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REVIEW

Realizing universal health coverage for maternal health services in the Republic of Guinea: the use of workforce projections to design health labor market interventions

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Video abstract

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Background: Universal health coverage requires a health workforce that is available, accessible, and well-performing. This article presents a critical analysis of the health workforce needs for the delivery of maternal and neonatal health services in Guinea, and of feasible and relevant interventions to improve the availability, accessibility, and performance of the health workforce in the country.

Methods: A needs-based approach was used to project human resources for health (HRH) requirements. This was combined with modeling of future health sector demand and supply. A baseline scenario with disaggregated need and supply data for the targeted health professionals per region and setting (urban or rural) informed the identification of challenges related to the availability and distribution of the workforce between 2014 and 2024. Subsequently, the health labor market framework was used to identify interventions to improve the availability and distribution of the health workforce. These interventions were included in the supply side modeling, in order to create a "policy rich" scenario B which allowed for analysis of their potential impact.

Results: In the Republic of Guinea, only 44% of the nurses and 18% of the midwives required for maternal and neonatal health services are currently available. If Guinea continues on its current path without scaling up recruitment efforts, the total stock of HRH employed by the public sector will decline by 15% between 2014 and 2024, while HRH needs will grow by 22% due to demographic trends. The high density of HRH in urban areas and the high number of auxiliary nurses who are currently employed pose an opportunity for improving the availability, accessibility, and performance of the health workforce for maternal and neonatal health in Guinea, especially in rural areas.

Conclusion: Guinea will need to scale up its recruitment efforts in order to improve health workforce availability. Targeted labor market interventions need to be planned and executed over several decades to correct entrenched distortions and mismatches between workforce need, supply, and demand. The case of Guinea illustrates how to design and operationalize HRH interventions based on workforce projections to accompany and facilitate universal health coverage reforms.

Keywords: human resources for health, workforce projections

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Introduction

Human resources for maternal and neonatal health in Guinea

The maternal mortality ratio and the neonatal mortality rate in the Republic of Guinea are estimated at, respectively, 724 per 100,000 live births and 33 per 1,000 live births.[1]

Reducing maternal and neonatal mortality is therefore a priority in the National Health Development Plan of the Republic of Guinea. One of the strategies to do so is to improve the availability, quality, and performance of human resources for health (HRH).[2]

In Guinea, 44% of all births are attended by a physician (Médecin-Généraliste [MG]); a nurse (Infirmier Diplômé d'Etat [IDE]); a midwife (Sage-Femme [SF]); or an auxiliary nurse (Agent Technique en Santé [ATS]). These cadre are called "trained providers." However, auxiliary nurses (who provide 4.2% of the assistance during birth) have received 3 years of training after their Brevet d'Etudes du Premier Cycle (BEPC, first secondary education cycle, or junior high school), and this training includes limited attention to MNH.[3] As opposed to the MG, IDE, and SF, ATSs are therefore not considered qualified to be the primary responsible person for the provision of maternal and neonatal health (MNH) services in Guinea, although no formal document exists that prohibits or allows ATS to assist during birth. Of all births, 40% are assisted in a health facility, and 88% of these births take place in the public sector. This is lower in rural areas, where only 32% of all births are assisted by a MG, IDE, SF, or ATS. In these rural areas, 29% of all births take place in a health facility, of which 97% are in the public sector. In both urban and rural areas, SFs provide most of the trained birth assistance (respectively, 56% and 19% of all births). In rural areas, in the absence of qualified staff, traditional birth attendants, family members and friends, followed by ATSs assist in deliveries.[1]

The pathway to universal health coverage (UHC): the role of the workforce

UHC is the goal that all people obtain the health services they need without the risks of financial hardship linked to paying for them.[4] One of the barriers that prevent Guinean citizens from accessing maternal and neonatal health services is the costs related to these services. This is among the reasons why the Government of the Republic of Guinea introduced in 2010 the policy of delivering MNH services free of charge. According to an evaluation in the region N'Zérékoré in 2012, this policy increased the indication, direct referral for, and utilization of life-saving cesarean sections.[5] Since then, Guinea has continued reflections on pathways toward UHC, under the leadership of the Ministry of Public Health (MOPH) and with support from the World Health Organization (WHO) and the European Union.[6]

The pathway to realizing UHC poses the challenge of ensuring a health workforce that can respond to the community needs. Reforms aiming to support the demand side consequently need to be accompanied by a strengthening of the supply side: a health workforce that is available, accessible, and acceptable and provides good quality services. Recent insights have shown that the formulation of interventions to educate, recruit, deploy, retain, and manage the performance of HRH for UHC requires evidence-based workforce planning based on an in-depth analysis of the health labor market.[7,8]

Multistakeholder workforce planning process in Guinea

Therefore, in 2012, the MOPH of Guinea started a process of 1) analyzing the current situation with regard to HRH providing MNH services;[3] 2) projecting future Human Resources for Maternal and Neonatal Health (HRMNH) needs and expected HRH availability following health sector demand and supply; 3) identifying relevant labor market interventions to address the mismatches in terms of availability, geographical accessibility, acceptability, and quality; and 4) analyzing the feasibility of these strategies.[9]

Multiple stakeholders (including Directorates from the MOPH, the Ministry of Public Service, the Ministry of Education, and representatives from health facilities) under the leadership of the MOPH Secretary General and the advisor to the Minister of Public Health were involved in the aforementioned stages of this consultative process. In November 2013, two workshops took place with national experts and stakeholders to develop and test the planning methodology. Given the priority of maternal and child health for the health sector in Guinea, the analysis focused primarily on human resources for maternal and neonatal health services. This article presents the health workforce projections that were used for the planning of the MNH workforce in Guinea.

Methods

Workforce planning methodologies for UHC

The purpose of workforce planning through projections is to establish long-term objectives for the expected HRH needs and match these with projections of the expected demand and supply of HRH. Doing this enables the rational identification of long-term HRH targets and of interventions to be implemented in the short, medium, and long-term to meet these targets.[10]

Developing the projections requires gathering a wide range of stock and flow data to model the health labor market demand and supply.[6] But at least as complex is the collection

and use of data to proxy the population needs for health services and to convert these needs into HRH requirements.[11] Projecting HRH requirements can be done on the basis of various methodologies or benchmarks that all aim to convert population health needs into HRH requirements, such as a workforce-to-population ratio, a health needs method, a service demand method, or a service target method.[10,12]

The service demand method is used in OECD (Organisation for Economic Co-operation and Development) countries with advanced workforce planning mechanisms, like Australia, the Netherlands, and the United Kingdom.[11,13–16] In the Netherlands for example, utilization rates in the previous years are used as proxy of population needs. These utilization rates are then translated into future HRH needs.[14] This is justifiable in a context where universal coverage is already achieved, as service demand can be assumed to equal service needs. However, even in these countries, there is a risk of projecting into the future current mismatches between need and utilization.[11]

In countries where UHC is not yet a reality, access barriers make that the actual population health service needs are higher than those reflected by the health service utilization rates.[7] For this reason, needs-based modeling is more appropriate than the service demand method in health systems where there is social and political commitment to UHC but where UHC is not yet a reality.[11]

Health labor market approach and workforce planning

At the same time, from a health labor market perspective, calls have been made upon policy makers to move away from needs-based methods for estimating workforce requirements, as an exclusive focus on boosting supply (ie, training more health workers) may not be sufficient in itself, without understanding role of and factors influencing demand (ie, employing more health workers). In a health labor market, the financial resources available determine the demand for HRH exerted by public providers, private providers, and donors. However, these financial resources rarely match the amount required to meet needs, in particular in low- and lower-middle income countries. The mismatch between "demand" (budgeted positions available) and "supply" (the pool of potential health workers available in a country) within the health labor market tends to be overlooked when departing from a needs-based planning of HRH.[17]

In light of the Republic of Guinea's commitment to UHC, a health needs method was used to project future HRH needs, but combined with deterministic modeling of both future health sector demand and supply, in order to arrive at a baseline scenario that shows need, demand, and supply so as to inform the development of targeted health labor market interventions tailored to the context of the health system in Guinea. The projection method was developed on the basis of the planning methodology designed for the H4+ High Burden Country Initiative in 2012.[18]

Projecting HRH requirements based on MNH needs

Figure 1 summarizes the various parameters and steps to be taken in the methodology. These steps are explained in more detail below. The methodology, parameters, and input data for the baseline scenario were discussed and determined with a group of international and national experts, including a demographer, public health experts, HRH experts, and (para)medical professionals.

Distribution of future pregnancies

As a first step in determining the needs for HRH, the national and United Nations (UN) population data, differentiated per age group and per sex, has been used to map human population distributions and to produce estimates of projected future numbers of pregnancies until 2025 within the eight regions of Guinea and for both urban and rural areas, taking into account population growth rates, urbanization rates, and age-, region-, and residence-specific fertility rates.[19] Between 2010 and 2025, the population of Guinea is expected to grow

Projecting HRH requirements

1. Determining the distribution of future pregnancies;
2. Definition of a package of services to be provided to pregnant women and need for these services;*
3. Defining key cadres required per service and division of the workload; and
4. Determining HRH productivity.

Projecting HRH supply and demand

5. Determining the current HRH stock;
6. Determining the average annual health sector demand (recruitment);
7. Determining the average annual inflow; and
8. Determining average annual attrition due to retirements, voluntary, and involuntary reasons.

Figure 1 Summary of the model: steps to be taken to arrive at the projections of staffing needs, supply, and demand.
Notes: *The package included family planning services around pregnancies and birth, four antenatal care visits, post-abortion care, skilled assistance of uncomplicated births, basic emergency obstetric and neonatal care, comprehensive emergency obstetric and neonatal care, three postnatal care visits, and care for neonates with complications.
Abbreviation: HRH, human resources for health.

from 10,876,000 to 15,590,000.[20] In the same period, the number of pregnancies per year increases from 484,884 to 745,800. In 2010, about 73% of these pregnancies took place in rural areas; in 2025 this will be 62%.

Package of MNH services to be provided

Subsequently, a package of MNH services for these pregnant women was defined, based on a nationally defined package of key contact moments during pregnancy and birth. These contact moments are described under Figure 1. During these consultations, essential reproductive, maternal and neonatal health services are provided according to the national standards. The percentage of pregnant women in need of these services was determined.

Key cadres required per service and division of the workload

The primary responsible cadres that should be delivering these services in Guinea were identified as the IDE, SF, MG, gynecologists (GYN), and pediatricians (PED). ATSs have an important role in supporting these cadres in the provision of MNH services, but are not considered skilled birth attendants. Per service within the package of MNH services, a normative division of the workload between the five key cadres was made by experts from the MOPH and representatives of the professional organizations. Their consensus was based on normative policies and guidelines on "who should be doing what" on the one hand, and data collected on "who is currently doing what" on the other hand. The latter was part of the assessment at the facility level. In the normative division of work, SFs should be the key cadre in providing the services related to uncomplicated deliveries and basic emergency obstetric and neonatal care, assisted by IDEs and MGs who also handle a part of the workload. GYNs should provide the majority of the comprehensive emergency obstetric and neonatal care, with the assistance from MGs, and PEDs should provide the care to neonates with complications.

Productivity

Thereafter, the following steps from the Workload Indicators of Staffing Needs (WISN) methodology were used to calculate the theoretical productivity of HRH: estimating working time available, setting activity standards or time needed per activity, and calculating the time needed for activities other than direct service delivery per cadre.[21] In Guinea, HRH have an estimated 210 working days per year available for work, but in reality, absenteeism and dual practice are known to limit the working time of HRH in the public sector significantly.[8,17] However, as no data were available to estimate these actual working hours, the theoretical and optimal working time was used.

The set of activities was determined per cadre and included the package of MNH activities, the other non-MNH activities, and support activities such as meetings, preparatory activities, or reporting. Based on health facility data and discussions with national and international experts, activity standards were defined per MNH activity, and an informed estimate was made of the percentage of the time dedicated per cadre to specific MNH services, to non-MNH services, and to support activities. For SFs, for example, the time dedicated to non-MNH services and support activities was estimated at, respectively, 0% and 20%, indicating that 80% of their time is available for MNH services. For IDEs, time dedicated to MNH services was assumed to be 20%, while another 30% of the time is dedicated to support activities. These productivity estimates, which were assumed to remain constant over time, allowed for converting the target population and the package of services into HRH needs for the provision of MNH services, per cadre, per year, per region, and per residence.

Projecting HRH demand and supply

After projecting HRH needs, a second step was to project the future HRH supply or availability (ie, the HRH employed to provide those services). Following a joint assessment of various health labor market dynamics and parameters, a stock and flow model for estimating workforce supply was prepared. The model distinguished between the pool of potential service providers, which comprises new graduates and other qualified but unemployed HRH ("supply" in health labor market terms) and the budget and employment opportunities available ("demand" in health labor market terms). The methodology (summarized in Figure 1) comprised the following steps:

1. Current "stock" employed in the health system, per employer and per payment mechanism

   A 2009 survey disaggregated the health workforce data by sex, age, marital status, type of health facility, residence (urban or rural), type of contract (employer; fulltime or part-time), and salary scale.[22] In Guinea, 52% of the HRH are female, although differences exist between cadres (eg, practically all SFs are female and around 60% of IDEs and ATSs are female). The average age of the workforce is 45.3 years. Practically no MG or specialists work in rural areas; for SF and IDE this is, respectively, 8% and 11%.

With regard to the ATSs, 31% work in rural areas. In the absence of trend data, these percentages were introduced as constant parameters into the projections. Practically all HRH have a fulltime contract, and therefore the headcount data on the 2009 HRH stock was assumed to equal the availability of HRH in fulltime equivalent (FTE).

One mechanism for HRH recruitment is a centrally organized, periodic group vacancy notice followed by submission of applications and a test (the concours[23]). After this civil service recruitment process, the selected candidates are integrated in the civil service scheme (statut général), on the basis of a permanent civil servant contract which includes specific arrangements for the health workforce (statut particulier). However, not all advantages for the health workforce that were agreed upon in this statut particulier of 2008 have come into effect, as for many provisions, insufficient budget is available. On average, about 80% of the HRH that are involved in the provision of MNH work within this civil service scheme, according to the 2009 HRH survey. The other 20% work as a contractor in the public or private sector.

A job in the civil service is the preferred option for most HRH, as this entails a job guarantee – even though financial benefits in the private sector are higher. However, in the past 10 years, only in 2005, 2011, and 2014, the civil service recruited HRH through this group vacancy notice. This means that after graduation, the potential supply of health professionals has to wait for months or years before being able to take part in the civil service recruitment process. In the meantime, they work as independent contractors in the public or private sector, as volunteers, are unemployed, or they leave the Guinean health sector altogether. The pool of volunteers, unemployed HRH or HRH who have left the health sector or the country is unknown. As part of data collected in 13 health facilities in Guinea, five out of 38 interviewed HRH involved in the provision of MNH services appeared to work at the facility as volunteers, some already for years.[8]

Payment of civil servants is arranged at the central level by the Ministry of Public Service. Payment of HRH contracted by the public or the private sector is arranged by the health facilities, the district or regional health authorities, or the communities that employ the HRH. Discussions with stakeholders indicated that volunteers are likely to generate their income through informal payments.[8]

2. Average annual demand (recruitment) of HRH

   In principle, the number of HRH to be recruited is determined every year by the Ministry of Public Service, based on a proposal of the MOPH. However, the last two rounds were organized in 2007 (the actual deployment took place in 2011) and in 2014.[8] This prevented performing a trends analysis to estimate the future average annual recruitment through the civil service recruitment process. Based on these two rounds since 2007, an assumption was made that in the baseline scenario (the scenario in which the country would continue with its "business as usual") a civil service recruitment process would be organized every 4 years. It was estimated that the number of new hires in future recruitment rounds would be equal to the average number of staff employed in the rounds of 2011 and 2014.

   No data were available on the annual number of contractors that are recruited in the public and private sector. Consequently, this part of the stock and flow model is unaccounted for in the supply projections. In order to compensate for this lack of information on annual recruitment, the HRH requirement projections were expressed at 85% instead of 100% of the total population needs for HRH providing MNH services. It was assumed that the other 15% of the services would be provided by these independent contractors in the public and the private sector that are not included in the supply-side projections. This assumption was informed by the aforementioned information that 12% of the population receives birth assistance in the private sector and that around 20% of the workforce is composed of contracted HRH.[1,22]

3. Average annual supply of new graduates

   The 2012 health workforce analysis[22] and information retrieved through experts provided data on the capacity and annual number of graduates from Guinea's health training institutes between 2006 and 2010. In consultation with national experts and stakeholders, this information was used to arrive at assumptions on the expected average number of graduates per year per cadre. The percentage of these graduates willing to work in the national health sector was not known, but in 2007 and 2014 the number of applications for the civil service recruitment process exceeded the number of places available. Based on the data from the 2009 HRH survey, the number of foreign trained staff working in the health sector in Guinea is negligible. Inflow from HRH returning to the health sector in Guinea was unknown and was therefore not included as a variable in the projections.

4. Average annual attrition

   Based on the dates of births as registered during the 2009 HRH survey and the retirement age per cadre, the workforce exits due to retirement until 2025 were forecasted.

However, no other data were available on percentages and reasons for voluntary and involuntary attrition per year. The average annual attrition rate for reasons other than retirement was estimated at 7% for MGs and specialists (as they tend to migrate more often) and 5% for IDEs, ATSs, and SFs; these attrition estimates were made in consultation with national experts and are based on information available in the international literature.[17]

Scenario planning

The described parameters and values informed one "baseline scenario" of the projected workforce need, demand, and supply between 2014 and 2024. This represented a scenario in which current demographic trends continue and current training, recruitment, and deployment efforts, or "business as usual" would be maintained and no additional strategies or interventions would be implemented. This baseline scenario included disaggregated data on HRH requirements and supply ("demand" in health labor market terms) per region, setting (urban or rural), and cadre.

The projections enabled the identification of the challenges related to the universal availability and accessibility of HRH for MNH between 2014 and 2024, per cadre, region, and setting. After identification of the major challenges, the health labor market framework[6,17,23–25] was used to identify targeted and feasible interventions to improve the availability and distribution of HRH; these interventions were then translated into changes in the values of the projection parameters described above. This allowed for producing an alternative ("policy rich") scenario B modeling the impact of such interventions on the availability and distribution of HRH, per region, setting (urban or rural), and cadre.

Results

The baseline scenario showed the projected HRH needs and supply of MGs, IDEs, SFs, GYNs, and PEDs in Guinea between 2014 and 2024.

As is shown by Figure 2, Guinea's population would need 5,981 qualified HRH to act as principal care providers in the provision of the package of MNH services in the public sector in 2014. This required workforce should comprise 2,674 IDEs; 2,263 SFs; 942 MGs; 43 GYNs; and 59 PEDs. The 2014 supply of these cadres (the employed HRH) is 49% of the needs. While the HRH needs are projected to increase by 22% in the coming decade due to trends in population growth and expected pregnancies, the supply of HRH is projected to decline by 15% under the assumptions of the model (which represent the situation in which current in- and outflows are maintained), leading to a projected decline in coverage rate of HRH needs from 49% to 34%.

Figure 3 shows the average number of graduates per year (the pool of potential HRH; ie, the supply) and the average number of recruits per year in the public sector (the public sector demand). This figure shows that simply training more HRH will not solve the problem, as every year, 671 ATSs, 24 IDEs, 16 SFs, and 230 MGs are being trained and enter the health labor market without being recruited into the civil service. Therefore, accelerating progress in increasing the availability of HRH in Guinea requires that recruitment efforts be scaled up, targeting the

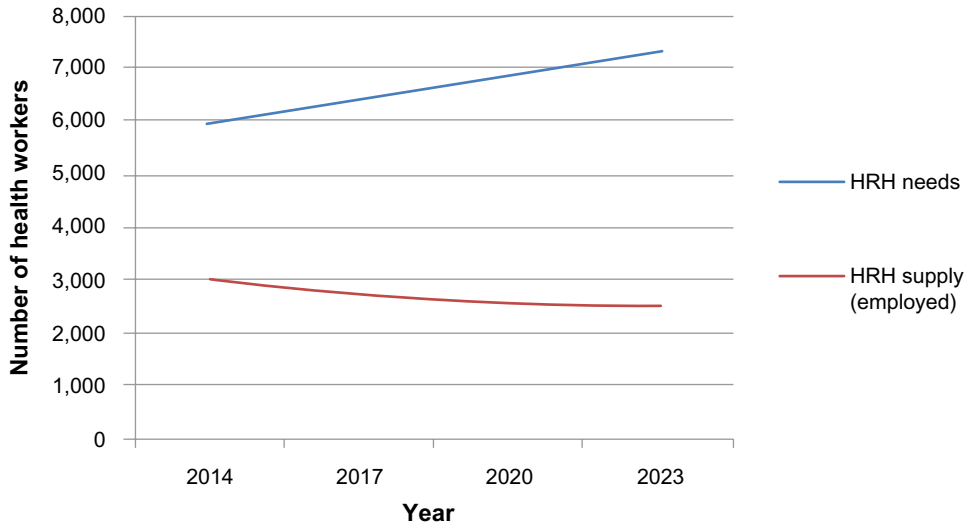

Figure 2 The evolution of the HRH needs and supply (IDE, SF, MG, GYN, and PED) in Guinea – baseline scenario.
Abbreviations: GYN, Gynécologue (gynecologist); HRH, human resources for health; IDE, Infirmier Diplômé d'Etat (nurse); MG, Médecin-Généraliste (physician); PED, Pédiatre (pediatrician); SF, Sage-Femme (midwife).

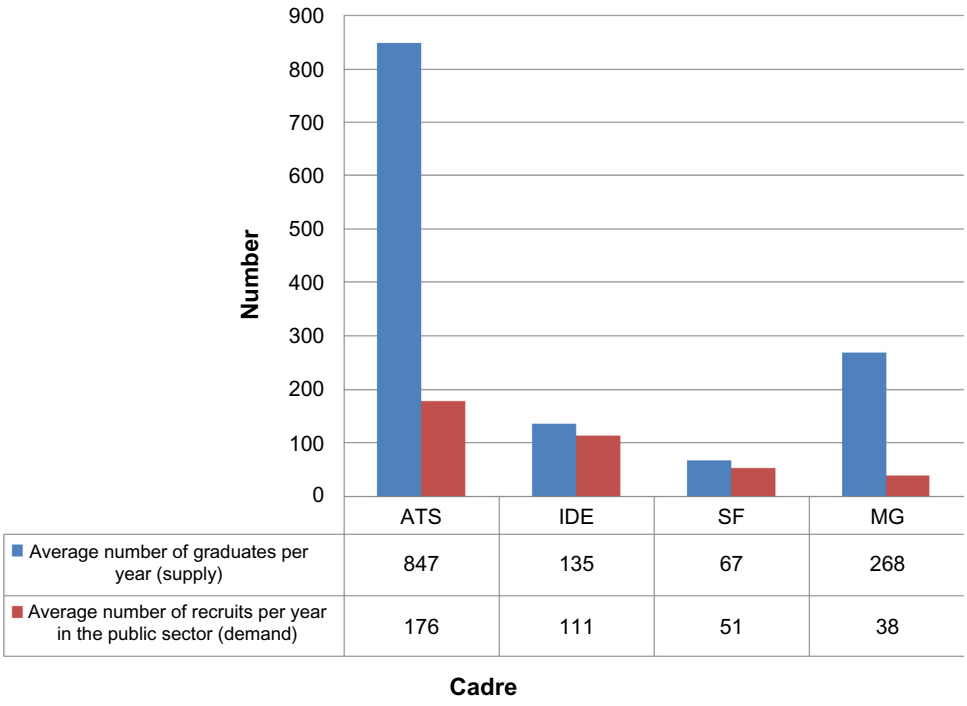

Figure 3 Average annual training ("supply") and public sector recruitment ("demand") for ATS, IDE, SF, and MG in Guinea – baseline scenario.
Abbreviations: ATS, Agent Technique en Santé (auxiliary nurse); IDE, Infirmier Diplômé d'Etat (nurse); MG, Médecin-Généraliste (physician); SF, Sage-Femme (midwife).

right cadres and the right geographical locations in order to maximize benefits.

The overall availability of 49% of the HRH needed to meet the needs of the population for MNH services at the national level actually masks differences among cadres, which vary from 18% for SFs to 254% (a surplus) for GYNs. Figure 4 shows a more detailed picture, in which the 2014 need and supply is shown per cadre. For IDEs and SFs, the supply is not meeting the need. The supply of MGs, GYNs, and PEDs on the other hand seems to meet and even exceed the population needs. Furthermore, Guinea employs a large workforce of ATSs who are not considered skilled birth attendants; this pool is 1.3 times as large as the entire pool of employed IDEs, SFs, MGs, GYNs, and PEDs together.

Table 1 demonstrates the extent to which the supply will meet the population needs in the coming years. Even though the supply of MGs in 2014 seems sufficient, the supply will fall short in the coming years, if no action is undertaken to

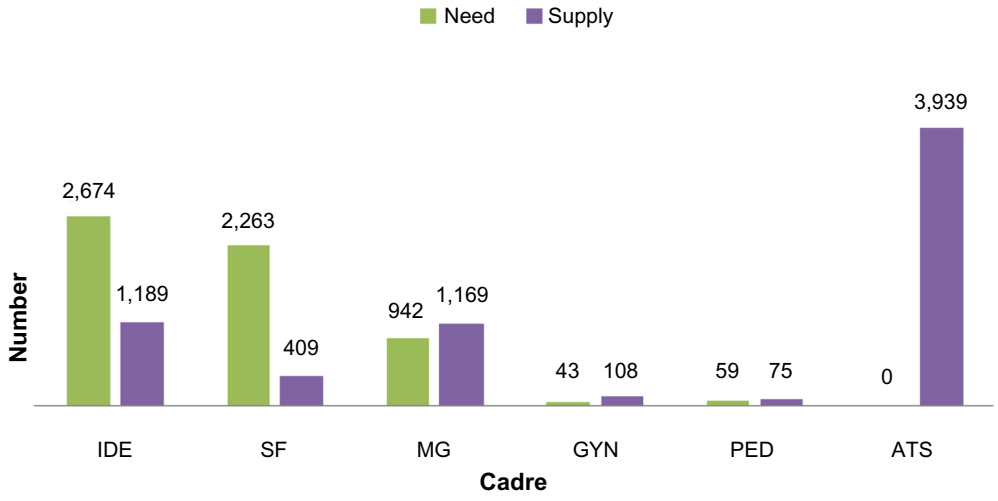

Figure 4 Needs and supply of HRH in Guinea per cadre (2014).
Abbreviations: ATS, Agent Technique en Santé (auxiliary nurse); GYN, Gynécologue (gynecologist); HRH, human resources for health; IDE, Infirmier Diplômé d'Etat (nurse); MG, Médecin-Généraliste (physician); PED, Pédiatre (pediatrician); SF, Sage-Femme (midwife).

Table 1 Projected availability of HRH as a percentage of the needs ("coverage") and gap between HRH needs and supply at the national level in Guinea – baseline scenario

	2014	2017	2020	2023
Coverage (supply/needs)				
IDE	44%*	38%*	35%*	34%*
SF	18%*	17%*	18%*	19%*
MG	124%	101%	80%*	61%*
GYN	254%	217%	166%	147%
PED	128%	144%	139%	138%
Gap (supply – needs)				
IDE	–1,485*	–1,776*	–1,994*	–2,143*
SF	–1,854*	–2,001*	–2,108*	–2,239*
MG	227	15	–220*	–444*
GYN	66	54	32	24
PED	17	27	26	28
ATS	3,939	3,513	3,014	2,592

Note: *HRH supply does not meet the need.
Abbreviations: ATS, Agent Technique en Santé (auxiliary nurse); GYN, Gynécologue (gynecologist); HRH, human resources for health; IDE, Infirmier Diplômé d'Etat (nurse); MG, Médecin-Généraliste (physician); PED, Pédiatre (pediatrician); SF, Sage-Femme (midwife).

change current in- and outflows. The gap or unmet need for IDEs and SFs will increase to, respectively, 658 and 385 FTE between 2014 and 2024.

Subsequently, we analyzed the geographical distribution of the HRH needs and supply in order to arrive at an estimate of current and future geographical accessibility. Figure 5 shows that all regions face suboptimal availability of HRH to ensure UHC in rural areas. In urban areas, the overall availability is aligned with needs, with the exception of the capital Conakry, where an oversupply of 1,263 HRH exists. This mismatch between HRH need and availability is most prominent in the rural areas the N'Zérékoré, Kankan, and Kindia regions.

Figure 6 shows that for all cadres except the SFs, HRH availability exceeds HRH needs in urban areas, while it does not meet the needs in rural areas. Only for SFs, the supply does not meet the needs in both urban and rural areas in Guinea.

Table 2 below shows the extent to which the staffing needs are being met by current and future projected supply. This is shown per cadre, and for urban areas (upper rows in red) and rural areas (lower rows in green). The relation between need and supply is shown in percentages (supply as a percentage of the need) and in absolute numbers of staff (supply minus the need). The results show that in rural areas, the supply is actually no more than 7% of the needs, irrespective of the cadre.

Health labor market interventions and their potential effects

The HRH analysis based on the projections described above provided input to a multisectoral HRH policy dialogue in which evidence, lessons learned, and positive experiences from the local, national, and international level informed the formulation of several health labor market interventions in Guinea.[26]

During this policy dialogue and following discussions between stakeholders from various levels within the health system and from non-health sectors, participants selected the following interventions for further analysis, with the aim to improve the availability, accessibility, and acceptability of HRH:

1. Reorganization of the civil service recruitment process into an annual recruitment effort as of 2015, during which among other cadres, 111 IDEs and 51 SFs are recruited per year. The baseline scenario does not foresee recruitment in 2015, 2016, and 2017, so this would also impact positively on the availability of HRH. The 2015–2017 recruits should be deployed in the rural areas of the most deprived regions of N'Zérékoré and Kankan.
2. Integration of the possibility to rotate within and/or between regions in the deployment regulations, after having served at least 3 years in a rural area.
3. Housing and child education allowances for HRH in rural areas.
4. Transformation of the ATS training institutes in N'Zérékoré and Kankan into IDE and SF training institutes with a projected yearly 110 output of eligible ATSs who are upgraded to SF or IDE, starting with the ATSs from N'Zérékoré and Kankan, in order to increase the pool of skilled birth attendants by using the currently available and experienced stock. According to their civil service contract, ATSs have the right to upgrade their qualifications to IDE or SF after 10 years of experience. The 2009 HRH survey[22] showed that practically all SFs are female and around 60% of ATSs and IDEs are female. This needs to be taken into account in the further analysis or future implementation of this intervention, as a male birth attendant might be less acceptable to the population.
5. Include the decentralization of the payment mechanisms of HRH in ongoing decentralization efforts, in order to ensure payment at the level of the urban and rural communities, with the aim to increase presence of HRH at their posts.

Scenario modeling showed that the implementation of this package of interventions between 2015 and 2017, has the potential to increase the availability of HRH from 38% of the needs in the baseline scenario (reference year 2020) to 52% of the HRH needs in the policy rich scenario (in the same reference year). For IDEs, this would be an increase from 35% to 51%, while for SFs, the potential impact would be an increase from 18% to 36%.

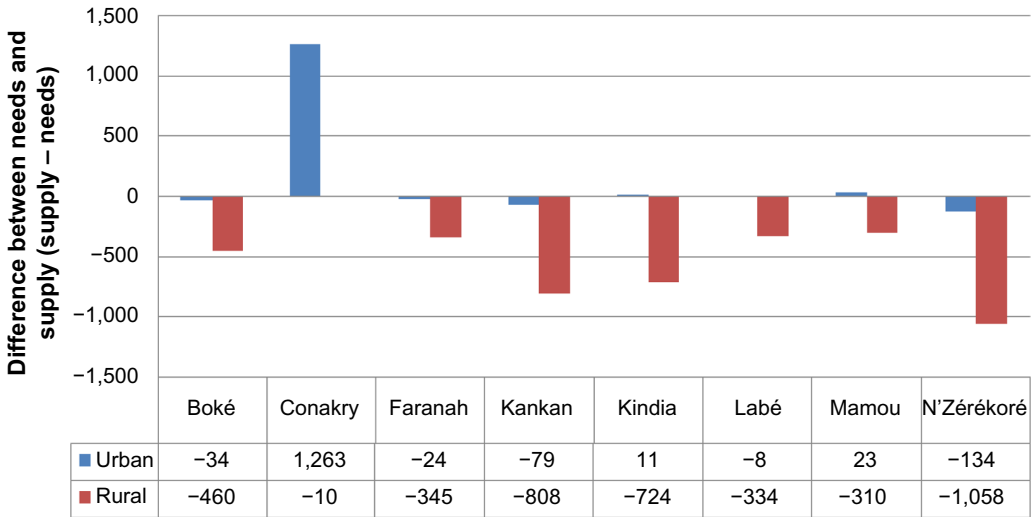

Figure 5 Projected difference between HRH needs and supply in Guinea, per region and for both urban and rural areas (2014).
Notes: A value of 0 indicates an equilibrium in which the supply is aligned with the needs. A negative value indicates a shortage, whereas a positive value indicates a deficiency.
Abbreviation: HRH, human resources for health.

The package of interventions would particularly impact positively on the rural zones, where between 2015 and 2020, the HRH availability would increase to 20% of the needs by 2020, instead of 4% in the baseline scenario. For IDEs, this would be an increase from 6% to 26%, while for SFs, the potential impact would be an increase from 2% to 20%. This is shown in Table 3, which compares the coverage of HRH requirements in the baseline scenario A with the potential coverage of the HRH needs under the policy rich scenario B in which the package of interventions is implemented.

Discussion

A needs-based methodology for workforce planning in countries committed to UHC, using a health labor market perspective

In many low- and middle-income countries, the service demand approach is applied to estimate health workforce requirements – for example, through the use of the WISN methodology. This service demand method converts past service utilization rates into staffing requirements per health facility, using time standards and productivity rates per activity, which enables setting of staffing requirements ("establishment") and the identification of interventions to enhance efficiency and equity in the distribution of HRH across facility types. The methodology can be adapted by integrating population growth trends.[21,27] However, potential future changes in access and utilization rates are not included in this demand-based approach to inform projections of future staff requirements. Therefore, we used a health needs method to project future workforce requirements in the Republic of Guinea, so as to establish long-term objectives which reflect the country's commitment to achieving UHC.

The government's budget allocation to HRH and regulatory mechanisms such as licensing of public and private providers play an important role in shaping health labor market forces.[17] These interventions need to be informed by projections of HRH requirements based on population health needs, in order to shape a health labor market that is aligned as much as possible with population needs.[6] After determining the HRH needs based on 85% coverage rates, the methodology allowed for setting more realistic service targets per service, in order to set more realistic short-, medium-, and long-term goals if needed, informed by current utilization rates and the budget available for the health sector and the workforce.

The methodology provided an excellent starting point for a new way of planning for HRH in Guinea in light of the UHC objective and the population needs, making use of latest insights from health labor market dynamics and technologies to project future distribution of the population. These health labor market dynamics differ per region, per setting, and per cadre, and projecting them through the development of the baseline scenario allowed for the development of targeted and relevant health labor market interventions which can be instrumental to increase the availability of HRH according to a detailed account of the needs, as a crucial step in achieving UHC.

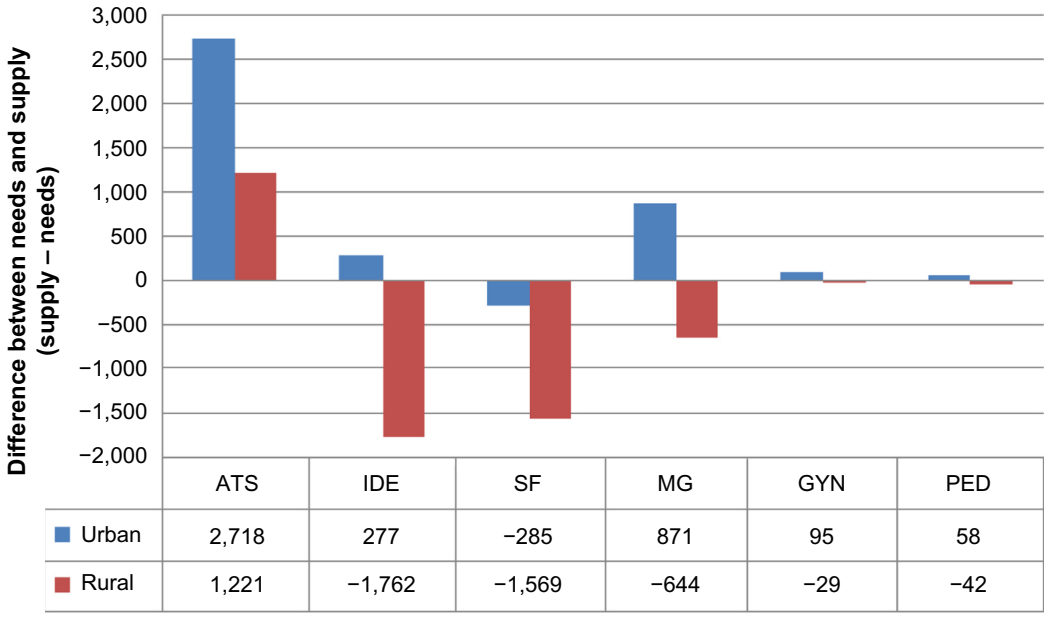

Figure 6 Projected difference between HRH needs and supply in Guinea, per cadre and for both urban and rural areas (2014).
Notes: A value of 0 indicates an equilibrium in which the supply is aligned with the needs. A negative value indicates a shortage, whereas a positive value indicates a deficiency.
Abbreviation: HRH, human resources for health; ATS, Agent Technique en Santé (auxiliary nurse); GYN, Gynécologue (gynecologist); IDE, Infirmier Diplômé d'Etat (nurse); MG, Médecin-Généraliste (physician); PED, Pédiatre (pediatrician); SF, Sage-Femme (midwife).

Table 2 Projected availability of HRH as a percentage of the needs (supply divided by the need, or "coverage") and in absolute figures (supply minus the need) in urban and rural settings in Guinea – baseline scenario

Coverage	2014	2017	2020	2023
Coverage (supply/needs; %) in urban areas				
IDE	135%	110%	96%	90%
SF	57%*	52%*	53%*	51%*
MG	416%	324%	243%	178%
GYN	862%	702%	512%	431%
PED	439%	469%	432%	410%
Coverage (supply – needs; number of staff) in urban areas				
IDE	277	89	−35*	−109*
SF	−1,762*	−1,866*	−1,959*	−2,034*
MG	871	694	495	302
GYN	95	84	64	58
PED	58	71	72	75
Coverage (supply/needs) in rural areas				
IDE	7%*	6%*	6%*	6%*
SF	2%*	2%*	2%*	2%*
MG	4%*	3%*	2%*	2%*
GYN	4%*	3%*	2%*	2%*
PED	0%*	0%*	0%*	0%*
Coverage (supply – needs) in rural areas				
IDE	−1,762*	−1,866*	−1,959*	−2,034*
SF	−1,569*	−1,646*	−1,718*	−1,784*
MG	−644*	−679*	−714*	−746*
GYN	−29*	−31*	−32*	−34*
PED	−42*	−44*	−46*	−47*

Note: *HRH supply does not meet the need.
Abbreviations: GYN, Gynécologue (gynecologist); HRH, human resources for health; IDE, Infirmier Diplômé d'Etat (nurse); MG, Médecin-Généraliste (physician); PED, Pédiatre (pediatrician); SF, Sage-Femme (midwife).

Methodological challenges

The model presented for the calculation of the population HRH needs departs from a clearly defined package of MNH services that is to be offered to a clearly defined population (pregnant women) within a clearly delineated period of time (10 months). The model becomes more complicated when the entire population, and the entire package of services is to be taken into account. We addressed this limitation by allocating a percentage of the working time per cadre to "non-MNH"

Table 3 Comparison between the availability of HRH as a percentage of the needs ("coverage") in the baseline scenario (A) and the intervention scenario (B)

Coverage	Scenario					
	A	B	A	B	A	B
	2017		2020		2023	
National level						
IDE	38%	49%*	35%	51%*	34%	48%*
SF	17%	28%*	18%	36%*	19%	33%*
Total	43%	52%*	38%	52%*	34%	46%*
Urban areas						
IDE	110%	No	96%	No	90%	No
SF	52%	change	53%	change	51%	change
Total	130%		109%		95%	
Rural areas						
IDE	6%	19%*	6%	26%*	6%	24%*
SF	2%	12%*	2%	20%*	2%	18%*
Total	4%	14%*	4%	20%*	4%	18%*

Note: *Improvements in scenario B in comparison to scenario A.
Abbreviations: HRH, human resources for health; IDE, Infirmier Diplômé d'Etat (nurse); SF, Sage-Femme (midwife).

services. This means that increasing the availability of HRH for MNH also implies increasing the time available for "non-MNH" services. However, the exact package of services that can be delivered within this time and to what extent it is truly aligned with the population needs for non-MNH services and changes in the burden of disease is not (yet) addressed in this model.

An added value of this flexible, context-specific, and needs-based methodology is that it moves from monitoring and analysis of the health workforce to strategic planning in which future changes in demographic contexts (population growth, urbanization and expected number of pregnancies) and future resource allocation to salaries of HRH in the public sector are included. However, the strategic planning could be improved by including trend analysis or horizon scanning on additional future developments in the areas of demographics (such as an aging population and an aging workforce), economics and financing (such as increases in the health sector budget or changes in health financing mechanisms), socio-cultural characteristics (such as changes in service delivery expectations or the introduction of gender-specific HRH strategies), or developments in the allocation and division of tasks, innovations in the organization of work processes, and productivity. These or other trends potentially change future workforce needs, demands, and supply.[15] At the same time, this would add to the complexity of the approach and make it less user-friendly.

Availability of data, competencies, and software at the national level

Various available data sources were consulted in order to inform the workforce projections in Guinea, but (reliable) information lacked on specific elements. Future public sector recruitment plans and budgets available for HRH appeared unknown and highly unpredictable. Information was lacking on voluntary and involuntary attrition rates and recruitment of contracted HRH in the public and private sector. Therefore, workforce projections must be re-evaluated and adjusted on a regular basis in order to 1) add data once new data becomes available and 2) update data in order to ensure that the projections remain accurate over time.

This regular re-evaluation and adjustment requires in-depth understanding of HRH planning methodologies and health labor market dynamics. At the same time, this requires practical, context-specific and easy-to-use software to produce the projections and calculations. The National Observatory for HRH could serve as the institution to safeguard these capacities.

The political side of workforce planning

Workforce planning is essential to rationalize decisions and guide investments, in order to ensure that the health workforce is able to meet future challenges within a context of limited resources.[10] However, improving the evidence-base does not necessarily imply that workforce decisions and investments are made in a more rational way from a technical point of view. During the first policy dialogue in Guinea, during which stakeholders from various sectors jointly worked on the identification of interventions to address the challenges highlighted by the projections, legal, political, financial-economic, social, and institutional barriers to technically ideal solutions became apparent. We found for example that it can be politically sensitive to use a planning methodology or design interventions that target a specific set of cadres (such as IDEs or SFs), specific services (such as maternal and newborn health services), or to develop interventions that target specific underserved regions, as other groups may feel their interests are not taken into account in the same way.

Increasing efficient use of resources also appeared difficult, as it can be perceived to conflict with interests of other groups, but also because resources saved on one budget line (such as pre-service training of health professionals) cannot easily become available for an intervention that is financed from another budget line (such as supervision). An example was the proposal to replace ATS training places by IDE and SF training places, as each year 670 ATSs are being trained without being recruited in the civil service scheme. Yet, stakeholders preferred to establish additional IDE and SF training places, without reducing the number of ATS training places. Another example was the proposal to reduce the number of students who enter medical training in the first year, as the attrition rate during the training is very high. When the entry criteria become stricter, resources for scholarships can be saved and reallocated, for example, to increase the number of faculty. However, this was not considered desirable by participants in the policy dialogue, as this would affect students' chances of being admitted to medical training, and was therefore politically sensitive.

The fact that most HRH are integrated in the civil service scheme also limits, on the grounds of equality, the possibilities of introducing selective retention measures such as continuous professional development or career advancement opportunities for specific cadres and/or for HRH who have served in rural areas. Another example of a regulatory context in Guinea is the fact that current legislation prescribes that ATSs can only receive training which upgrades them to IDE or SF after 10 years of serving in the public service.

Even in short-term operational plans, it is politically easier to formulate general strategies that are beneficial to all cadres, all services, and all regions and settings, rather than to make difficult reallocation choices which generate resistance from stakeholders who feel that their interest has not been taken sufficiently into account.

Therefore, the next phase of the policy dialogue should contain a further analysis of the feasibility of the various interventions. The aim of this analysis is to gather insight into the various positions and arguments against and in favor of the interventions and to provide stakeholders with evidence regarding the costs and impact of the proposed interventions, their financial, political, social, and operational feasibility, and consequently the trade-offs that need to be made.

Translation of planning to the operational level

The methodology assumes the availability of infrastructure, equipment, supplies, and other professional support in the locations where the need for HRH is identified. Therefore, the "authoritative national approach," which has the advantage of using a consistent methodology and national data,[16] needs to be discussed and agreed upon with the authorities of the targeted geographical areas. The central level planning process needs to be translated into planning at the regional or district level: where are facilities located, can they absorb additional staff, and are infrastructure, equipment, and supplies available to ensure productive and performing HRH in these underserved areas?

Conclusion

The analysis provided and quantified several major insights that need to be addressed by the interventions. First of all, national aggregates of HRH needs and supply mask important differences in dynamics between cadres, regions, and residence areas. Secondly, the dynamics change over time. Projecting workforce requirements and availability needs to take into account future dynamics of population growth and demographics,[28] as well as a trend analysis or horizon scanning regarding future resource allocation to HRH training and remuneration. And thirdly, important opportunities exist for improving efficiency in the training, recruitment, and deployment of HRH in Guinea in order to optimize the use of financial and human resources available. Examples are the fact that more HRH are being trained than deployed; that the irregular organization of the civil service recruitment process results in a potential supply of HRH who are being put on hold for a long period of time before they are being used effectively; that an oversupply of staff exists in urban areas; and that a large pool of employed ATSs is available that is actually not considered to fully meet the competencies required for the provision of MNH services. A relative oversupply of specialists versus an absolute shortage of other cadres, and a concentration of health workers in urban areas are not unique to the health system in Guinea, but the quantification of these imbalances provides an opportunity for rationalizing and making more equitable the health workforce production and deployment in the country.

The use of existing evidence on the potential of a more diverse skills mix in rationalizing the health workforce configuration[29–31] and effective strategies to facilitate health workers' retention in rural and remote areas,[32] as well as multistakeholder involvement under the guidance of high-level decision makers within the government, appeared important facilitators in the identification of relevant and feasible interventions to be integrated in the health sector plans in Guinea.

The path toward UHC requires reforms in order to improve the availability, accessibility, and performance of HRH. This cannot be done without carefully estimating the population needs and the formulation of targeted interventions to train, recruit, deploy, retain, and manage the performance of HRH based on a good understanding of the dynamics of the health labor market. The case of Guinea has shown that projections of needs-based HRH requirements, in combination with projections of the HRH demand and supply, based on a good understanding of the health labor market, allow for the formulation of targeted interventions and the modeling of these interventions into scenarios in order to estimate their potential impact. This evidence-base has greatly supported the multistakeholder and multisectorial policy dialogue that took place in Guinea, indicating that improving health worker availability will require scaling up recruitment efforts in future.

However, political factors and the existing health system organization at the central and local level have to be acknowledged: evidence as a basis for a joint situational analysis is crucial in the design of interventions, but policy follows a path-dependent pattern, and therefore the background and context become of paramount importance in determining the political feasibility of alternative policy options and the ultimate choice of policy reforms.[33] Therefore, the policy dialogue in Guinea will need to reflect on the economic, political, social, and operational feasibility of the interventions in the Guinean

context, in order to increase the likelihood of successful implementation.

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Disclosure

The authors declare that they have no competing interests.

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