

# Health workforce supply, needs and financial feasibility in Lesotho: a labour market analysis

James Avoka Asamani,<sup>1,2</sup> Pascal Zurn,<sup>3</sup> Palesa Pitso,<sup>4</sup> Mathapelo Mothebe,<sup>5</sup> Nthabiseng Moalosi,<sup>6</sup> Thabo Malieane,<sup>6</sup> Juana Paola Bustamante Izquierdo,<sup>3</sup> Mesfin G Zbelo,<sup>7</sup> Albert Mohlakola Hlabana,<sup>7</sup> James Humuza,<sup>8</sup> Adam Ahmat,<sup>1</sup> Sunny C Okoroafor,<sup>1</sup> Juliet Nabyonga-Orem ,<sup>2,9</sup> Jennifer Nyoni<sup>1</sup>

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For numbered affiliations see end of article.

## Correspondence to

Dr James Avoka Asamani; [Asamani@who.int](mailto:Asamani@who.int)

## ABSTRACT

**Background** The Government of Lesotho has prioritised health investment that aims to improve the health and socioeconomic development of the country, including the scaling up of the health workforce (HWF) training and improving their working conditions. Following a health labour market analysis, the paper highlights the available stock of health workers in Lesotho's health labour market, 10-year projected supply versus needs and the financial implications.

**Methods** Multiple complementary approaches were used to collect data and analyse the HWF situation and labour market dynamics. These included a scooping assessment, desk review, triangulation of different data sources for descriptive analysis and modelling of the HWF supply, need and financial space.

**Findings** Lesotho had about 20 942 active health workers across 18 health occupations in 2020, mostly community health workers (69%), nurses and midwives (17.9%), while medical practitioners were 2%. Almost one out of three professional nurses and midwives (28.43%) were unemployed, and nearly 20% of associate nurse professionals, 13.26% of pharmacy technicians and 24.91% of laboratory technicians were also unemployed. There were 20.73 doctors, nurses and midwives per 10 000 population in Lesotho, and this could potentially increase to a density of 31.49 doctors, nurses and midwives per 10 000 population by 2030 compared with a need of 46.72 per 10 000 population by 2030 based on projected health service needs using disease burden and evolving population size and demographics. The existing stock of health workers covered only 47% of the needs and could improve to 55% in 2030. The financial space for the HWF employment was roughly US\$40.94 million in 2020, increasing to about US\$66.69 million by 2030. In comparison, the cost of employing all health workers already in the supply pipeline (in addition to the currently employed ones) was estimated to be US\$61.48 million but could reach US\$104.24 million by 2030. Thus, a 33% gap is apparent between the financial space and what is required to guarantee employment for all health workers in the supply pipeline.

**Conclusion** Lesotho's HWF stock falls short of its population health need by 53%. The unemployment of some cadres is, however, apparent. Addressing the need

## WHAT IS ALREADY KNOWN ON THIS TOPIC

- ⇒ Health labour market analysis uses explicit economic principles to gain insights into existing and potential health workforce challenges, guiding responsive evidence-based policies.
- ⇒ The Government of Lesotho put health and education on the top priority areas for public expenditure, but health workforce development, employment and deployment are still below international benchmarks.
- ⇒ A comprehensive health labour market analysis had not been undertaken in Lesotho to quantify the needs, demand, supply and financial space requirements.

## WHAT THIS STUDY ADDS

- ⇒ In 2020, Lesotho's health workforce stock represented 46.6% of the WHO global threshold of 44.5 per 10 000 population deemed necessary to make progress towards universal health coverage.
- ⇒ In the last 5 years, Lesotho prioritised 21% of its health budget for health workforce employment, but this is lower than half of the global average of 57%, culminating in increasing unemployment of skilled health workers.
- ⇒ By 2030, it is expected that training outputs would have increased the stock of health workers, improving the density of doctors, nurses and midwives to 31.49 per 10 000 population, representing almost 70% of the WHO Sustainable Development Goal threshold.
- ⇒ Nevertheless, the country's disease burden and population demographics would require at least 46.72 physicians, nurses and midwives per 10 000 population in 2030.

requires increasing the HWF budget by at least 12.3% annually up to 2030 or prioritising at least 33% of its recurrent health expenditure to the HWF.

## INTRODUCTION

In the pre-COVID-19 context, the world faced a looming shortage of 18 million health

**HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE AND OR POLICY**

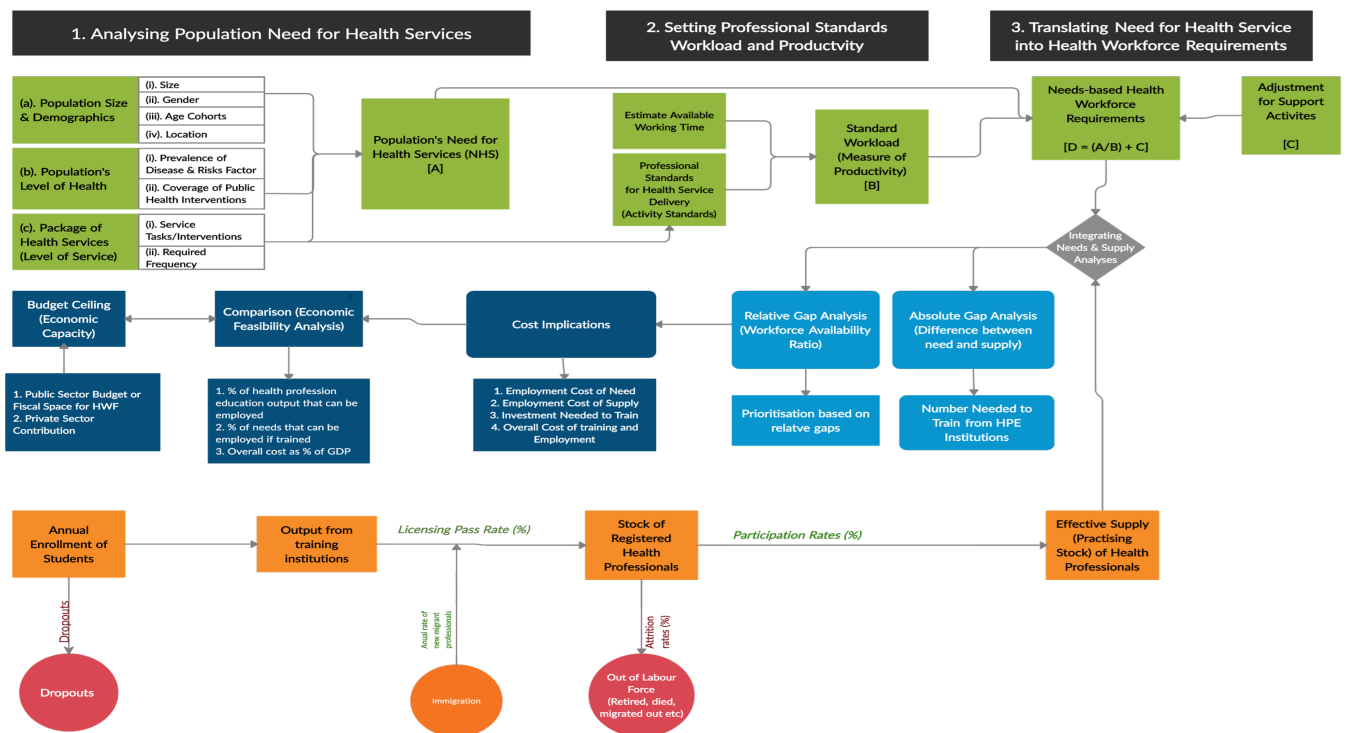
- ⇒ An urgent national policy dialogue in Lesotho to build a national consensus towards a sustained 3%–5% increase in the health sector allocation of overall government expenditure towards the Abuja target of 15% (or at least US\$85 per capita health expenditure per year).
- ⇒ Developing a multi-sectoral health workforce strategy is imperative, which should be costed and advocate for the health workforce expenditure (wage bill allocation from the health budget) to be increased by 12.3% annually (or at least 32% of the recurrent health sector budget) to recruit health workers and ensure their retention.
- ⇒ Lesotho's health labour market analysis demonstrates that strengthening health workforce data and evidence generation is important to monitor progress and shape evidence-informed decision making.

workers by 2030,<sup>1 2</sup> which required >50% of all investments needed to attain the Sustainable Development Goal (SDG) 3.<sup>3</sup> However, the global health workforce (HWF) crisis is escalated by the direct and indirect effects of the protracted COVID-19 pandemic, requiring greater investments in the HWF in countries. The African region faces a potential shortage of 6.1 million health workers by 2030 and rising levels of trained but unemployed health workers due to fiscal constraints.<sup>2 4</sup>

The Government of Lesotho has, over the years, prioritised education and health as key areas of investment, the two sectors jointly consuming at least 25% (25.4%–26.6%) of government budgets from 2018 to 2020.<sup>5 6</sup> The health sector allocation as a share of general government

expenditure is estimated to be 12.8% in 2019/20,<sup>6</sup> which was 2.2% short of the 15% target of the Abuja declaration.<sup>7</sup> Part of the government's investments in the health sector includes several initiatives to address HWF challenges, including the scaling up of the HWF production (using six in-country institutions and foreign training), advancing the role of community health workers and improving the wages and working conditions of health workers.

Nevertheless, Lesotho still faces critical HWF issues, including (but not limited to) shortages, maldistribution, migration and unemployment, as well as sub-optimal productivity and performance.<sup>8 9</sup> These lingering challenges have impacted the health system's capacity to deliver adequate and quality health services to address the population's health needs.<sup>8-10</sup> As part of efforts to generate context-appropriate evidence for evidence-informed HWF policies and strategies, the Ministry of Health (MoH) conducted a health labour market analysis using a recently published guidebook for such analysis by World Health Organization (WHO).<sup>11</sup> Health labour market analysis is an approach of using an economic framework for systematically generating evidence to gain insights into the interaction and mismatches between the supply of health workers (those available and employed or willing to be employed at current wages levels); the demand for health workers (the number of funded positions available to employ health workers from the combined ability and willingness to pay from both public and private sectors), viz-a-viz the population health needs and the feasibility and impact of different policy



**Figure 1** Framework for need-based health workforce planning. Source: adapted from Asamani *et al.*<sup>15</sup>

options.<sup>12 13</sup> This paper highlights the available stock of health workers in Lesotho, projected supply versus needs and the financial implications over the next decade.

## METHODS

Using a multimethod approach, data were triangulated from multiple and diverse sources. The process included a desk review, Technical Working Group (TWG) discussions on the HWF needs and challenges, descriptive analysis and a group modelling exercise to project the future needs and supply of the HWF.

### Desk review

Several policy documents, reports and academic papers were obtained through the MoH, Lesotho Nursing Council (LNC), The National Health Training College (NHTC), Christian Health Association of Lesotho (CHAL), Ministry of Public Services and Ministry of Finance. In addition, a non-systematic general search of published and grey literature was conducted on google scholar and PubMed using the following keywords: Lesotho “AND” health workforce OR human resources for health OR health workers OR doctors OR nurses OR midwives OR wage bill OR unemployment OR training. In all, 20 relevant government policy/strategic documents, reports and 7 published papers were reviewed (see online supplemental file 1 for the list of documents reviewed). These documents were reviewed purposely to ascertain (a) data on HWF stock and densities, (b) wage bill, (c) training capacity and (d) unemployment in Lesotho. The desk review was primarily aimed to extract the needed secondary data for the descriptive analysis to inform the predictive modelling. No qualitative synthesis of different reports and papers is being reported in this piece.

### Shaping the policy issues through stakeholder engagement

Broad stakeholder engagements were undertaken through a series of meetings with directors, policymakers and implementers of the MoH to gain their perspectives to clarify the scope and potential utility of the HLMA. Several bilateral engagements were held with the LNC, Medical and Dental Council of Lesotho, CHAL, NHTC, Ministry of Public Services, Ministry of Labour, Ministry of Development Planning and some development partners and independent private practitioners to elicit their expectations and policy questions for the health labour market analysis and to obtain available data and reports relevant for the exercise. At each stage of the conceptualisation and analysis, teleconferences were held to provide updates, discuss the progress of data acquisition, issues of data quality and completeness and receive inputs to shape the subsequent steps.

### Methodology workshop

A workshop was held for 30 policy actors and stakeholders drawn from the various institutions and ministries mentioned above. The methodology workshop

## Box 1 Stock and flow formulae for HWF supply projection

$$S_{n,t} = [T_{n,t-1} \times (1 - a_n) + I_n] \times P \dots \text{equation (1)}$$

Where:

- ⇒  $S_{n,t}$  is the supply of health worker of category  $n$ , at time  $t$ .
- ⇒  $T_{n,t}$  is the aggregate stock of health worker of category  $n$  at time  $t$ .
- ⇒  $a_n$  represents the attrition rate (a proportion of the stock,  $T_{n,t-1}$  that died, retired, could not work due to ill-health or migrated out).
- ⇒  $I_n$  is the inflow of health workers of category  $n$  trained domestically or immigrating from another country.
- ⇒  $P$  is the labour participation rate or the proportion of the health workers willing to engage in professional practice.

Source: adapted from Asamani et al.<sup>15</sup>

## Box 2 Need-based health workforce requirements

$$NHS_t = \sum P_{i,j,g,t} \times [H | h, i, j, t - 1 \times (1 + R_h)] \times L_{y,h,i,j,t} \dots \text{equation (2)}$$

Where:

- ⇒  $NHS_t$  represents the ‘needed health services’ by a given population under a given service delivery model,  $L_{i,j,t}$  over a period of time  $t$ .
- ⇒  $P_{i,j,g,t}$  represents the size of the given population of age cohort  $i$ , gender  $j$  in location (rural or urban)  $g$  at time  $t$  in a given jurisdiction (this represents the population and its demographic characteristics).
- ⇒  $H_{h,i,j,g,t}$  represents the proportion of the given population with health status  $h$ , of age cohort  $i$ , gender  $j$  in location  $g$  at time  $t$  (this represents the level of health of the population).
- ⇒  $L_{y,h,i,j,g,t}$  represents the frequency of health services of type  $y$  planned or otherwise required, under a specified service model, to address the needs of individuals of health status  $h$  among age cohort  $i$ , gender  $j$  in location  $g$  over time  $t$  (this represents the level of service required by the population).
- ⇒  $R_h$  is the instantaneous rate of change of the health status,  $h$ .

$$SW_{n,y} = \frac{AWT_n}{SS_{y,n}} \dots \text{equation (3)}$$

Where:

- ⇒  $SW_{n,y}$  is the standard workload for health professionals of category  $n$  when performing health service activity  $y$ .
- ⇒  $AWT_n$  is the annual available working time of the health professional of category  $n$ .
- ⇒  $SS_{y,n}$  is the service standard or the time it takes a well-trained health professional of category  $n$  to deliver the service activity,  $y$ .

$$\text{Needs - based HWF requirements}_{n,y} = \frac{NHS_{n,y,t}}{SW_{n,y}} \dots \text{equation (4)}$$

- ⇒  $NHS_t$  represents the number of needed health service activity  $y$ , to be delivered by a health professional of category  $n$  at time  $t$ .
- ⇒  $SW_{n,y}$  is the standard workload for health professionals of category  $n$  when performing health service activity  $y$ .

Source: adapted from Asamani et al.<sup>14 15</sup>

was used to harmonise the understanding of the TWG that conducted the analysis on the methods for Health Labour Market Analysis (HLMA); build consensus on the priority labour market issues for the analysis; agree on key methodological assumptions and assess the extent of data available for analysis to address the identified priority issues and develop a roadmap for data collection, analysis and validation.



### Descriptive analysis of the health labour market

Lesotho's HWF's size, composition and distribution were analysed using descriptive statistics and contextually interpreted with the qualitative insights obtained from stakeholders to ensure consistency. The analysis and interpretation of data were undertaken jointly by WHO technical experts and MoH technical team. In the context of travel and meeting restrictions occasioned by the COVID-19 pandemic, a series of virtual working sessions were held between June and September 2020 and then from 30 November 2020 to 11 December 2020, two data analysis workshops (1 week each for descriptive analysis and group modelling exercise) were held. The workshops had active participation from clinicians, public health experts, policymakers, epidemiologists, health economists and human resource for health practitioners to thoroughly analyse and interpret the available data.

### Modelling the future supply and need-based requirements for health workers

We adopted an empirical framework for integrated analysis of HWF supply, needs and economic feasibility (figure 1).<sup>14</sup> A simulation tool in Microsoft Excel that was recently published to operationalise the empirical framework,<sup>14 15</sup> which has been applied in modelling the HWF as part of health labour market analysis in different contexts,<sup>15–18</sup> was fitted with the country-specific data from Lesotho. As HWF supply and need modelling is complex and requires multidimensional skills, a group modelling approach was used whereby a multidisciplinary team of clinicians, public health professionals, human resource practitioners and policy actors worked together to review relevant documents, Lesotho's model of care and clinical guidelines as well as routine service data and previous surveys, to identify priority health needs of the population for the projections. Using the adopted framework (figure 1), three distinct but inter-related estimations were made: (1) supply of HWF, (2) need-based requirements for HWF and (3) financial space for HWF in Lesotho. These have been extensively described in the literature,<sup>14 15 19–22</sup> hence are briefly highlighted in this section.

#### Health workforce supply forecast

Building on the stock and distribution of the HWF, the future supply of health workers was modelled using a stock-and-flow approach, as illustrated in box 1 (equation 1). This comprised determining the inflow or entry in the current workforce on the one hand and the outflow or attrition from the current workforce on the other hand. The inflow depended on the training capacity and immigration, while the outflow/attrition was influenced by retirements, emigration, deaths, resignations and dismissals.<sup>23</sup>

#### Modelling the need-based requirements for health workers

There are several methods for determining the 'needed' HWF in a country.<sup>23 24</sup> The health need-based

### Box 3 Fiscal and financial space assumptions

⇒ *Public sector HWF budget space for the year,  $i$ =(GGHE as % GDP,  $\times$ nominal GDP values)  $\times$  HWF expenditure as % GGHE  $_i$  ... equation (5)*

⇒ *Cumulative financial space for the year,  $i$ =public sector fiscal space  $_i \times (1 + \text{proportion of private sector HWF employment})$  ... equation (6)*

Where:

⇒  $i$ =target year;

⇒ GGHE=general government health expenditure;

⇒ GDP=gross domestic product.

It was conservatively assumed that if the government continued to spend a similar proportion of GDP on health and a similar proportion of GGHE on HRH, all other things being equal, the fiscal space for HRH would be proportional to the size of the GDP. It was further assumed that the private sector would not contract and that a conservatively similar proportion of private-sector employment would continue.

Source: Asamani and Cometto as applied in HLMA in Rwanda.<sup>32</sup>

or epidemiology approach was adopted following the assumption that the need for health workers flows directly from the 'need for health services'.<sup>25 26</sup> Box 2 provides the detailed formulae for computing the need-based requirements.

#### Estimating the population's 'need for health services'

First, the 'need for health service' covering at least 98% of the disease burden in Lesotho was estimated. A desk review of the prevalence rates of diseases and their risk factors and coverage rates of priority public health interventions was conducted. For each of the diseases and risk factors, a team of clinicians worked together to identify the planned or otherwise necessary health intervention to address them and the health worker occupational group that has the competency to do so. The appropriate population cohorts (demographic groups, gender and location) that will benefit from the interventions (services) were identified and matched to generate the need-based service requirements for each given year (equation 2). Details of the identified disease burden are contained in online supplemental file 2.

#### Translating the need for health service into need-based staffing requirements

The second stage of the model translated the aggregated need for the different health services into 'need-based staffing requirements' using a measure of standard workload (using equation 3)—defined as the volume of work within one health service activity that one health worker can accomplish within a year to acceptable professional standards (see online supplemental file 2). The standard workload determined by a multidisciplinary clinician team constituted and trained for that purpose was then used to translate the need-based service requirements (estimated in equation 2) into need-based HWF requirements using equation 4.

**Table 1** Stock and densities of health workforce in Lesotho

ISCO-08 code	Staff category (ISCO-08 classification)	Estimated active stock	Employment sector			Density per 10000 population	% of those employed who are in the public sector	% of those employed who are in private not for profit	% of those employed who are in private for profit
			Public	Private not for profit	Private for profit				
2211	Community health workers	14 508	9196	5312	0	72.21	63.39	36.61	0.00
2212	Dental assistants and therapists	66	20	25	21	0.33	30.30	37.88	31.82
222	Dentists	25	13	5	7	0.12	52.00	20.00	28.00
3221	Dietitians and nutritionists	29	19	10	n.d.	0.14	65.52	34.48	0.00
2261	Environmental and occupational health and hygiene workers	144	144	n.d.	n.d.	0.72	100.00	0.00	0.00
3251	Generalist medical practitioners	380	263	50	67	1.89	69.21	13.16	17.63
2263	Healthcare assistants and other personal care workers in health services	849	384	459	6	4.23	45.23	54.06	0.71
2264/3255	Medical and dental prosthetic technicians	13	13	n.d.	n.d.	0.06	100.00	0.00	0.00
2267	Medical and pathology laboratory technicians	273	135	66	4	1.36	65.85	32.20	1.95
3211	Medical imaging and therapeutic equipment operators	41	28	7	6	0.2	68.29	17.07	14.63
3212	Medical records and health information technicians	349	158	182	9	1.74	45.27	52.15	2.58
3214	Nursing and midwifery professionals	2779	667	632	50	13.83	49.44	46.85	3.71
3253	Nursing associate professionals	967	408	171	33	4.81	66.67	27.94	5.39
2265	Optometrists and opticians	13	3	5	5	0.06	23.08	38.46	38.46

Continued

**Table 1** Continued

ISCO-08 code	Staff category (ISCO-08 classification)	Estimated active stock	Employment sector			Density per 10000 population	% of those employed who are in the public sector	% of those employed who are in private not for profit	% of those employed who are in private for profit
			Public	Private not for profit	Private for profit				
5321	Pharmaceutical technicians and assistants	347	166	130	5	1.73	55.15	43.19	1.66
3252	Pharmacists	97	48	31	18	0.48	49.48	31.96	18.56
2262	Physiotherapists and physiotherapy assistants	22	17	3	2	0.11	77.27	13.64	9.09
3213	Specialist medical practitioners	40	17	10	13	0.2	42.50	25.00	32.50
		<b>20 942</b>	<b>11 699</b>	<b>7 098</b>	<b>246</b>				

Source: authors' analysis based on data from Lesotho Nursing Council, Ministry of Health, Lesotho Medical and Dental Council, WHO/AFRO HRH survey, 2019. ISCO-08, International Standard Classification of Occupations 2008 version; n.d., no data available at the time of analysis.

**Forecasting financial space for the health workforce**

The economic demand for health workers is reflected in a country's ability and willingness to pay for health workers in its efforts to meet the health need of the population.<sup>13</sup> Thus, aggregate demand is an estimate of the collective financial capacity of the government, development partners and the private sector in purchasing healthcare services, of which the cost of health workers' wages represents a substantial proportion. This approach assumes that countries (governments and partners) will not necessarily spend on healthcare more than they can afford, even if their health or level of health utilisation is suboptimal relative to an internationally established metric.<sup>13</sup> Therefore, demand for health workers can be gauged using the financial space for health workers, which we define as the public sector budget space for HWF employment and the private sector's contribution. As illustrated in **box 3**, we used the public sector budget space for the wage bill as a proxy and adjusted for the private sector contribution to HWF employment (equation 6). Analysis of the health sector budget was undertaken to gauge the level of prioritisation of the HWF within the successive budgets. Between 2015 and 2021, Lesotho has been spending 17.5%–20.5% of its overall public health expenditure on the HWF remuneration.<sup>6 27</sup> Assuming this level of prioritisation, a potential budget space was simulated using equations 5 and 6, the projected gross domestic product (GDP) growth rate estimated by the World Bank<sup>28</sup> and the general government health expenditure as a share of GDP.

**FINDINGS**

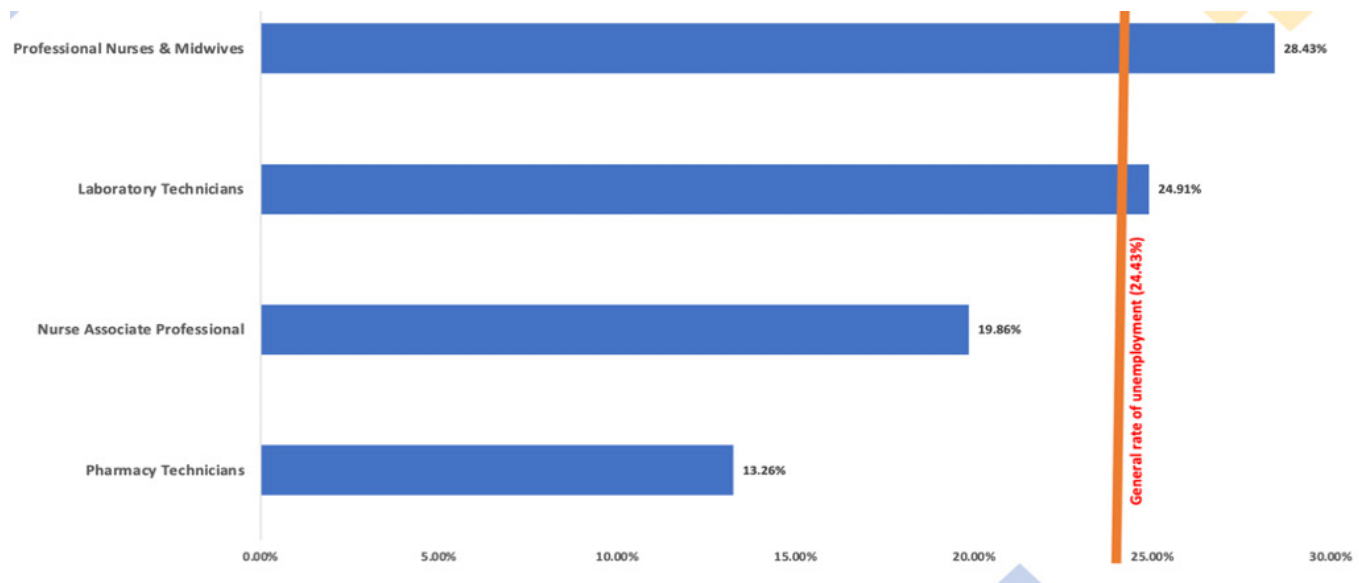
**Health workforce stock, densities and distribution**

Triangulating from the various data sources, it was estimated that there were about 20 942 active HWF across 18 health occupations in Lesotho in 2020 (**table 1**). Of this, the large majority (69%) were community health workers, followed by nurses and midwives (professionals and associate professionals), who constitute 17.9% (n=3746). Medical practitioners and specialists make up a smaller proportion of 2% (n=420) of the health workforce stock.

The density of doctors, nurses and midwives in Lesotho was estimated to be 20.73 per 10 000 population, representing about 47% of the WHO SDG indicative threshold of 44.5 per 10 000 needed to make progress towards universal health coverage (UHC). However, the density of 72.2 community health workers per 10 000 population is higher than Africa's average of 5 per 10 000 population.<sup>29</sup>

**Unemployed health workers**

Triangulating data from regulatory bodies and the MoH job seekers database showed that nearly one out of three professional nurses and midwives (28.43%, n=1349) were unemployed—about four percentage points higher than the country's unemployment rate of 24%. Almost 20% of associate nurse professionals (192 out of 967), 13.26%



**Figure 2** Health workforce unemployment rates versus general unemployment rate, 2019. Source: authors' construction based on data from Ministry of Health.

of pharmacy technicians (46 out of 347) and 24.91% of laboratory technicians (68 out of 273) were also unemployed (figure 2).

#### Supply projections for selected categories of the health workforce, 2020–2030

A stock-and-flow method of workforce supply was adopted to estimate the anticipated supply of health workers up to 2030 (equation 1). Twenty-three occupations were prioritised by the MoH for supply and need modelling. The annual enrolments, dropouts and outputs (graduation) from training institutions were obtained from the health training institutions and triangulated with data from the professional regulatory bodies (for regulated professions), while attrition was estimated from routine administrative records of the MoH.

The results show that across 23 categories of health workers, Lesotho's aggregate HWF stock is expected to progressively increase at an average rate of 1.01% annually. By 2030, the supply of these 23 categories of health workers is expected to reach a total of 22 610 from 19 934 in 2020 if the current trend of production and attrition continues without interventions on either side (table 2). The most considerable proportional growth in the HWF stock is expected among nutritionists and dietitians, who may increase by almost sevenfolds from 29 in 2020 to 199 by 2030. The environmental health officers who are trained locally are also expected to increase by at least 3.5-folds from 144 within the public sector alone in 2020 to >500 by 2030.

For general medical practitioners, the prevailing rate of foreign production, if continued, will likely yield an increase of 53.4% from the baseline stock of 380 in 2020 to 583 within 10 years. This expansion could have a knock-on effect on specialist training that could boost the stock of medical specialists (of all fields) from 40

in 2020 to about 70 within 10 years. The production of nursing and midwifery professionals is also anticipated to lead to a net increase of 61.6% above the baseline stock of 2779 in 2020 to roughly 4490, barring any unprecedented outmigration and/or declining enrolments resulting from negative feedback of the large (28%) unemployment among professional nurses/midwives. Holding the same assumptions, nursing associate professionals (nurse assistants) are likely to increase from 967 in 2020 to 1560 within 10 years if no interventions target inflows or outflows.

The density of doctors, nurses and midwives, estimated to be 21 per 10 000 population in 2020, is likely to improve by 27% to 26.73 per 10 000 population by 2025 and then 31.49 per 10 000 population by 2030. This will represent almost 70% of the WHO SDG threshold of 44.5 physicians, nurses and midwives per 10 000 population. Thus, even when future population growth is accounted for, the increases in the density of doctors, nurses, and midwives per 10 000 population are likely to be close to 50% within 10 years if the current production rate is sustained.

#### Need-based requirements for health workforce, 2020–2030

The need-based modelling revealed that, across both public and private sectors, the population's health needs of Lesotho required at least 17 681 health workers across 23 occupational groups in 2020, which could increase by 35.3% to 23 922 by 2025 and escalate by a further 48.4% to 35 506 by 2030 in line with expanding health needs of the population, mainly due to ageing, resulting from increasing life expectancy and the changing disease patterns. If all the estimated need-based requirements are translated into positions and filled, it would have translated into a workforce (doctors, nurses and midwives) density of 36.55 per 10 000 population in 2020 and 46.72



**Table 2** Projected supply of health workers, 2020–2030

No.	Health professionals	Estimated aggregate supply					
		2020	2022	2024	2026	2028	2030
1.	Biomedical scientist	60	66	72	78	85	91
2.	Community health workers	14 508	14 288	14 072	13 859	13 651	13 446
3.	Dental assistants and therapists	66	81	96	110	123	136
4.	Dental specialists	1	1	1	1	1	1
5.	Dentists	25	25	26	26	27	27
6.	Dietitians and nutritionists	29	64	99	133	167	199
7.	Environmental and occupational health and hygiene workers	144	223	299	372	442	509
8.	Epidemiologist	5	6	7	8	9	9
9.	Generalist medical practitioners	380	422	463	504	544	583
10.	Health educators	58	63	69	74	79	84
11.	Medical and pathology laboratory technicians	273	290	306	321	336	351
12.	Medical imaging and therapeutic equipment operators	41	44	48	51	54	58
13.	Nursing and midwifery professionals	2779	3150	3505	3847	4175	4490
14.	Nursing associate professionals	967	1090	1211	1330	1446	1560
15.	Occupational therapist	–	–	–	–	–	–
16.	Optometrists and opticians	13	15	16	18	20	21
17.	Pharmaceutical technicians and assistants	347	375	401	428	453	478
18.	Pharmacists	97	131	164	197	229	260
19.	Physiotherapists and physiotherapy assistants	22	23	24	25	26	27
20.	Psychiatric social worker	–	–	–	–	–	–
21.	Psychologists	29	37	45	53	60	68
22.	Specialised nursing professional	50	68	87	105	123	140
23.	Specialist medical practitioners	40	46	52	58	64	70
<b>Lesotho</b>		<b>19934</b>	<b>20509</b>	<b>21064</b>	<b>21598</b>	<b>22113</b>	<b>22610</b>

Source: authors' analysis using triangulated data curated from various sources.

There were no data on the current stock and training of occupational therapists and psychiatric social workers. Hence, their anticipated supply could not be estimated. However, they were considered high priority areas for urgent training; hence, their need estimation was conducted, as shown in tables 3 and 4.

per 10 000 population by the year 2030 (compared with the WHO SDG threshold of 44.5 per 10 000 population). **Table 3** shows the estimated population health need-based requirements for the various health occupational groups included in the analysis.

### Health workforce need versus supply gaps, 2020–2030

The status of the HWF in Lesotho as per the analysis demonstrates that the country required 17 681 health workers across various occupational categories in both public and private sectors in 2020 (including community health workers), which will likely increase to 23 922 in 2025 and then 35 506 in 2030 if the current trends of production and underlying factors of need remain relatively constant. If community health workers are not included, the additional health workers needed was 5915 in 2020, likely reaching 6418 by 2030. The increasing gap suggests that the country's rate of health workforce production is at a relatively slower pace than the rate of growth in the actual need for health workers.

Comparing the supply and need-based requirements estimates, the supply of health workers in 2020 (both employed and unemployed) represented only 47% of the aggregate requirement. This is, however, expected to gradually improve to 53% in 2025 and 55% in 2030. In contrast, the supply of community health workers was 131% more than the estimated need-based requirements in 2020, but as the population health need evolves, the need-based excess of community health workers will decline to 30% in 2025 and reach undersupply of 32% by 2030 if additional community health workers are not trained and engaged.

The baseline need-based shortage of general practitioners was estimated to be 264 (59% of the need is met by the supply); shortage of 240 pharmacists (only 22% of the need is met by the supply) and 475 need-based shortage of professional nurses (15% need-based shortfall). However, the shortage of nursing associate professionals at baseline was estimated to be 2084, representing



**Table 3** Need-based requirements for health workers

No.	Health professionals	Need-based requirements											
		2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
1	Biomedical scientist	175	179	182	186	190	196	200	205	210	216	223	
2	Community health workers	6271	6933	7693	8566	9571	10739	12074	13615	15394	17450	19848	
3	Dental assistants and therapists	369	372	375	378	381	391	394	397	400	403	412	
4	Dentists	126	127	128	129	130	133	134	135	137	138	141	
5	Dental specialists	11	11	11	11	11	11	11	11	11	12	12	
6	Dietitians and nutritionists	122	126	132	137	143	153	160	168	177	187	200	
7	Environmental and occupational health and hygiene workers	360	363	366	369	372	375	378	381	384	387	390	
8	Epidemiologist	8	8	9	9	9	9	9	10	10	10	10	
9	Generalist medical practitioners	644	664	684	706	730	758	786	817	851	889	932	
10	Health educators	62	63	63	64	64	65	65	66	66	67	67	
11	Medical and pathology laboratory technicians	595	614	634	656	680	709	737	767	799	834	877	
12	Medical imaging and therapeutic equipment operators	53	54	55	55	56	57	58	59	60	61	61	
13	Nursing and midwifery professionals	3254	3355	3460	3571	3686	3826	3954	4089	4230	4379	4549	
14	Nursing associate professionals	3051	3127	3208	3294	3386	3492	3597	3710	3832	3965	4117	
15	Occupational therapist	22	22	22	22	23	23	23	23	23	23	24	
16	Optometrists and opticians	29	30	30	31	31	33	33	34	34	35	36	
17	Pharmaceutical technicians and assistants	729	746	764	783	804	837	863	891	921	956	1000	
18	Pharmacists	437	449	461	474	488	502	518	535	553	573	594	
19	Physiotherapists and physiotherapy assistants	40	40	40	41	41	41	42	42	42	42	43	
20	Psychiatric social worker	47	47	48	48	48	49	49	50	50	50	51	
21	Psychologists	888	914	943	975	1009	1065	1109	1158	1212	1274	1361	
22	Specialised nursing professional	327	338	349	360	372	385	399	413	429	446	464	
23	Specialist medical practitioners	60	62	65	67	70	73	77	80	85	90	95	
	<b>Total</b>	<b>17681</b>	<b>18644</b>	<b>19722</b>	<b>20932</b>	<b>22296</b>	<b>23922</b>	<b>25670</b>	<b>27655</b>	<b>29912</b>	<b>32486</b>	<b>35506</b>	

Source: authors' analysis using triangulated data curated from various sources.

**Table 4** Need-based requirements versus supply gap analysis, 2020–2030

No.	Health professionals	2020				2025				2030			
		Need (a)	Supply (b)	Gap (b-a)	SAR (b/a)	Need (a)	Supply (b)	Gap (b-a)	SAR (b/a)	Need (a)	Supply (b)	Gap (b-a)	SAR (b/a)
1	Biomedical scientist	175	60	115	34.2%	196	75	120	38.5%	223	91	132	40.7%
2	Community health workers	6271	14508	8237	231.3%	10739	13965	3226	130.0%	19848	13446	6402	67.7%
3	Dental assistants and therapists	369	66	303	17.9%	391	103	288	26.3%	412	136	275	33.1%
4	Dental specialists	11	1	10	9.4%	11	1	10	8.5%	12	1	11	7.7%
5	Dentists	126	25	101	19.8%	133	26	107	19.7%	141	27	113	19.5%
6	Dietitians and nutritionists	122	29	93	23.9%	153	116	37	75.9%	200	199	0	99.8%
7	Environmental and occupational health and hygiene workers	360	144	216	40.0%	375	336	39	89.5%	390	509	119	130.4%
8	Epidemiologist	8	5	3	60.9%	9	7	2	79.1%	10	9	1	91.9%
9	Generalist medical practitioners	644	380	264	59.0%	758	484	274	63.8%	932	583	349	62.6%
10	Health educators	62	58	4	93.2%	65	71	6	109.8%	67	84	16	124.3%
11	Medical and pathology laboratory technicians	595	273	322	45.9%	709	313	396	44.2%	877	351	525	40.1%
12	Medical imaging and therapeutic equipment operators	53	41	12	77.2%	57	50	8	86.7%	61	58	4	93.7%
13	Nursing and midwifery professionals	3254	2779	475	85.4%	3826	3678	149	96.1%	4549	4490	58	98.7%
14	Nursing associate professionals	3051	967	2084	31.7%	3492	1271	2221	36.4%	4117	1560	2557	37.9%
15	Occupational therapist	22	-	22	0.0%	23	-	23	0.0%	24	-	24	0.0%
16	Optometrists and opticians	29	13	16	44.8%	33	17	15	53.2%	36	21	14	59.7%
17	Pharmaceutical technicians and assistants	729	347	382	47.6%	837	415	423	49.5%	1000	478	522	47.8%
18	Pharmacists	437	97	340	22.2%	502	181	322	36.0%	594	260	333	43.8%
19	Physiotherapists and physiotherapy assistants	40	22	18	55.2%	41	25	16	60.5%	43	27	15	64.0%

Continued

**Table 4** Continued

No.	Health professionals	2020				2025				2030			
		Need (a)	Supply (b)	Gap (b-a)	SAR (b/a)	Need (a)	Supply (b)	Gap (b-a)	SAR (b/a)	Need (a)	Supply (b)	Gap (b-a)	SAR (b/a)
20	Psychiatric social worker	47	-	47	0.0%	49	-	(49)	0.0%	51	-	(51)	0.0%
21	Psychologists	888	29	859	3.3%	1065	49	1016	4.6%	1361	68	1,294	5.0%
22	Specialised nursing professional	327	50	277	15.3%	385	96	289	24.9%	464	140	323	30.3%
23	Specialist medical practitioners	60	40	20	66.3%	73	55	18	75.8%	95	70	25	73.6%
<b>Overall for Lesotho</b>		<b>17681</b>	<b>19934</b>	<b>2253</b>	<b>47%</b>	<b>23922</b>	<b>21333</b>	<b>2589</b>	<b>53%</b>	<b>35506</b>	<b>22610</b>	<b>12896</b>	<b>55%</b>

Source: authors' analysis using triangulated data curated from various sources. SAR, Staff Availability Ratio.

an almost 68% shortfall in supply compared with the need. Similarly, of 327 specialised nurses needed, the supply was only 50 in 2020, representing a paltry 15% of the need. Thus, there was a massive shortage of 85% of specialised nurses needed in 2020, which may reduce by 15 percentage points to 70% by 2030. In comparison, the need-based shortage general practitioners by 2030 will likely be 62% (n=349); 74% (n=25) for medical specialists; 41% (n=132) for biomedical scientists and 44% (n=333) for pharmacist. [Table 4](#) compares the projected needs with supply to establish the potential need versus supply mismatches for all the occupational categories considered in the analysis.

#### Financial feasibility analysis: estimates of financial space versus the cost of supply and needs, 2020–2030

Using the trend of public sector expenditure prioritisation for the health sector and the level of prioritisation of the health workforce spending within the health budget (17%–21% of the recurrent expenditure), the fiscal space for the health workforce was estimated to be US\$34.2 million in 2020 which would likely grow to US\$55.57 million by 2030. Additionally, the private sector's contribution to health workforce employment (estimated at 20%) translates into US\$6.8 million in 2020, which may reach US\$11.11 million by 2030. Thus, the composite financial space for the HWF was US\$40.94 million in 2020, which on the back of a weak medium-term economic outlook,<sup>30</sup> could only increase by 6.3% annually, up to US\$66.69 million by 2030 across public and private sectors, representing 1.7%–2.2% of GDP over the 10 years ([table 5](#)).

In comparison, the cost of employing all health workers in the supply pipeline (in addition to the currently employed ones) is estimated to be US\$61.48 million in 2020 (2.5% of GDP), expanding considerably to US\$104.24 million by 2030. Thus, a 33% deficit is apparent between the financial space and what is required to guarantee employment for all health workers in the supply pipeline in 2020. Against a backdrop of a sluggish medium-term economic outlook with fiscal pressures, this financial deficit is likely to worsen to 36% by 2030 if the health workforce is not better prioritised beyond the current 17%–20% of recurrent health expenditure. Addressing the gap requires increasing the HWF budget by at least 12.3% annually up to 2030 or spending at least 33% of the recurrent health budget on the HWF employment and remuneration. With the prevailing level of HWF prioritisation within public health spending, the investment can only meet 32%–37% of the requirements needed to address the country's disease burden and changing demographic dynamics of the population ([tables 5 and 6](#)).

As shown in [figure 3](#), up to 67% of the HWF could potentially be employed within the estimated financial space, but it would marginally decline to 64% by 2030 if there is no expansion in the budgetary allocation or prioritisation of the health investments. If this continues, there would

**Table 5** Financial feasibility analysis: supply and needs compared with estimated financial space

Cost implications and financial sustainability estimates	2020	2022	2024	2026	2028	2030
Public sector budget space, US\$ (A)	34 116 487	37 613 427	41 468 804	45 719 356	50 405 590	55 572 163
Estimated private sector demand, US\$ (B)	6 823 297	7 522 685	8 293 761	9 143 871	10 081 118	11 114 433
Cumulative financial space, US\$ (C)	40 939 785	45 136 113	49 762 564	54 863 227	60 486 708	66 686 595
Cost of employing projected supply, US\$ (D)	61 479 612	70 554 451	79 359 175	87 902 920	96 194 489	104 242 360
Cost of filling need-based requirements, US\$ (E)	128 963 555	136 000 689	143 979 466	154 092 996	164 830 152	178 247 628
Cost of training to fill need-based gaps, US\$ (F)	221 198 068	216 518 785	216 867 854	226 459 999	240 790 255	267 017 553
Overall investment requirement (need-based employment+cost of training), US\$ (E+F)	350 161 622	352 519 475	360 847 320	380 552 995	405 620 407	445 265 181
The proportion of the supply-side wage bill that could be absorbed by the estimated financial space (D/C)	66.59%	63.97%	62.71%	62.41%	62.88%	63.97%
The proportion of need-based wage bill that could be absorbed by economic capacity (E/C)	31.75%	33.19%	34.56%	35.60%	36.70%	37.41%
Per cent of public health sector wage required to absorb 'unemployed' health workers	60.20%	67.58%	71.37%	72.27%	70.84%	67.58%
Proportional increase required in HWF allocation to meet need-based requirements	182.41%	169.26%	157.76%	149.63%	141.61%	136.60%

Source: authors' analysis using triangulated data curated from various sources.

possibly be HWF unemployment of 33%–37% between 2020 and 2030, given an unmitigated health workforce production pipeline. These estimates are quite similar to the estimated 22% (range: 13%–28%) unemployment rate among nurses, pharmacy technicians and laboratory technicians based on the job seekers' register kept by the MoH.

## DISCUSSION

We found that Lesotho had a density of 20.72 doctors, nurses and midwives per 10 000 population from 6.7 per 10 000 in 2005,<sup>10</sup> which represents a 209% improvement over 15 years. However, previously the nursing and midwifery professionals in Lesotho were pegged at about 6000<sup>31</sup> compared with 2779 found in this analysis. The current analysis uncovered that the previous estimates used the overall number of those who ever registered as nurses and midwives in Lesotho since the establishment of the Lesotho Nursing Council, some of whom have since died, migrated or retired from active service.

It was found that the density of 72.2 community health workers per 10 000 population is higher than in most countries in Africa, where the average is 5 per 10 000 population.<sup>29</sup> This seeming reliance on community health workers is attributed to a shortage of highly qualified health professionals and the emphasis on task-shifting in the health system. However, the potential risk of labour substitution is becoming apparent whereby community health workers are taking up roles originally carried out by other health professionals, but there is no robust mechanism to evaluate the long-term impact on individual health outcomes. Thus, closer monitoring is imperative to address the quality and safety of the services provided.

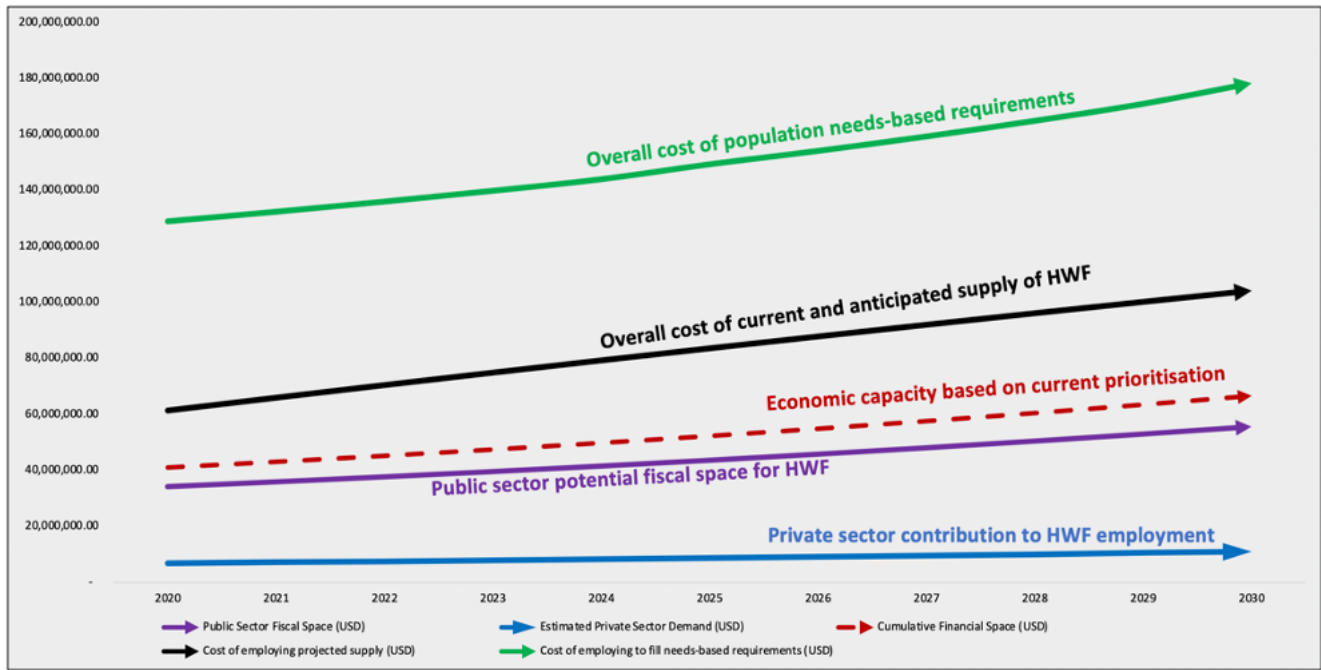
The financial space analysis suggests there may be insufficient funding to employ all the HWF that may be produced from the education pipeline by 2030 if the production of health workers and budgetary prioritisation of HWF remains the same over time. However, this phenomenon is widespread in Africa and not peculiar



**Table 6** Estimated wage bill (in US\$) of supply versus need-based requirements of selected health workers, 2020–2030

No.	Health professional	Estimated wage bill in US\$					
		2020		2025		2030	
		Need	Supply	Need	Supply	Need	Supply
1	Biomedical scientist	2 135 413.79	731 306	2 387 066.48	919 553	2 713 121.03	1 103 141
2	Dental assistants and therapists	4 500 716.08	804 436	4 759 974.44	1 254 121	5 018 431.15	1 660 601
3	Dental specialists	360 569.62	33 929	381 339.80	32 429	402 045.76	30 996
4	Dentists	3 615 982.98	717 339	3 824 277.34	752 496	4 031 927.65	785 930
5	Dietitians and nutritionists	1 481 777.76	353 464	1 865 321.87	1 415 232	2 435 956.76	2 430 073
6	Environmental and occupational health and hygiene workers	4 390 779.78	1 755 134	4 569 557.57	4 090 187	4 755 398.09	6 200 890
7	Epidemiologist	183 065.54	111 482	204 017.60	161 302	227 367.65	208 919
8	Generalist medical practitioners	18 487 264.77	10 903 558	21 739 482.27	13 875 472	26 732 934.81	16 723 209
9	Health educators	758 733.02	706 929	789 571.83	866 620	821 664.09	1 021 577
10	Medical and pathology laboratory technicians	7 249 063.45	3 327 441	8 642 662.97	3 820 954	10 683 527.62	4 280 874
11	Medical imaging and therapeutic equipment operators	647 024.65	499 726	696 068.37	603 335	749 432.42	702 364
12	Nursing and midwifery professionals	32 065 319.19	27 385 674	37 708 109.69	36 244 200	44 826 193.00	44 251 605
13	Nursing associate professionals	15 973 606.50	5 063 395	18 282 301.57	6 654 909	21 558 207.41	8 168 422
14	Optometrists and opticians	646 983.08	290 084	726 506.62	386 843	802 864.05	479 326
15	Pharmaceutical technicians and assistants	8 890 641.31	4 229 384	10 207 436.45	5 052 584	12 189 477.42	5 827 564
16	Pharmacists	7 851 300.69	1 742 115	9 022 264.72	3 245 524	10 662 457.63	4 675 251
17	Physiotherapists and physiotherapy assistants	485 445.34	268 145	502 858.14	304 150	521 070.25	333 508
18	Psychologists	13 201 937.97	4 310 42	15 832 165.15	724 031	20 230 207.04	1 004 071
19	Specialised nursing professional	3 990 493.09	609 421	4 691 984.98	1 167 527	5 649 803.27	1 711 819
20	Specialist medical practitioners	2 047 435.88	1 357 159	2 481 428.77	1 880 342	3 235 540.48	2 380 401
	Lesotho	128 963 554.48	61 321 162.77	149 314 397	83 451 811	178 247 628	103 980 542

Only cadres with both supply and need estimates are included in this cost estimate. Community health workers were removed from this estimate because they are largely remunerated by development partners, and there is no standardised salary scale.



**Figure 3** Economic feasibility analysis under different projection scenarios. Source: authors’ construction.

to Lesotho. For instance, reports from Ghana, Ethiopia, Namibia, Sierra Leone and Rwanda suggest that between 25% and 30% of some health workers may fail to find jobs and start practice within 1 year after graduation.<sup>16 32–35</sup> Addressing the HWF unemployment and filling the need-based gaps for health workers in Lesotho require an accelerated investment in the HWF (about a 12.3% annual increase in the budget), but Lesotho’s public sector wage bill, which already is nearly 24% of the GDP, coupled with weakened growth prospects imposed by the COVID-19 pandemic,<sup>30</sup> could constrain the prospects of massive investments in the HWF. The government can leverage its moderate level of debt sustainability<sup>36</sup> in addition to exploring innovative health financing mechanisms by increasing taxes on alcoholic and tobacco products, accelerating growth in tourism and mining and tackling inefficiencies in public spending, including poor budget execution and rationalising the public sector wage bill.<sup>5 28</sup>

**CONCLUSION**

Lessons from Lesotho’s case demonstrates great value in conducting a health labour market analysis to feed into national HWF strategic plan development. Lesotho’s HWF density of 20.72 doctors, nurses and midwives per 10000 population are lower than previously thought, and the overall stock of health workers covers just 48% of the need arising from the country’s disease burden. Addressing the health labour market mismatches would require bold inter-sectoral and multistakeholder policy actions to sustainably expand investments in the HWF education, recruitment, equitable distribution and retention. These are crucial to avert the growing HWF unemployment, progressively inching towards UHC targets and accelerating socio-economic growth. In this regard, expanding public sector

budget space for HWF by a sustained increase in the HWF by 12.3% annually (or at least 32% of the recurrent health sector budget) is necessary to recruit health workers being trained and ensure their retention.

**Author affiliations**

- <sup>1</sup>Health Workforce Unit, Universal Health Coverage—Life Course, World Health Organization Regional Office for Africa, Brazzaville, Republic of the Congo
- <sup>2</sup>Centre for Health Professions Education, Faculty of Health Sciences, North-West University, Potchefstroom, South Africa
- <sup>3</sup>Health Labour Market Unit, Health Workforce Department, World Health Organization, Geneva, Switzerland
- <sup>4</sup>Human Resources for Health, Open Development Lesotho, Maseru, Lesotho
- <sup>5</sup>Human Resources, Lesotho Ministry of Health and Social Welfare, Maseru, Lesotho
- <sup>6</sup>Human Resources, Ministry of Development Planning, Maseru, Lesotho
- <sup>7</sup>World Health Organization, Maseru, Lesotho
- <sup>8</sup>Department of Health Policy, Economics and Management, School of Public Health, University of Rwanda, Kigali, Rwanda
- <sup>9</sup>Health Financing and Investment Unit, Universal Health Coverage—Life Course, World Health Organization Regional Office for Africa, Brazzaville, Republic of the Congo

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planning process and was not conceived as primary research. The MoH, therefore, determined that no primary data collection was necessary and that ethical review was not required. As such, the stakeholders were engaged in their respective roles as policy actors within a constituted Technical Working Group or Steering Committee as part of a policy development process rather than research subjects.

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#### ORCID iD

Juliet Nabyonga-Orem <http://orcid.org/0000-0002-1061-8678>

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