle and family life (vacation time, opportunities for spousal employment). Keeping in mind these many forms of compensation is vital when reviewing policy options.

Compensation refers to net compensation—the difference between the gross (monetary plus nonmonetary) compensation and the costs associated with a particular job that are borne by the employed individual. For example, doctors in rural areas may bear additional monetary and nonmonetary costs—such as having to pay for children’s private schooling (because rural public schools are of a lower quality than urban schools) or having to pay both their own rural housing and urban housing for children who remain in the city to study; forgone opportunities for professional development; and forgone amenities available only in urban areas and proximity to family in the city. Net compensation compares costs and benefits, creating a more accurate picture of the choices facing health workers.

Economists argue that the supply side of the health labor market is determined by the number of health workers available (the health labor force) and their willingness to work at various compensation levels. Because many workers are willing to work at a high compensation levels and few are willing to work at low compensation levels, the market supply curve is always upward sloping.

The demand for health labor is determined by the number and the size of employers and their willingness to hire health workers at various compensation levels. Because employers hire only a few workers at a high compensation level but many workers at a low compensation level, the demand curve is always downward sloping (demand in the economic sense is distinct from demand in the social welfare sense, where it refers to the number or healthcare workers needed to address all health care concerns). Demand is determined by the desire, ability, and willingness of employers to pay for providers of health-related services. Healthcare that is desired but cannot be paid for is not considered part of demand and does not affect the health labor market.

**Market-clearing equilibrium, unemployment, and labor shortages**

The classical labor market model assumes that all markets ultimately clear. Key assumptions underlying this model are that compensation levels are allowed to fluctuate (for example, they are not fixed by the government or trade unions); that people are free to work or not; and that accurate information is available to both employers and workers about labor market conditions. Failure to meet these conditions must be taken into account in crafting policy.
At the market-clearing equilibrium, the quantity of labor supplied equals the quantity of labor demanded. In other words, employers are willing to employ \( \text{Labor}^{MC} \) units of labor, and employees are willing to offer \( \text{Labor}^{MC} \) units of labor at \( \text{Comp}^{MC} \) level of compensation (figure C.1).

The situation in which the quantity of labor supplied exceeds the quantity of labor demanded is referred to as unemployment. If the compensation level were higher, the quantity of labor supplied would exceed the quantity of labor demanded, as more people would be willing to work for a high compensation level but employers would be willing to hire fewer employers.

A situation in which more labor is demanded than is supplied is called a labor shortage. When the compensation level is set below the market-clearing level—say, at, \( \text{Comp}^{LS} \)—employers will want to hire workers, but only be willing to work for such a low compensation (figure C.3).

When the assumptions of the classical labor market model are met, the unemployment and labor shortage situations will move to the market-clearing situation over the long run. When compensation is higher than the market-clearing compensation level, some unemployed workers in the labor market will begin to offer their labor for a lower compensation level, which is beneficial to employers; in this way, the compensation level will be driven downwards toward \( \text{Comp}^{MC} \). When the compensation level is lower than the market-clearing compensation level, employers will offer a higher compensation in order to attract workers unwilling to work for \( \text{Comp}^{LS} \). People previously unwilling to work at \( \text{Comp}^{LS} \) or people entering the labor market will increase the supply of labor until the market-clearing situation is reached.

The economics of urban versus rural labor markets

Non-market-clearing labor markets can persist in the long run when the classical labor market model assumptions are not met. Market distortions take different shapes. Trade unions, minimum wage regulation, government pay policies, multinational corporations’
Figure C.2 Unemployment

Source: Authors

Figure C.3 Labor shortage

Source: Authors
pay policies, and labor codes may keep compensation levels higher than $\text{Comp}_{MC}$. Both unemployment and labor shortages are undesirable. Unemployed workers represent a major inefficiency in a country’s labor market. Shortages in rural areas mean that clients do not receive the health services they are willing to pay for.

In most instances in Sub-Saharan Africa, the urban market is in unemployment or at best at a market-clearing equilibrium (although, occasionally, in a shortage situation); rural areas are often in shortage situations. As a result, the urban and rural markets together are

**Figure C.4 Urban employment and rural shortage situation**

![Diagram showing urban and rural HRH markets](source: Authors)

**Figure C.5 Urban and rural HRH markets with improved information**

![Diagram showing urban and rural HRH markets with improved information](source: Authors)
usually in one of three different situations: urban unemployment equals rural shortage (figure C.4), urban unemployment is greater than rural shortage, or urban unemployment is less than rural shortage.

Market distortions of all kinds can cause markets to fail to clear. An urban surplus of health workers may not equilibrate in the long run with a rural deficit of health workers because of market imperfections, such as lack of information. In practice, most urban workers remain uninformed about compensation and vacancies in rural areas, making them less likely to move there. A more effective system to communicate information regarding vacancies would increase the rural supply of labor. Increased information translates into an outward shift in the rural supply curve, along with an inward shift in the urban supply curve, which would increase the rural labor force and employment while decreasing urban unemployment (figure C.5).
Vujicic and Zurn (2006) provide a useful framework for analyzing the supply of labor. The main idea is that HRH density can be seen as the outcome of a complex process that begins with the education of high school students and ends in the employment of health workers (figure D.1). Many possible leakages prevent a country with an adequate education system from obtaining the needed density of health workers.

Until recently, most HRH country analyses focused on only two boxes in figure D.1: HRH education capacity and the number of health workers employed in the public sector. For better understanding of the HRH situation of a given country, leakage sources—particularly migration trends, underemployed workers, and private sector workers—have to be measured and, if possible, addressed. Exploring these categories of health workers is especially difficult, but some rigorous analyses have been conducted (see Côte d’Ivoire for underemployment and private sector; see Ghana for migration trends).

**Figure D.1 Health labor market analysis: a country example (for doctors)**

Source: Vujicic and Zurn 2006
References


Furth, R. 2006. “Zambia Performance-Based Incentives Pilot Study.” Initiatives Inc. and USAID.


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Pounds

Gallons

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Reducing Geographical Imbalances of Health Workers in Sub-Saharan Africa is part of the World Bank Working Paper series. These papers are published to communicate the results of the Bank’s ongoing research and to stimulate public discussion.

This paper discusses and analyzes labor market dynamics in Sub-Saharan Africa and outcomes (including unemployment, worker shortages, and urban-rural imbalances of categories of health workers) from a labor economics perspective. This analysis reviews the experience of many Sub-Saharan African countries and is the basis for elaborating policy options that incorporate the underlying labor market forces to address undesirable outcomes such as the urban-rural imbalance more effectively. The conclusions are relevant to researchers, policy analysts, and policy makers with an interest in understanding and improving the allocation of human resources for health in the developing world.

This working paper was produced as part of the World Bank’s Africa Region Health Systems for Outcomes (HSO) Program. The Program, funded by the World Bank, the Government of Norway, the Government of the United Kingdom and the Global Alliance for Vaccines and Immunization (GAVI), focuses on strengthening health systems in Africa to reach the poor and achieve tangible results related to Health, Nutrition and Population. The main pillars and focus of the program center on knowledge and capacity building related to Human Resources for Health, Health Financing, Pharmaceuticals, Governance and Service Delivery, and Infrastructure and ICT. More information as well as all the products produced under the HSO program can be found online at www.worldbank.org/hso.

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