Applying a Next-Generation Approach to Comprehensive Planning for Human Resources for Health in Ghana

As individual country governments plan their health workforce of the future, the importance of making accurate projections cannot be understated. If national policymakers overestimate or underestimate the future demand for or supply of healthcare workers, they may end up misspending or wasting scarce funds, as well as damaging the health of their citizens. While models for estimating human resources for health (HRH) have become increasingly sophisticated over the past two decades, they have often relied on limited data sets and unrealistic assumptions. Clearly, if national governments and health ministries are to successfully manage their own health systems, improved projection tools are needed.

Recently, the USAID-funded HRH2030 Program has produced a comprehensive new analysis and planning tool that takes into account three types of economic, epidemiologic, and demographic (EED) transitions that societies often experience. The Comprehensive HRH Assessment, Modeling, and Planning Solution (CHAMPS), which is based on accepted labor market principles, uses EED data to predict the demand for HRH in the near and medium term—for example, from 2020 to 2030. Selecting 2030 as a reference year aligns with many international initiatives, first and foremost the Sustainable Development Goals, the World Health Organization's (WHO) HRH strategy, and the 95-95-95 targets for controlling the HIV epidemic. The CHAMPS methodology is based on the analysis of HRH and EED data from 84 LMICs as described in the technical report *Improving Human Resource Forecasting for Healthcare Services: Global Implications of a Next-Generation Planning Solution*.

CHAMPS can be used to project HRH demand while recognizing and accounting for likely future shifts in the labor market and dynamic changes in HRH supply over time. It offers HRH decision makers and policymakers in low- and middle-income countries (LMICs) a methodology that provides more robust country-specific estimates of healthcare worker demand and supply. Moreover, the unprecedented capacity of CHAMPS to project the demand for and supply of community health workers (CHWs)—a cadre that is key to universal health coverage, providing primary health care to a large number of underserved and hard-to-reach populations—makes it a vital tool for formalizing and strengthening CHWs' role within countries' health systems.

Transitions Defined

Economic transitions are changes in the wealth and resources of a country, especially in terms of the production and consumption of goods and services. As people become wealthier and their needs grow, so will the demand for healthcare workers.

Epidemiologic transitions are the shifts in health and disease patterns in a population. As income increases in a country, noncommunicable diseases gain in relative importance over infectious diseases. Changes in population health impact the demand for healthcare workers in numbers and by type.

Demographic transitions are the decline from high to low birthrates and death rates and population growth. They also relate to an increasing aging population and urbanization. As demographics change, so do populations' healthcare needs and the demand for healthcare workers with specific skills.

While the CHAMPS methodology is grounded in an analysis of data from 84 LMICs, this brief presents the results from applying this methodology to a single country, Ghana. Unlike earlier HRH projections, CHAMPS produces estimates of HRH supply and demand at the country level by including several country specific EED factors in the analysis. (Table 1 presents an overview of which of these factors are included in CHAMPS.) This gives policymakers specific information about the most influential EED factors that will drive HRH demand over the coming decade in Ghana. With additional data, CHAMPS can address issues such as increased productivity through technological advances and shifts in healthcare delivery models. The Ghana example is meant to illustrate how CHAMPS can be applied at a country level, which can be replicated for any number of countries with similar data availability. Data for these countries are readily available from the dataset of 84 LMICs that was used to develop the CHAMPS methodology; and more data are added by international organizations regularly to allow this analysis for ever more countries.

Background

In Ghana, early HRH planning interventions stemmed from the 1995 "Ghana: Vision 2020"[1] report, which included health sector measures to increase the number of health facilities and supply of healthcare workers. This led to interventions like the highly effective strategy to produce new midwives in the early 2000s, which more than tripled the number of midwives from 2003-2009.[2]

However, success thus far has been measured against international benchmarks or increases in the ratio of healthcare workers to population, rather than assessing a balance of supply, need, and demand of healthcare workers. For example, though the increased supply of midwives has contributed to reducing maternal mortality rates, the public sector has struggled to absorb the current supply of qualified but unemployed nurses and midwives.[3]

Table 1. Economic, Epidemiologic, and Demographic (EED) Transitions Included in CHAMPS

Economic	Epidemiologic	Demographic
Goss Domestic Product (GDP) per capita	Disability Adjusted Life Years (DALYs)	Life Expectancy at birth
Out of pocket expenditure for healthcare (OOP) per capita	Cardiovascular disease (CVD) Incidence	Death rate per 1000 people*
Access to Electricity (%)	Malaria Incidence*	Fraction of Urban Population (%)*
National Health Insurance Scheme	Human Immunodeficiency Virus (HIV) Incidence*	Fraction of Population aged 65+ (%)
		Fraction of Population aged 15-64 (%)
		Modern Contraceptive Prevalence Rate (mCPR)
HRH Demand and Supply Measures		
Physicians, Nurse-midwives, CHWs (each per 1000 population)		

** These factors were not significantly related to HRH demand and not retained in the final analysis for Ghana*

In Ghana, the production of labor supply relies on the capacity and appetite of health education institutions (many of them public) to produce certain types of health workers. For example, while

[1] Government of Ghana, 1995. Ghana – Vision 2020; The First Step: 1996-2000.
[2] The World Bank, 2012. Toward Interventions in Human Resources for Health in Ghana: Evidence for Health Workforce Planning and Results.
[3] World Health Organization, 2015. Joining Hands for Health Workforce Improvements.

lower-level cadres may be required in the health system, cheaper to train, and more likely to stay in Ghana and practice in rural areas, urban health education institutions mostly focus on training high-level cadres like physicians.[4] Recent attempts to predict health workforce needs as an extension of models to predict the need for additional health facilities have anticipated a shortage of general health workers as well as a more serious shortage of specialized professionals and para-clinical staff.[5] As a result, the imbalance of supply and demand is coupled with an imbalance of cadres in the health system. This type of sector disconnect is mirrored in other countries across other sectors as well: finance ministries, civil service commissions, education ministries, global funding mechanisms, labor unions, and other entities work separately to advance their aims, and efforts may not always be aligned with health workforce needs.

CHAMPS Application in Ghana

In Ghana, one of USAID's priority countries, health systems strengthening efforts are focused on ending preventable child and maternal deaths, controlling the HIV/AIDS epidemic, and enabling participation in the Global Health Security Agenda. The HRH2030 program conducted a country-level analysis for Ghana to provide an example of the predictive and planning power CHAMPS could deliver to country HRH stakeholders. We explored how CHAMPS can be used to estimate the supply and demand for healthcare workers (physicians, nurse-midwives, and CHWs) as a function of EED transitions.

Some factors specific to Ghana may have affected (or are likely to affect) the supply of and demand for healthcare workers over time:

- The National Health Insurance Scheme (NHIS) is an authority that was established in 2003 to implement a national health insurance policy that ensures access to basic healthcare services to all Ghana residents. The NHIS was implemented nationwide in 2005. It improved access to healthcare services by effectively ending the cash-and-carry system, and potentially increased demand for healthcare workers over time.
- The incidence of "brain drain" has been documented as a common phenomenon in Ghana's healthcare sector. Many well-trained health professionals have emigrated to other countries in search of better employment opportunities. This practice may influence the supply of healthcare workers. Unfortunately, this factor could not be included in the CHAMPS analysis because of a lack of data.

The Impact of EED Factors on HRH Demand in Ghana

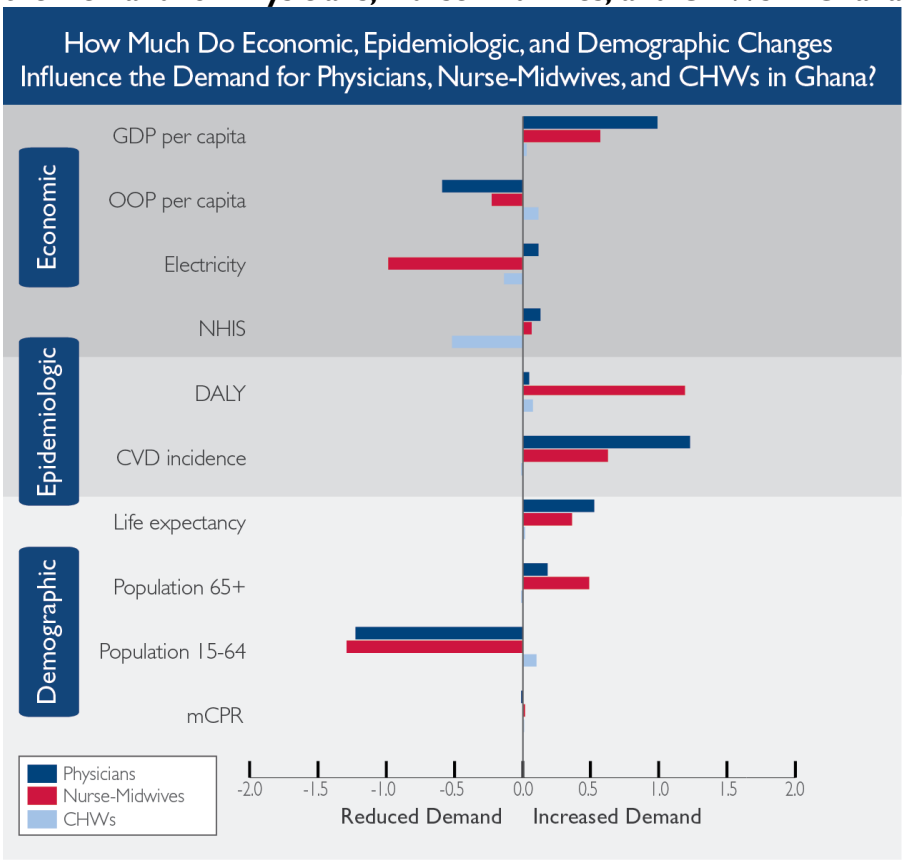
EED Factors that Drive the Demand for Healthcare Workers

Figure 1 shows the extent to which various EED factors drive the demand for physicians, nurse-midwives, and CHWs, based on healthcare worker density or the number of healthcare workers per 1,000 population. The numbers in Figure 1 are standardized and show the relative power of each EED factor on demand for healthcare workers; the numbers do not indicate *actual* healthcare worker density.

[4] World Bank, ibid.

[5] Asamani, Chebere, Barton, et al., 2018. Forecast of Healthcare Facilities and Health Workforce Requirements for the Public Sector in Ghana, 2016-2026. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6326637/

Figure 1: How Much Do Economic, Epidemiologic, and Demographic Changes Influence the Demand for Physicians, Nurse-Midwives, and CHWs in Ghana?



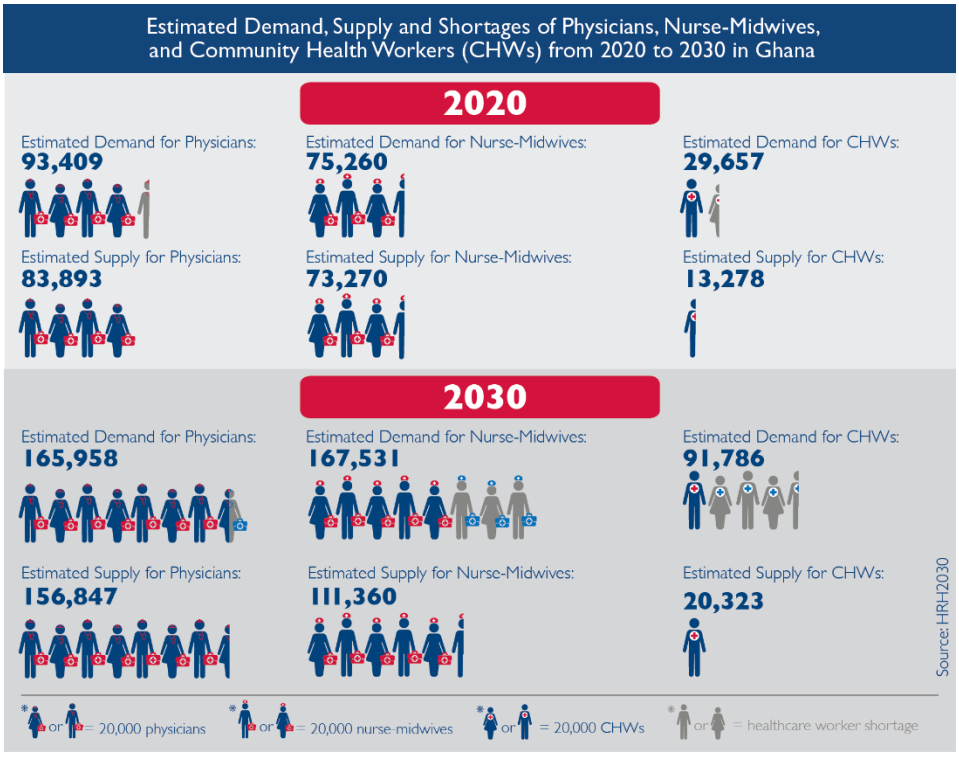
- *Economic transitions* increase the demand for all three types of healthcare workers, but the effect on CHWs is relatively small compared to the effect on physicians and nurse-midwives. This suggests that as people become wealthier, they seek and can afford increasingly expensive healthcare. This is consistent with the finding that as people pay more for healthcare in out-of-pocket expenditures, demand for the more expensive care provided by physicians and nurse-midwives decreases but demand for CHWs increases. This observation contrasts perfectly with the opposite influence of national health insurance and its ability to reduce out-of-pocket expenditures, which results in an increase in the demand for physicians and nurse-midwives and a decrease in demand for CHWs. As access to electricity—which approximates advances in medical technology, but also is a reflection of wealth—increases, so does the demand for the higher-level care provided by physicians, while the demand for nurse-midwives and CHWs decreases.
- *Epidemiologic transitions* show that overall poor population health, as reflected in higher Disability Adjusted Life Years (DALYs), increases demand for all three cadres, but especially for nurse-midwives. However, Ghanaians are expected to become healthier over the coming decade, which will reduce demand for these cadres. Such gains will be offset by a rise in cardiovascular diseases (CVDs), which will increase the demand for the sort of care provided by physicians and especially by nurse-midwives but will very slightly decrease the demand for CHWs.[6]

[6] The seemingly lower demand for CHWs indicated by CHAMPS cannot be interpreted at face value, however: This finding may reflect the fact that CHWs are found mostly in rural areas and are trained to take care of infectious diseases but not emerging chronic illnesses. CHWs will likely continue to play an important role as frontline healthcare workers in both rural and urban areas.

- *Demographic transitions* show that as Ghanaian populations get healthier and live longer—as indicated by greater life expectancy—the demand for all three cadres increases substantially. As people live longer, the presence of aging populations in need of more health care than younger people elevates the demand for physicians and nurse-midwives, though not for CHWs. While general population growth also leads to an increased number of people under the age of 65, they have a much lower demand for health services than the elderly, except for those provided by CHWs.

In Ghana, unlike what is seen in the global model, epidemiologic factors such as malaria, HIV, and the death rate do not appear to be as relevant as DALYs, CVD, life expectancy, and population age-groups.

Figure 2. Estimated Demand, Supply, and Shortages of Physicians, Nurse-Midwives and CHWs from 2020 to 20130 in 84 LMICs



CHAMPS Projections of HRH Demand and Supply in Ghana

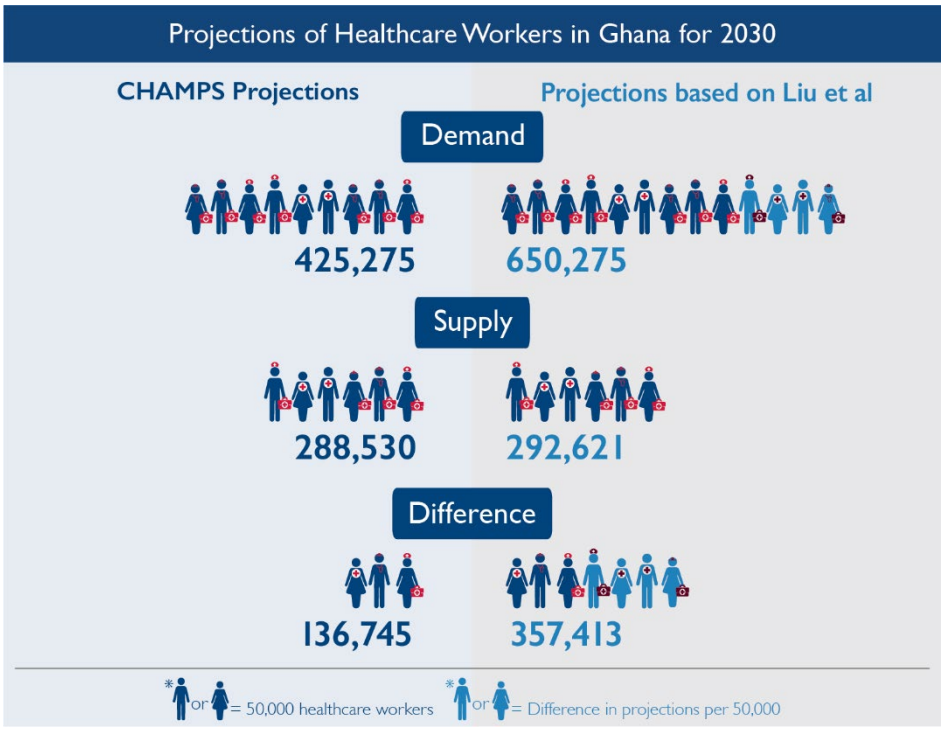
Based on the impact of EED transitions presented above, estimates of the demand for and supply of healthcare workers can be estimated for 2020 and 2030. The CHAMPS model predicts a combined shortfall in Ghana of about 137,000 physicians, nurse-midwives and CHWs by 2030, with predictions varying between a shortage of 107,000 and 256,000, based on country-specific HRH and EED data. Figure 2 shows that by 2030, Ghana will be approximately 60,000 nurse-midwives short of the projected need (estimates varying between 54,000 and 148,000) and about 70,000 CHWs short (estimates varying between 30,000 and 113,000). Based on Ghana's HRH data, the country is likely to have a sufficient supply of physicians by 2030, possibly experiencing a slight shortfall of 9,000, though this could be anywhere between a surplus of 13,000 and a shortage of 31,000. It is likely that the NHIS plays a role in stimulating the demand for healthcare workers, as it effectively ended the cash-and-carry system and increased accessibility to health services.

The finding that Ghana will experience a significant shortfall of nurse-midwives and CHWs but not of physicians is consistent with the country's health labor market development and a production favoring higher level cadres such as physicians as mentioned earlier.

Comparison of HRH Projections in Ghana by CHAMPS and Earlier Models

In 2017, the Human Resources for Health journal published the *Global Health Workforce Labor Market Projections for 2030* (Liu et al, 2017). Liu et al. used an economic model based on projected economic growth, demographics, and health coverage, and used health workforce data from 1990-2013 for 165 countries from the WHO Global Health Observatory. The HRH2030 team studied these methods carefully and formulated CHAMPS as a way to further improve the predictive reliability of HRH shortage estimates. (Differences between the approach by Liu et al. and CHAMPS are described in more detail in the full global report.)

Figure 3. Projections of Healthcare Workers in Ghana for 2030



We applied the Liu et al. methodology to Ghana HRH and EED data to develop estimates that could be compared with the CHAMPS projections. (Note that CHWs were included in both the CHAMPS and Liu et al. estimates.) Overall, the shortage in healthcare workers projected by the HRH2030 methodology was significantly lower than that shown in the projections using the Liu et al. methodology (Figure 3). Interestingly, the projected demand and shortage for Ghana using the Liu et al. methodology differed significantly from the estimates derived from the HRH2030 methodology; on the supply side, however, the estimates were almost identical.

Implications for HRH Policymakers and Planners

The shortage of physicians in Ghana by 2030 predicted by CHAMPS is much lower in relative terms than the comparable predicted global shortage (5% vs 43%). The relatively smaller shortage for Ghana may be explained by a number of factors, such as a population that is healthier and associated with fewer DALYs. Based on past trends, out-of-pocket expenses are expected to increase in Ghana, which impacts demand for physicians negatively. This negative effect should be counteracted by Ghana's NHIS.

Policymakers may need to investigate the actual effects of the NHIS compared with its intended effects, as well as whether it is reaching its intended beneficiaries (the lower socioeconomic strata) and what policy changes may need to be made if it is not. On the other hand, if out-of-pocket payments are rising because more well-off people are willing to pay for services not included in the basic NHIS coverage, then more attention may have to be given to needs-based targeting, the basic benefits package, and the role of private healthcare providers.

Examining the data for a related factor, we see that GDP per capita is expected to rise in Ghana over the coming decade. This will increase the demand for physicians more than for nurses or CHWs. With higher income, we would expect people to be able to afford higher out-of-pocket payments for services, much of which should benefit the private sector. While not without controversy, policies about allowable dual practice may have the advantage of meeting an anticipated increased demand for physicians, but they could also help reduce physician turnover in the public sector, as Ministry of Health doctors may seek relatively greater financial incentives from working in the private sector.

Data for Ghana also show that increasing incidence of CVD will be a key driver of demand for physicians, but less so for nurse-midwives and/or CHWs. This change will need policy attention, not only in terms of cadre mix, but also in terms of medical school curricula. Training for all cadres will need to include techniques for diagnosing and treating CVDs, with perhaps a reduced emphasis on communicable diseases. In addition, a well-functioning system for drug and medical supplies is needed to treat CVDs and other noncommunicable diseases.

Conclusions

The analysis of data from Ghana presents good news for HRH stakeholders in the country. For physicians, supply should mostly keep up with demand. While shortages are predicted for nurse-midwives and CHWs, these are not impossible to overcome for a country with Ghana's resources to fund health services and HRH. Additionally, it is important to note that these estimates have a substantial margin of error because of data limitations, so while the actual gap could be even smaller, it might also prove to be larger. Based on the important part that CHWs play in rural areas, their potential roles in addressing noncommunicable diseases and in providing care in urban settings may need reevaluation. HRH planners and policymakers committed to closing this gap need to act now to meet the challenges that will be brought about by the economic, epidemiological, and demographic transitions that the country will go through over the coming decade. Doing so will require changes to the allocation of the national budget to health, which will drive the demand for health care workers, and will necessitate changes in the educational sector to ensure a greater supply of qualified nurse-midwives and CHWs. All these measures take time, require political will, and should rely on the best available evidence. CHAMPS can provide the evidence that HRH plans and policies must be based on.

For the first time, CHAMPS offers HRH decision-makers and policymakers in LMICs a methodology that provides more robust, country-specific estimates of healthcare worker demand and supply. These estimates are based on a more comprehensive data set and a more inclusive analysis than was feasible in the past, taking into account many different economic, epidemiological, and demographic changes. It also suggests which factors may be most important for HRH planners and policymakers. Such estimates allow governments to make more targeted policy decisions in response to predicted changes in a country, such as accelerating economic growth, a population that becomes more prone to chronic diseases and aging, or progress toward universal health coverage and national health insurance. As HRH data become more available and reliable, through National Health Workforce Accounts and other efforts, these predictive scenarios will become even more dependable.

With more pinpoint accuracy about what types of healthcare workers will be needed and when, wasteful programming and human resources spending can be reduced or eliminated. In addition, this predictive model indicates potential opportunities to engage with nongovernmental players in HRH policy and planning—the private sector, for example.

ABOUT CHAMPS

CHAMPS is a rigorous methodology that is designed to be applied in a country setting with a relatively small level of effort because much of the data is already included in the global database developed for this study. It is estimated that the data review and analysis could be completed in approximately 5 -10 days, depending how much additional data needs to be gathered. The report writing would take an additional 3 -5 days. Ideal team composition would consist of a researcher with a health economics background, a research assistant, and a report writer. Applying CHAMPS on a country level would involve the following six broad steps:

1) Review the data for your country in the database for 84 LMICs
2) Identify additional data needs and sources
3) Prepare data for analysis
4) Conduct the statistical analysis
5) Facilitate a stakeholder workshop
6) Implement policy and practice changes

Each step is described in detail in the policy brief for Ghana. For a copy of the full report about the creation and application of the CHAMPS model click here; for the condensed brief on global implications, click here. For more on HRH2030, visit the HRH2030 web site. To get more information or assistance in applying CHAMPS in your country, contact info@hrh2030program.org

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