A decade review of the health workforce in the WHO African Region, 2013-2022

Implications for aligning investments
to accelerate progress towards
universal health coverage

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A decade review of the health workforce in the WHO African Region, 2013-2022: implications for aligning investments to accelerate progress towards Universal Health Coverage

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Foreword

Economic growth and development of countries depend on a healthy population and health workers have the responsibility of ensuring this. This guides our actions in the World Health Organization (WHO) African Region that aims to ensure sustained investment in the health workforce as it increases the trust of the citizens in the government, creates jobs and reduces unemployment and poverty, improves production capacity to meet the needs of the population, and ensures resilience and health security. This report takes a 10-year view of the progress and opportunities for policy reforms and investments in the health workforce in the African region.

Over the last decade, the WHO African Region has made giant strides towards ensuring universal access to skilled and motivated health workers which is critical for achieving the sustainable development goal 3 - healthy lives and well-being for all at all ages. The overall stock of health workers has tripled over the past decade, from 1.6 million in 2013 to 5.1 million in 2022. The density of doctors, nurses, midwives, dentists, and pharmacists has increased from 11 to 27 per 10,000 population. This highlights the improved availability of qualified and skilled health workers to provide much-needed health services to the population in need. Countries have invested in establishing and sustaining over 4001 health training institutions to produce various specialities of health workers to address the population's health needs. The production capacity for health workers increased by more than 70% from almost 150 000 graduates in 2018 to at least 255 000 in 2022 - this translates to a more than 70% improvement. Several countries are progressively implementing competency-based health worker education with about 30 countries implementing the WHO prototype curriculum for nursing, midwifery, and eye health. Details on these improvements and others are presented in this comprehensive report.

Still, we still face several challenges which require urgent actions. The unemployment rate for trained health workers is rising and this contributes significantly to the high health worker migration rates out of the Region. The quality of education and training of health workers, as well as their regulation, varies widely in countries. Lastly, investment in health workforce development and management is suboptimal with 43% funding gap to ensure all trained health workers are employed. Addressing the health needs of the population across the public health functions requires investments of nearly 2% of the gross domestic product of the countries.

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Looking into the future, the report provides nuanced recommendations based on the level of progress and trajectory of the countries. Principally, there is a need to:

1. Expand the training of health workers by 8 – 12% annually to meet the health needs of our country's population.

2. Transform the health profession education curricula to be competency-based and fit-for-purpose to tackle the health-related challenges of our time, both during peacetime and emergencies.

3. Invest in expanding opportunities to employ and retain trained health workers, especially in rural and primary health care settings, while ensuring decent working conditions and the protection of health workers.

4. There is an urgent need for us all to address these challenges and continue to advance towards ensuring universal access to a qualified, skilled, equitable distributed and motivated health workforce.

Dr Matshidiso Moeti

WHO Regional Director for Africa

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Abbreviations

WHO AFRO	WHO Regional Office for Africa
CHE	Current health expenditure
COVID-19	Coronavirus disease 2019.
GSHRH	Global strategy on human resources for health: Workforce 2030
HALE	Health-adjusted life expectancy
HLMA	Health labour market analysis
HRH	Human resources for health
HWF	Health workforce
ISCO-08	International Standard Classification of Occupations – 2008
NHS	Needed health services
NHWA	National Health Workforce Account
OECD	Organisation for Economic Co-operation and Development
SADC	Southern Africa Development Community
SDGs	Sustainable Development Goals
UHC	Universal health coverage
UHC SCI	Universal health coverage service coverage index
UN	United Nations
WHO	World Health Organization

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Executive summary

Introduction: This report provides a snapshot of the health workforce (HWF) in the African Region for the decade 2013–2022. To provide a thorough understanding of the status of the workforce in the Region, the report analyses stock and density, training and education capacities, migration, employment status, supply and demand, need for health workers, expenditures, leadership and governance and the impact of HWF levels across all 47 Member States. It also analyses key performance indicators against targets. The report's main findings are summarized below.

Health workforce data availability and use have improved dramatically: In 2013, data was reported for 26% of cadres across all 47 countries of the region. This improved to 75% in 2019 and 81% in 2022.

The overall stock and density of health workers have improved, but there are wide variations among countries and regional economic communities. The HWF has tripled in size over the past decade, from only 1.6 million in 2013 to 5.1 million in 2022. The significant increase is due to a combination of improved data availability and the HWF development efforts of Member States.

In 2022, there were 27 doctors, nurses, midwives, dentists and pharmacists (occupations under United Nations Sustainable Development Goal (SDG) 3c) per 10 000 population in the Region, a 250% improvement compared to 11 per 10 000 population in 2013. While 62% of countries (n = 29) were on a positive trajectory between 2018 and 2022, 18 countries (38%) recorded negative growth in the density per 10 000 population. The most significant improvement was witnessed in the Arab Maghreb Union (from 7.93 to 34.48), the Southern Africa Development Community (SADC) (from 17.24 to 47.01), and the Common Market for Eastern and Southern Africa (from 16.01 to 38.79). There were 2.6 million doctors, nurses, midwives, dentists and pharmacists in the African Region, a 300% increase since 2013, with an annual growth rate of 13%.

Population growth is outpacing the growth of health workers: Overall, 37 countries showed a positive trajectory in increasing their number of health workers (headcount) between 2018 and 2022, but the workforce density per 10 000 population increased in only 29 countries. This illustrates that populations are growing faster than the workforce development rate. The loss in workforce is also marginally due to out-migration. Eight countries (Botswana, Burundi, the Democratic Republic of the Congo, Malawi, Mali, Niger, Rwanda and Senegal) increased their stock, but population growth outpaced it. Meanwhile, 10 countries (the Central African Republic, Chad, Eritrea, Gabon, The Gambia, Guinea, Lesotho, Liberia, Madagascar, and Mauritius) saw their number of health workers and their density reduce between 2018 and 2022.

Almost one in three skilled health workers in the Region is paradoxically unemployed: HWF unemployment for SDG 3c occupations was estimated to be 26.57% (with a 95% confidence interval of 14.03%—39.11%). This estimate is from a sample of 10 countries in the Region, where there is also a needs-based shortage of health workers as defined by national staffing norms and standards.

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Sex composition: Overall sex-disaggregated data for health worker occupations (including data from doctors, nurses, midwives, community health workers, dentists and pharmacists) show that about three quarters of the health workforce (72%) is female. Occupations such as nursing personnel (73%), community health workers (CHWs) (79%), and midwifery personnel (94%) are predominately female, whereas only 35% of medical doctors are female. Nevertheless, more women have entered the medical workforce over the past decade, with an increase of seven percentage points; women accounted for only 28% of medical doctors in 2019.

Age distribution: The HWF in the African Region is generally young, with up to 82% of the health workers under 45 years of age. Nurses have the highest proportion (89%) of personnel under 45 years of age, followed by pharmacists (88%), midwives (85%), medical doctors (80%), CHWs (76%), and dentists (72%).

Education and training capacity has improved. Currently, a ratio of one health worker is trained for every 10 workers who are already employed. The annual education output of health workers increasing from 148 357 graduates in 2018 to more than 255 000 in 2022. This translates to a more than 70% improvement due to expanded production capacity and enhanced data availability and quality. In 2022, Member States reported that 90% of medical and 75% of nursing education programmes in the Region were accredited through national accreditation processes. However, the quality of education and training continues to be a concern for service users and policymakers.

HWF migration remains a considerable challenge: For every 10 doctors or nurses working in the African Region, at least one other is working in a country other than their country of origin. Out-migration of health workers from the Region to high-income counties accelerated during the COVID-19 pandemic. On average, about 42% [95% CI: 32% - 53%] of the health workers in the African Region intend to migrate to another country at some point in the future, with the United Kingdom, the United States, Canada, Ireland and Australia being the preferred destinations.

In 2030, the HWF is anticipated to increase by 40%, but the Region is expected still to face a 6.1 million needs-based shortage of health workers if its disease burden is to be tackled. It is projected that the Region will add some 2 million health workers to its existing stock of million health workers by 2030. However, at the current pace, there will be a shortage of health workers needed to tackle the rising burden of diseases, with the shortage projected to increase from 5.6 million in 2022 to 6.1 million in 2030.

There is a significant deficit in funding for the HWF in the African Region: In 2022, only US$ 20.85 billion (57%) of the required US$ 36.3 billion was available for HWF employment in the African Region. The funds were from domestic resources, the private sector and external development assistance. The funding gap to employ all the trained health workers in 2022 was 43%, similar to previous estimates for countries in East and Southern Africa. Despite the seemingly large amount of funds required for HWF, the figures represent, on average, less than 2% of the Gross Domestic Product (GDP) of the countries in the African Region.

Level of prioritization for HWF investments: About 7% of government expenditure in the Region on average goes to health, with expenditure ranging from 2.1% to 15.3%. In addition, countries spend an average of 43% (12%–71%) of their health expenditure on HWF remuneration, which determines employment levels in countries. Globally, about 57% of health spending goes towards HWF.

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Governance and management: Thirty-two countries have policies on human resources for health (HRH), as compared to 27 reported in 2018. In addition, nearly three quarters (74%) of the countries in the African Region have a human resource unit or department within the Ministry of Health (MoH). About 63% of countries reported the availability of intersectoral mechanisms and 83% have an up to date HRH strategic plan.

Most countries have HWF policies (80%) and strategic plans (63%) in place, but half (50%) have no commitment to increase budget allocation to implement the HWF strategic plan. Only one in three countries have prioritized dealing with health worker migration in their strategic plans. Of the 26 countries that responded to the survey, 14 countries (53%) experienced an average of four strikes (range: 1 to 17) within the 12 months preceding the assessment, signalling considerable disagreements regarding working conditions and labour relations.

While countries continue to face similar challenges, they have different capabilities in terms of education, training and budget space. It is therefore essential to tailor solutions to the HWF challenges of each country. The following recommendations under four thematic areas have emerged and are discussed in detail in this report.

1. Expanding HWF education and decent employment; and ensuring retention with a view to halving the needs-based shortage within a decade.
2. Making HWF education competency-based to better address population health needs.
3. Expanding and ensuring efficient investment in HWF across the African Region, ensuring that HWF strategies and investment plans are evidence-informed and implemented.
4. Managing ethical health worker migration and ensuring self-sustainability (train, employ and retain).

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In 2022, there were 27 doctors, nurses, midwives, dentists and pharmacists (occupations under United Nations Sustainable Development Goal (SDG) 3c) per 10 000 population in the Region, a 250% improvement compared to 11 per 10 000 population in 2013.

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01 Background

1.1   The state of health in Africa and the central role of health workers

The attainment of **Sustainable Development Goal 3 (SDG 3) is hinged on** achieving universal health coverage (UHC), which means that all people have access to the full range of quality health services they need, when and where they need them, without financial hardship. Delivering UHC, in turn, hinges on people having equitable access to health workers within resilient health systems that are capacitated to provide services along the life course and that can predict prevent, and promptly and effectively respond to public health emergencies.

The Global strategy on human resources for health (GSHRH): Workforce 2030[1] aims to accelerate progress towards achieving UHC and the SDGs by ensuring equitable access to health workers within a strengthened health system. The Global strategy on human resources for health (GSHRH): Workforce 2030[1] aims to accelerate progress towards achieving UHC and the SDGs by ensuring equitable access to health workers within a strengthened health system.

In the past two decades, the Region has made progress towards reducing its critical HWF gaps. There were more than 4000 training institutions and programmes in 2018, with the training output for doctors increasing from 6000 per year in 2005 to about 28 600 in 2018 [3]. At least 60 000 nurses and midwives were produced annually as of 2018, compared to 26 000 in 2005. **This enabled the Region to** increase its HWF (doctors, nurses, midwives, dentists, and pharmacists) from 1.8 million in 2013 to 2.8 million in 2020 [4].

The modest progress in the quantity of the HWF in the Region has contributed to progressive improvements in key health indicators. Between 2019 and 2022, all countries in the Region made some progress towards UHC. For example, healthy life expectancy[1] in the Region increased by two years, from 57 years in 2019 to 59 years in 2022 [5], and coverage of essential services increased marginally from 46% in 2019 to 47% in 2022.[2] The increase in coverage of essential services is one of the primary reasons why people live longer – about 30% of the rise in healthy life expectancy is owing to the improvement in essential service coverage [6]. However, the healthy average life expectancy and essential service coverage in the African Region are substantially lower than in other WHO regions.

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1   The HALE is an important indicator because it is the measure of health and well-being as mentioned in the vision of the World Health Organization. It is the recognized indicator for monitoring SDG 3. It represents the average number of years that a person can expect to live in "full health". It reflects years lost due to disease, injury or disability. Improvement in HALE is therefore driven by reductions in the occurrence of diseases, injuries, disabilities and deaths in the population.

2   WHO 2019. Universal Health Service Coverage Index. (https://www.who.int/data/gho/data/themes/topics/service-coverage, accessed 10 December 2022).

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There are also notable reductions in maternal and child mortality in the African Region.
[7]. The maternal mortality ratio reduced by 6% from 564 per 100 000 live births in 2019 to
512 per 100 000 live births in 2022, against a 2022 target of 215 live births. The under-five
mortality rate reduced by 10% from 76 per 1000 live births in 2019 to 69 per 1000 live births
in 2022, against a 2022 target of 49. The neonatal mortality rate reduced by 4% from 27 per
1000 live births in 2019 to 26 per 1000 live births in 2022, against a 2022 target of 20.

**Adolescent mortality reduced from 18 per 1000 live births in 2015 to 16 per 1000 live
births in 2019 and is projected to decline to 13 in 2030. Rates of childbirth among
adolescent girls remain high, but the trend is showing a steady decline.** WHO estimates
that the adolescent birth rate has declined from 110 per 1000 adolescents aged 15–19 years
between 2010 and 2015 to 102 between 2015 and 2020 [7].

**The proportion of women of reproductive age (aged 15–49 years) who have their needs
for family planning satisfied with modern methods in the African Region increased
from 47% in 2010 to 56% in 2020.** In addition, the number of deliveries with skilled birth
attendance increased by 20% from 53% between 2008 and 2014 to 65% between 2014 and
2021. If this pace is sustained, skilled birth attendance will reach 90% in 2030.

Nevertheless, the African Region disproportionately bears 23% of the global disease burden
with less than 4% of the workforce. It faces 52% of the projected global shortage of health
workers by 2030 if no action is taken [4]. Diseases are estimated to cost Africa an estimated
US$ 2.4 trillion annually [8] in lost economic productivity across all sectors. Thus, addressing
the disease burden with effective health interventions is not only a fundamental human
right but an economic investment which could propel GDP growth by an estimated 0.5%
per annum [3].

Health workers have a role to play. Evidence shows that an increase in HWF investment
[9] improves a country's health outcomes and national economies. For example, investing
in HWFs improves health care outcomes, protects global health security and stimulates
economic growth [1,10]. More specifically, modelling work shows that every US$ 1 invested
in the general HWF returns at least US$ 9 – which is also true for CHWs [1,10]. Again, many
health worker occupations are predominately female; hence, there is an opportunity for
investment in decent work to drive women's economic empowerment and inclusive
economic growth, especially among well-paying occupations.

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3   [8]

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There are persisting and emerging health system challenges that could impede further progress if urgent action is not taken.

Each year, the African Region records over 100 health emergencies. Although the time taken to detect and respond to health emergencies has shortened, extraordinary efforts in building capacity to prevent, prepare for, detect and rapidly respond to them are more critical now than ever. Building resilience anchored on a responsive and fit-for-purpose HWF cannot be overemphasized. The COVID-19 pandemic impacted progress towards achieving the health-related SDGs [11] and magnified pre-existing health system challenges which require urgent action to build resilient systems, especially the HWF for future pandemics[12].

However, investment in health, especially from domestic sources, is still low and inadequate for to achieve UHC and HWF targets. For example, 21 countries spend less than 5% of their GDP on health and, in 2019, 36 countries spent less than the minimum of US$ 112 per capita required to ensure access to essential health services. Official development assistance (ODA) in Africa has plateaued at an average of 22% of total health spending since 2011, with around half going to in-service training. Owing to the underinvestment in health, many aspects of health systems remain immature and unable to reach their potential. While the efficiency of health systems has improved by 13% since 2014, 23% of current health expenditure is still lost to technical inefficiencies [13], of which the HWF contributes at least 40%. Thus, effectively addressing inefficiencies in HWF management is a necessary intervention for better and smarter health investments.

An estimated US $ 77 billion worth of health care construction projects are ongoing across the Region as part of efforts to bridge health infrastructural shortfalls. With many international financing institutions such as the African Development Bank and other lending agencies prioritizing health infrastructure, it is critical to address the challenges of the people who will turn that infrastructure into centres of service provision: health workers.

Countries in the WHO African Region:

The WHO African Region (AFR) comprises 47 countries, including all countries in continental Africa except Egypt, Libya, Somalia, Sudan, Morocco and Tunisia, which are part of the Eastern Mediterranean Region. The Member States of the AFR are Algeria, Angola, Benin, Botswana, Burkina Faso, Burundi, Cabo Verde, Cameroon, the Central African Republic, Chad, Comoros, Congo, Côte d'Ivoire, the Democratic Republic of the Congo, Equatorial Guinea, Eritrea, Eswatini, Ethiopia, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Kenya, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Mauritius, Mozambique, Namibia, Niger, Nigeria, Rwanda, Sao Tome and Principe, Senegal, Seychelles, Sierra Leone, South Africa, South Sudan, Togo, Uganda, the United Republic of Tanzania, Zambia and Zimbabwe.

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1.2   Key health workforce initiatives since the 2000s

In Africa, the HWF has been acknowledged as crucial for health and development since the Alma Ata Declaration in 1978 [14]. In January 2002, representatives of 16 African countries, as well as international organizations, held a consultative meeting in Addis Ababa in Ethiopia, to examine the state of the HWF in Africa [15]. This was the first meeting ever held in which various stakeholders met and discussed the HWF crisis. During the meeting, the Africa Working Group was set up to map the current landscape of the HWF in Africa, identify key issues and define a broad strategy to address the prevailing HWF crisis.

The HWF was recognized as a top priority of the global agenda following the publication of the Joint Learning Initiative report in 2004 and the World Health Report in 2006, which detailed the extent of the shortage of health workers in all Member States, including those in the African Region [16,17]. This work resulted in a more comprehensive and up to date database on the HWF in the African Region. To maintain this momentum, the WHO African Region established the Africa Health Workforce Observatory in 2007 to maintain an updated regional database on the HWF, to monitor progress and support evidence-based decision-making, as well as to inform policy dialogue and the investments needed to strengthen the HWF [18].

The global focus on HWF was renewed with the establishment of the Global Health Workforce Alliance (GHWA) in 2006. This was coupled with specific World Health Assembly resolutions on HWF. Later major initiatives followed, including the Kampala declaration and agenda for global action of the First Global Forum on HRH (GHWA 2008), the United Nations (UN) consensus statement on UHC (UN 2012) and Recife political declaration on HRH (GHWA 2013c), the global strategy on HWF and the Botswana high-level consultation at the inter-ministerial level in March 2007 [19].

In 2015, the African Union held a high-level ministerial meeting was held, which resulted in the Addis Ababa Call to Action on investing in HRH for sustainable development. Other subregional initiatives included a report by the UN High-Level Commission on Health Employment and Economic Growth, which proved that HWF is a worthwhile investment and advocated for the scaling up of HRH efforts, the assembling of health ministers of the East, Central and Southern Africa Health Community (ECSA-HC) and the SADC (SAID 2016). These initiatives increased attention on HRH as the foundation of an effective health system and a determinant of health outcomes and equity.

In 2016, the GSHRH: Workforce 2030 and Working for Health programme were developed to implement a five-year action plan. In 2017, the Regional Committee for Africa adopted the Regional framework for implementing the GSHRH. In 2022, the WHO Regional Office for Africa (WHO AFRO) convened stakeholders to deliberate on the dwindling, isolated and piecemeal investment in the HWF, leading to the development of the investment charter [21] launched at the High-Level African Health Workforce Investment Forum in 2023 (see Figure 1).

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Timeline

- **2002** – 16 Country Consultative Meeting in Addis Ababa (Africa Working Group)
- **2004** – Joint Learning Initiative report
- **2006** – World Health Report – Working for Health; & Global Health Workforce Alliance (GHWA)
- **2007** – Botswana High level inter-ministerial consultations health (AU Health Strategy)
- **2008** – 1st Global Forum on HRH - Kampala Declaration on HRH
- **2010** – Global Code adopted to guide ethical management of migration
- **2012** – Roadmap for scaling up HRH in Africa adopted by Regional Committee of Health Ministers, 2012 - 2025
- **2015** – 1. AU High-level Ministerial Meeting – Addis Ababa Call to Action on investing in HRH for sustainable development. 2. Report of UN High-Level Commission on Health Employment and Economic Growth proved that HWF is a worthwhile investment
- **2016** – 1. Global Strategy on HRH: Workforce 2030. 2. Working for Health programme to implement 5-year action plan.
- **2017** – Africa Regional Framework for the Implementation of the GSHRH
- **2022** – Regional Policy Dialogue on HWF Investment
- **2024** – 1st Africa Health Workforce Investment Forum; Africa Health workforce Investment Charter

We are here!

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1.3   Why is this report needed?

WHO AFRO has developed HWF-specific frameworks, such as the regional implementation framework for the global strategy for the HWF [22] to action global landmark policy positions [1]. The recent development of the African HWF investment charter [21], which promises to stimulate more and align HWF investment, is expected to be a game changer in the African Region.

WHO AFRO has developed HWF-specific frameworks, such as the regional implementation framework for the global strategy for the HWF [22] to action global landmark policy positions [1]. The recent development of the African HWF investment charter [21], which promises to stimulate more and align HWF investment, is expected to be a game changer in the African Region.The first edition of the report [23] highlighted the progress made in the production, recruitment and retention of a well-trained, competent, responsive, motivated, productive and fairly distributed HWF, which is considered key to a functional health system. The report recommended that Member States strengthen HWF information systems and standardize data collection tools to provide accurate data to aid the development of national and regional HRH Strategic Plans (HRHSP).

1.4   Scope of the report

Unlike the 2021 report, which was based on a survey as the vehicle for data collection, this report is the result of triangulation and analysis of all available data and evidence from National Health Workforce Accounts (NHWA), Health Labour Market Analysis (HLMA) reports and published literature on the HWF across the Region to inform the following analyses:

- A 10-year trend in the stock and density of health workers in the Region and per country disaggregated by country type and by occupation.

- The status of training and education capacities in the Region.

- HWF migration.

- HWF employment status.

- The projected supply, demand and need for health workers.

- HWF budgeting and spending.

- State of HWF governance and stewardship/leadership.

- Recommendations for 2025–2030.

"

Adolescent mortality reduced from 18 per 1000 live births in 2015 to 16 per 1000 live births in 2019 and is projected to decline to 13 in 2030. Rates of childbirth among adolescent girls remain high, but the trend is showing a steady decline.

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02 Methodology

This section presents the data collection process, the analysis approach and the limitations encountered in developing the report.

2.1   Data collection process

A three-step approach was adopted to triangulate and address data discrepancies issues.

2.1.1   Data sources

The report predominantly relied on the NHWA standard [24], and the primary source of data was the NHWA data platform (https://apps.who.int/nhwaportal/Home/Index) as the institutionalized mechanism for countries to report HWF statistics. Where applicable, the NHWA was systematically combined with other sources, including HLMA reports, country HRH profiles, HRHSPs plans and annual reports of professional regulatory councils (see Figure 2). The dataset revealed that there were several data gaps and breaks in trends. Thus, cross-sectional comparisons of three time points of 2013, 2018 and 2022 were agreed on to be used for the descriptive part of the analysis.

HLMA reports were available for 14 countries for 2019–2023 as well as HRH profiles or annual statistics reports from professional regulatory bodies. For these countries, wherever NHWA data showed a break in trends or missing data points, data from other sources were used (see Table 1).

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Fig. 2. Approach to HWF data triangulation and use through NHWA
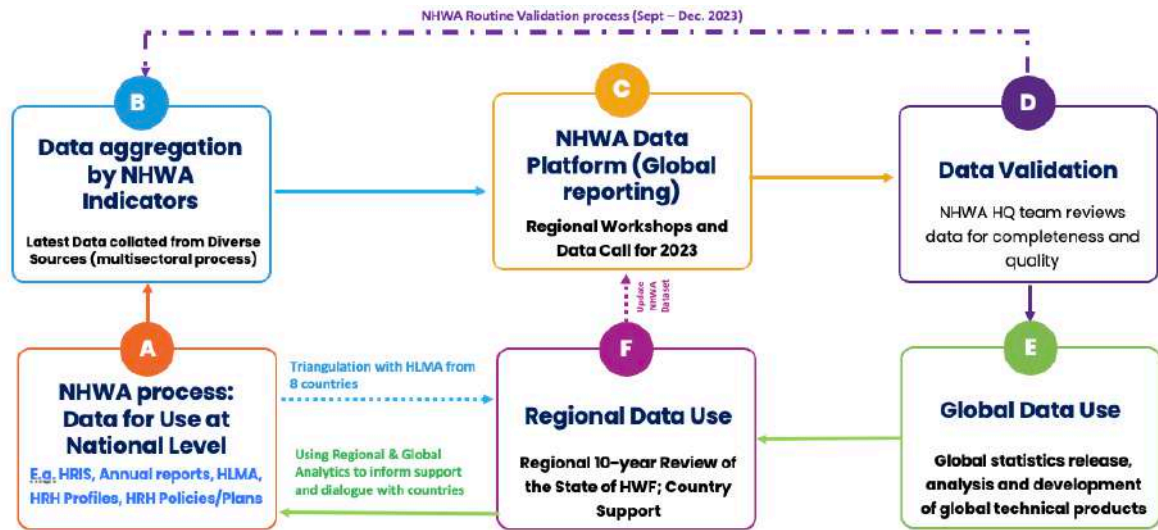
Table 1. Data sources for each country

COUNTRY	COUNTRY CODE	DATA SOURCES
Burkina Faso	BFA	NHWA Dataset
Central African Republic	CAF	NHWA Dataset
Sao Tome and Principe	STP	NHWA Dataset
Democratic Republic of the Congo	COD	NHWA Dataset
Ethiopia	ETH	NHWA Dataset & HLMA 2020
Nigeria	NGA	NHWA Dataset & HRH country profile
Gabon	GAB	NHWA Dataset
Mauritania	MRT	NHWA Dataset
Eswatini	SWZ	NHWA Dataset & HLMA 2023
Lesotho	LSO	NHWA Dataset & HLMA 2021
Algeria	DZA	NHWA Dataset
Angola	AGO	NHWA Dataset
Benin	BEN	NHWA Dataset
Botswana	BWA	NHWA Dataset
Burundi	BDI	NHWA Dataset
Côte d'Ivoire	CIV	NHWA Dataset
Cabo Verde	CPV	NHWA Dataset
Cameroon	CMR	NHWA Dataset
Chad	TCD	NHWA Dataset
Equatorial Guinea	GNQ	NHWA Dataset

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COUNTRY	COUNTRY CODE	DATA SOURCES
Gambia	GMB	NHWA Dataset
Ghana	GHA	NHWA Dataset & HLMA 2023
Guinea	GIN	NHWA Dataset
Guinea-Bissau	GNB	NHWA Dataset
Kenya	KEN	NHWA Dataset & HLMA 2023
Liberia	LBR	NHWA Dataset
Madagascar	MDG	NHWA Dataset
Malawi	MWI	NHWA Dataset
Mali	MLI	NHWA Dataset & HLMA 2023
Mauritius	MUS	NHWA Dataset
Mozambique	MOZ	NHWA Dataset & HLMA 2023
Namibia	NAM	NHWA Dataset
Rwanda	RWA	NHWA Dataset & HLMA 2019
Senegal	SEN	NHWA Dataset
Seychelles	SYC	NHWA Dataset
Sierra Leone	SLE	NHWA Dataset & HLMA 2019
South Africa	ZAF	NHWA Dataset & Nursing Council Annual Report, Health Professions Council 2022
South Sudan	SSD	NHWA Dataset
Congo	COG	NHWA Dataset
Niger	NER	NHWA Dataset
Uganda	UGA	NHWA Dataset & HLMA 2023
Zambia	ZMB	NHWA Dataset & HLMA 2023
Zimbabwe	ZWE	NHWA Dataset & HLMA 2022
Eritrea	ERI	NHWA Dataset
Togo	TGO	NHWA Dataset
Comoros	COM	NHWA Dataset
Tanzania	TZA	NHWA Dataset

2.1.2 Selection of data points for 2013, 2018 and 2022

Data reported for 2013 or the nearest year between 2012 and 2014 were used for the 2018 estimate. Similarly, data reported for 2018 or the nearest year between 2016 and 2019 was used for the 2018 estimate. For the 2022 estimate, the latest reported data was used, of which 46 countries reported in 2022 (see Table 2).

Table 2. Data availability for the occupations across the 47 countries for 2013, 2018 and 2022

S/N	ISCO 8 CODE	CADRE	NUMBER OF COUNTRIES WITH 2013 DATA	NUMBER OF COUNTRIES WITH 2018 DATA	NUMBER OF COUNTRIES WITH 2022 DATA
1	221	Medical doctors	32	47	47
1.1	2211	Generalist medical practitioners	5	47	47
1.2	2212	Specialist medical practitioners	8	45	47
2		Nursing personnel	37	47	47
2.1	2221	Nursing professionals	16	47	47
2.2	3221	Nursing associate professionals	16	37	39
3		Midwifery personnel	34	42	44
3.1	2222	Midwifery professionals	30	41	42
3.2	3222	Midwifery associate professionals	14	26	27
4	2230 & 3230	Traditional and complementary medicine practitioners	7	21	26
5	2240	Paramedical practitioners	6	30	33
6	2261	Dentists	21	46	46
7	2262	Pharmacists	27	47	47
8	2263 & 3257	Environmental and occupational health & hygiene workers	26	44	47
9	2264 & 3255	Physiotherapists and physiotherapy assistants	11	36	40
10	2265	Dietitians and nutritionists	21	34	40
11	2266	Audiologists and speech therapists	1	8	20
12	2267 & 3254	Optometrists and ophthalmic opticians	6	32	34
13	2634	Psychologists		12	23

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S/N	ISCO 8 CODE	CADRE	NUMBER OF COUNTRIES WITH 2013 DATA	NUMBER OF COUNTRIES WITH 2018 DATA	NUMBER OF COUNTRIES WITH 2022 DATA
14	2635 & 3412	Social workers	7	11	18
15	3211	Medical Imaging and therapeutic equipment technicians	13	42	42
16	3212	Medical and pathology laboratory technicians	14	42	43
17	3213	Pharmaceutical technicians and assistants	12	40	44
18	3214	Medical and dental prosthetic technicians	8	34	38
19	3251	Dental assistants and therapists	6	35	38
20	3252	Medical records and health information technicians	1	32	33
21	3253	Community health workers	9	36	40
22	3256	Medical assistants		26	29
23	5321, 5322, 5329	Personal care workers in health service		32	35
24	1342	Managerial staff	1	36	38
25		Medical and pathology laboratory scientists	9	46	47
26		Other nonmedical professional staff		34	36
27		Other nonmedical support staff		29	34
		Total	398	1164	1258

2.1.3 Adjustment for private sector contribution

It became apparent that, for some occupations, the 2022 data reported in NHWA focused mainly on the public sector. This was clear when the 2022 data were compared to the 2018 survey data point. To accommodate the contribution of the private sector to the HWF, proportions from the 2018 regional survey were used to adjust the 2022 reported values where applicable. Overall, 31% of the 1258 data points from 2022 were adjusted, resulting in a 5% (245 866) increase in the overall estimated number of health workers. The adjustment affected an average of eight of the 33 occupations across all countries (See Table 3 and Table 4).

Table 3. Proportion of the number of adjusted occupations (out of 33) across countries

S/N	COUNTRY	NUMBER OF OCCUPATIONS NOT ADJUSTED	NUMBER OF OCCUPATIONS ADJUSTED	NUMBER OF OCCUPATIONS REPORTED	PERCENTAGE OF OCCUPATIONS ADJUSTED
1	Algeria	21	9	30	30%
2	Angola	16	16	32	50%
3	Benin	24	2	26	8%
4	Botswana	14	11	25	44%
5	Burkina Faso	21	11	32	34%
6	Burundi	18	9	27	33%
7	Cameroon	30	3	33	9%
8	Cabo Verde	20	9	29	31%
9	Central African Republic	16	11	27	41%
10	Chad	19	11	30	37%
11	Comoros	14	3	17	18%
12	Congo	15	6	21	29%
13	Côte d'Ivoire	19	10	29	34%
14	Democratic Republic of the Congo	14	7	21	33%
15	Equatorial Guinea	15	4	19	21%
16	Eritrea	13	10	23	43%
17	Eswatini	18	14	32	44%
18	Ethiopia	26	2	28	7%
19	Gabon	15	18	33	55%
20	Gambia	14	11	25	44%
21	Ghana	24	7	31	23%
22	Guinea	13	7	20	35%
23	Guinea-Bissau	14	15	29	52%
24	Kenya	21	4	25	16%

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S/N	COUNTRY	NUMBER OF OCCUPATIONS NOT ADJUSTED	NUMBER OF OCCUPATIONS ADJUSTED	NUMBER OF OCCUPATIONS REPORTED	PERCENTAGE OF OCCUPATIONS ADJUSTED
25	Lesotho	17	12	29	41%
26	Liberia	17	7	24	29%
27	Madagascar	21	4	25	16%
28	Malawi	19	10	29	34%
29	Mali	20	3	23	13%
30	Mauritania	20	6	26	23%
31	Mauritius	20	10	30	33%
32	Mozambique	23	8	31	26%
33	Namibia	17	14	31	45%
34	Niger	18	8	26	31%
35	Nigeria	18	8	26	31%
36	Rwanda	19	1	20	5%
37	Sao Tome and Principe	11	3	14	21%
38	Senegal	14	18	32	56%
39	Seychelles	18	6	24	25%
40	Sierra Leone	17	9	26	35%
41	South Africa	18	10	28	36%
42	South Sudan	23	4	27	15%
43	Tanzania	15	12	27	44%
44	Togo	19	13	32	41%
45	Uganda	20	4	24	17%
46	Zambia	26	1	27	4%
47	Zimbabwe	28	5	33	15%
	Total	872	386	1258	31%

Table 4. Countries and occupations for which adjustments were made

SN	OCCUPATION	NUMBER OF COUNTRIES NOT ADJUSTED	NUMBER OF COUNTRIES ADJUSTED	NUMBER OF COUNTRIES THAT REPORTED	PERCENTAGE OF COUNTRIES ADJUSTED
1	Dental assistants and therapists	22	16	38	42%
2	Dentists	22	24	46	52%
3	Generalist medical practitioners	33	14	47	30%
4	Medical doctors	28	19	47	40%
5	Midwifery associate professionals	22	5	27	19%
6	Midwifery personnel	31	13	44	30%
7	Midwifery professionals	26	16	42	38%
8	Nursing associate professionals	26	13	39	33%
9	Nursing personnel	31	16	47	34%
10	Nursing professionals	27	20	47	43%
11	Pharmaceutical technicians and assistants	35	9	44	20%
12	Pharmacists	20	27	47	57%
13	Psychologists	20	3	23	13%
14	Specialist medical practitioners	22	25	47	53%
15	Audiologists and speech therapists	16	4	20	20%
16	Community health workers	36	4	40	10%
17	Dietitians and nutritionists	30	10	40	25%
18	Environmental and occupational health & hygiene workers	34	13	47	28%
19	Managerial staff	35	3	38	8%
20	Medical and dental prosthetic technicians	25	13	38	34%
21	Medical and pathology laboratory scientists	31	16	47	34%
22	Medical and pathology laboratory technicians	28	15	43	35%
23	Medical assistants	22	7	29	24%
24	Medical imaging and therapeutic equipment technicians	33	9	42	21%
25	Medical records and health information technicians	27	6	33	18%
26	Optometrists and ophthalmic opticians	20	14	34	41%
27	Other nonmedical professional staff	26	10	36	28%
28	Other nonmedical support staff	28	6	34	18%
29	Paramedical practitioners	23	10	33	30%

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SN	OCCUPATION	NUMBER OF COUNTRIES NOT ADJUSTED	NUMBER OF COUNTRIES ADJUSTED	NUMBER OF COUNTRIES THAT REPORTED	PERCENTAGE OF COUNTRIES ADJUSTED
30	Personal care workers in health service	28	7	35	20%
31	Physiotherapists and physiotherapy assistants	28	12	40	30%
32	Social workers	15	3	18	17%
33	Traditional and complementary medicine practitioners	22	4	26	15%
34	Total	872	386	1258	31%

2.2 Analytical approach

The following milestones in the report were achieved by taking a mixed approach.

2.2.1 Stock and density

A descriptive analysis of the stock data was undertaken in headcounts. The density of health workers in each country within the Region was calculated and expressed per 10 000 population. This metric is essential in comparing the available health workers to the population size and is a key indicator of the capacity of a health system to deliver services.

The analysis was disaggregated by occupational groups and income levels in order to provide a more comprehensive understanding of the HWF composition. This process facilitated the identification of trends among various categories of health workers, especially the SDG 3c.1 tracer occupations (medical doctors, nurses, midwives, pharmacists and dentists).

2.2.2 Training capacities

A descriptive analysis of the training and education capacities and outputs in the Region was undertaken and the relationship between training outputs and density of available stock per population examined to determine the relative adequacy or otherwise of the outputs from the education pipeline.

2.2.3 Health workforce migration

A descriptive analysis was conducted of data reported by destination countries through the NHWA and other available datasets from the Organization for Economic Co-operation and Development (OECD) was carried out. Synthesis and meta-analysis of intention to migrate from six countries that conducted exploratory surveys as part of HLMA between 2021 and 2023 were also included.

2.2.4 Health workforce employment status

There was a descriptive analysis of unemployment levels from a subset of 10 countries that conducted HLMAs between 2019 and 2023. It involved quantifying the number of unemployed health workers by occupation.

2.2.5 Projected stock and need for health workers

2.2.5.1 Methods and assumptions for health workforce stock projections

For each occupation group, the projection of health workers up to 2030 utilized a simple stock and flow model over eight years (2023–2030) which factors in the production and attrition of health workers. This modelling approach was initially applied in WHO's State of the World's Nursing 2020 report and to a global estimation of shortage in health workers conducted in 2022 [25,26]projections were computed for the year 2030. The global health workforce shortage estimation was revised.\nResults   In 2020, the global workforce stock was 29.1 million nurses, 12.7 million medical doctors, 3.7 million pharmacists, 2.5 million dentists, 2.2 million midwives and 14.9 million additional occupations, tallying to 65.1 million health workers. It was not equitably distributed with a 6.5-fold difference in density between high-income and low-income countries. The projected health workforce size by 2030 is 84 million health workers. This represents an average growth of 29% from 2020 to 2030 which is faster than the population growth rate (9.7%. In this report, the model was adapted to factor in out-migration for medical doctors and nurses. It can be expressed as follows:

$$\text{Health workforce stock}_{2030} \approx (\text{health workforce stock}_{2022} \times (1 - \% \text{ age}_{65+})) \times (1 - 0.1 \times \% \text{ age}_{55-64})^{(8-1)} + 8 \times 0.7 \times \text{number of graduates annually} - 1/20 \times \text{number of workers in a foreign country} - \text{Equation 1}$$

To estimate projections for individual years from 2023 to 2030, the value "8" used in the formula was adapted to 1 for 2023, 2 for 2024 and so on, until it reaches 8 for 2030.

The percentage of health workers older than 65 years was applied in the first projection year (2023) and later the share of those aged 55–64 years in the following years (2024–2030) was used to factor in attrition from 2023 to 2030. Since the age of retirement is 65 years in many countries [27], the share of those aged 65 and above was considered as an attrition on an annual basis. One-tenth of those aged 55–64 were considered as moving to the 65 and above category in the years after 2023.

The capacity of health systems to absorb new graduates was also factored into the modelling by adding in a fixed 70% of annual graduates [25]projections were computed for the year 2030. The global health workforce shortage estimation was revised.\nResults In 2020, the global workforce stock was 29.1 million nurses, 12.7 million medical doctors, 3.7

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million pharmacists, 2.5 million dentists, 2.2 million midwives and 14.9 million additional occupations, tallying to 65.1 million health workers. It was not equitably distributed with a 6.5-fold difference in density between high-income and low-income countries. The projected health workforce size by 2030 is 84 million health workers. This represents an average growth of 29% from 2020 to 2030 which is faster than the population growth rate (9.7%. Data from 10 countries in the African Region which conducted HLMAs between 2019 and 2023 show that 27% of the HWF are unemployed, implying an average absorption capacity of 70%. This estimate is similar to OECD data [28] that shows an average ratio of health workers who are practicing and licensed to practice of around 70% for physicians (74%), nurses (70%), dentists (70%) and pharmacists (66%). The fixed 70% absorption capacity assumes that in each country, the education market would self-regulate relative to the availability of positions in the health labour market of each country.

The out-migration factor used NHWA data on the number of medical doctors and nursing personnel reported as working in a foreign country. For medical doctors, the data correspond to the sum of foreign workers from each country of origin reported by 69 countries, and for nursing personnel the sum reported by 63 countries. It covers mostly high-income countries and large economies in the African Region such as Nigeria and Uganda. However, some countries did not report the number of foreign workers by country of origin. As a result, figures are an underestimate of the true number of workers from a foreign country. Since this figure corresponds to the total number of workers, irrespective of their time of arrival in a foreign country, a factor of 1/20 was used to mimic the annual outflow from the country of origin.

A sensitivity analysis was also conducted assuming a capacity for complete absorption of graduates in countries, while another sensitivity analysis also projected the stock of health workers in the absence of a migration pattern.

2.2.5.2 Methods for needs-based health workforce projections

Building on previous needs-based models [29–31]addressing those needs increasingly requires the knowledge, skills, and judgment of multiple types of human resources for health (HRH, and critical considerations identified from the literature review [32], a previously published needs-based tool was used for the analysis [31].

The underlying conceptual framework of the model (as shown in Figure 3) consists of needs analysis, stock/supply analysis, gap analysis and analysis of resource implications. As in most needs-based models, the fundamental assumption is that any given population requires health services. The need for health services in the population is modelled using the population disaggregated along the life course; the disease burden, which reflects the level of health of the population within the jurisdiction; and the type and frequency of health services that is planned or is necessary to realize and sustain optimal health in the population. The estimated need for health services can then be translated into the number of health professionals necessary to deliver services if the work division and standard workload (productivity standard) of health professionals are determined. The empirical model is illustrated in Box 1 [also see the following texts for detailed step-by-step guidance on the formulae: [30,31,33,34] lingering gaps in empirical models and lack of open access tools have partly constrained its uptake in health workforce planning processes in countries. This paper presents an advanced empirical framework for the need-based approach to health workforce planning with an open-access simulation tool in Microsoft® Excel to facilitate real-life health workforce planning in countries. Two fundamental mathematical models

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are used to quantify the supply of, and need for, health professionals, respectively. The supply-side model is based on a stock-and-flow process, and the need-side model extents a previously published analytical frameworks using the population health needs-based approach. We integrate the supply and need analyses by comparing them to establish the gaps in both absolute and relative terms, and then explore their cost implications for health workforce policy and strategy. To illustrate its use, the model was used to simulate a real-life example using midwives and obstetricians/gynaecologists in the context of maternal and new-born care in Ghana. Sensitivity analysis showed that if a constant level of health was assumed (as in previous works].

The estimated need and stock of health workers can then be compared in various ways, including absolute gap analysis, relative gap analysis and by estimating their cost implication for resource planning and mobilization.

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Fig. 3. The conceptual framework for HWF projection of HWF needs
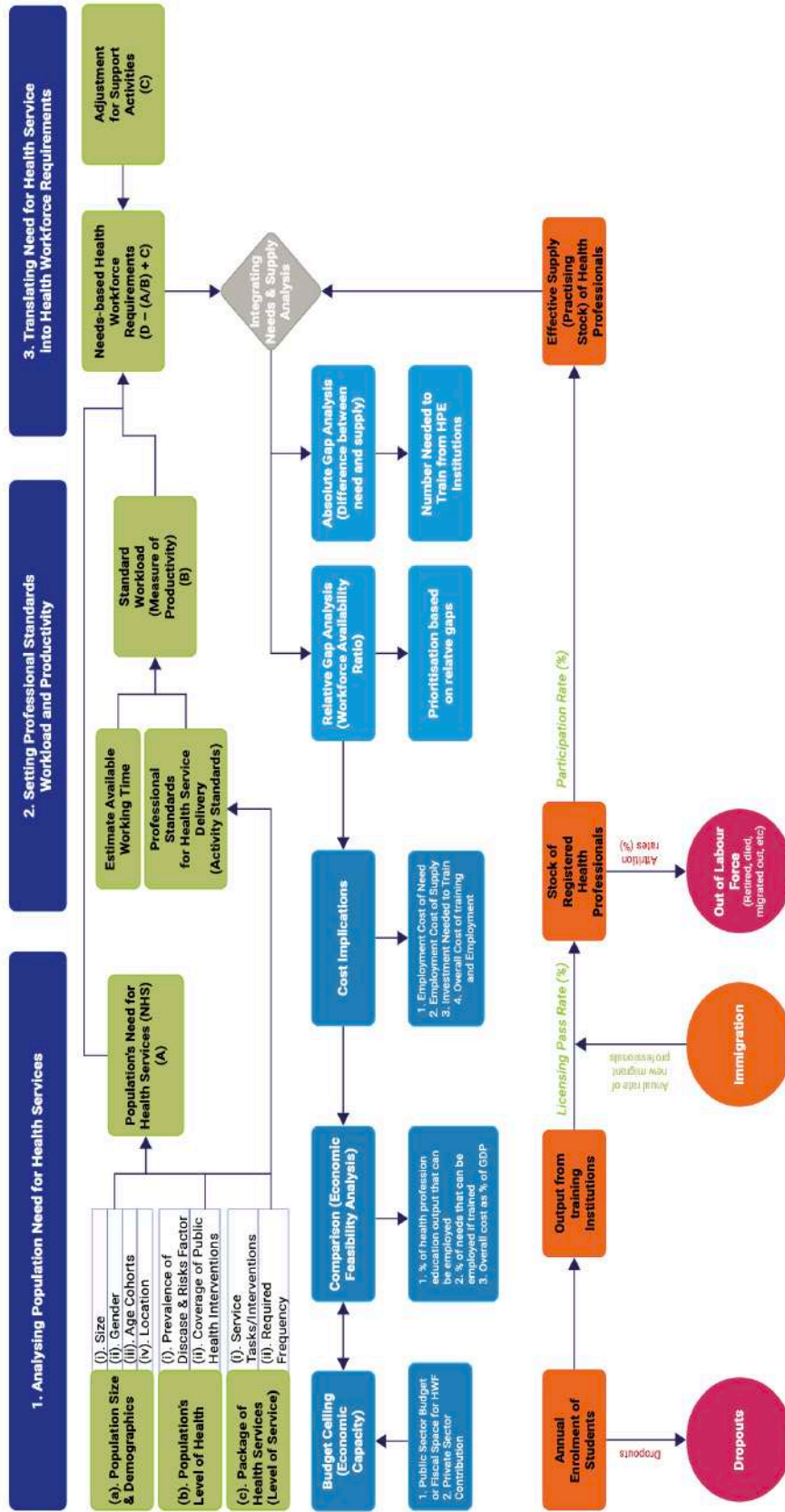
Box 1. Needs-based HWF estimation formulae

Equation 2: $NHS_t = \sum P_{i,j,g,t} \times [\, H_{h,i,j,t-1} \times (1+R_h)\,] \times L_{y,h,i,j,t}$

Where:

- **NHS_t** is the "needed health services" of the population using service delivery model, over a period t.

- **$P_{i,j,g,t}$** represents a given population in a jurisdiction in terms of size, age cohort i, gender j in location (rural or urban) g, at time t.

- **$H_{h,i,j,g,t}$** is the distribution of the population in the given jurisdiction in terms of disease and risk factors or their level of health h, along the life course of in age cohort i, gender j in location g at time t.

- **$L_{y,h,i,j,g,t}$** is the number of times health services type y that has been planned or is otherwise necessary, to optimally address the health needs of persons who have health status h in age cohort i, with gender j and in location g at time t.

- **R_h** represents the instantaneous rate of change in the level of health or health status, h.

Equation 3: $SW_{n,y} = \dfrac{AWT_n}{SS_{y,n}}$

Where:

- **$SW_{n,y}$** represents the professionally acceptable workload standard (or productivity level) for nurses or midwives of category n when delivering a health service intervention y.

- **AWT_n** represents the annual amount of time that a nurse or midwife in category n has to do their work, considering all authorized absences (available working time).

- **$SS_{y,n}$** represents a professionally acceptable standard time (service standard) that a well-trained nurse or midwife of category n will need to undertake a health service intervention y.

Equation 4: $N_{n,t} = S\,\dfrac{NHS_{n,y,t}}{SW_{n,y}}$

Where:

- **$N_{n,t}$** is the needs-based requirements of nurses/midwives of category n at time point **t.**

- **NHS_t** represents the number of needed health service activity y, delivered by nurses or midwives of category n at time t.

- **$SW_{n,y}$** is the standard workload for nurses or midwives of category n when performing health service activity y.

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2.3   Application of the health workforce needs-based framework

Fig 4: The conceptual framework for HWF projection of health workforce needs

Practically, the essential diseases or conditions, injuries, and risk factors were defined using WHO Health Observatory [35] and Global Burden of Disease Study (IHME, 2019) data [36] coordinated by the Institute for Health Metrics and Evaluation (IHME and their contribution to at least 95% of disability-adjusted life years (DALYs) and mortality, together with other priority conditions in the African Region. For each disease or condition, injuries and risk factors, the lower band and upper band were selected in addition to the normal level to account for their fluctuation range.

To compute the population in need of health services, all diseases or conditions, injuries and risk factors were mapped to the most affected life course cohort(s), gender and geographical distribution (urban or rural) using prevalence rates and disaggregated population data from UN population datasets for all countries.

After quantifying the population in need, the next step was to define essential interventions by occupation and professional acceptable time standards for delivering these interventions. Acknowledging that all health workers are not performing the interventions at the same pace, a minimum time was defined for experts, while the maximum time was attributed to novices [37,38].

The next step was to define the skill-mix of health workers required to care for diseases or conditions, injuries and risk factors (see Figure 4). Then every disease or condition, injury and risk factor was matched to the skill-mix of health workers and the necessary interventions. Data on the variables described above were input into an Excel-based analytical tool developed by WHO AFRO for such analysis in the context of broader HLMA. The tool produced estimates and scenarios analysis per country that were aggregated and analysed to produce a regional picture. The detailed step-by-step process is contained in a separate technical report [39].

2.4   Methods for the meta-analysis of health workers' intentions to migrate

Data on intention to migrate was extracted from surveys on HWF conducted in six countries (Eswatini, Ghana, Kenya, Mozambique, Zambia and Zimbabwe). To estimate the average percentage of health workers who intended to migrate and a 95% confidence interval, a meta-analysis was conducted using the DerSimonian and Laird random effect model [40]. The Higgins I^2 statistics measuring the level of heterogeneity between surveys was used, as all results had an I^2 above 90% and the random effect estimate was reported for all meta-analysis.

For each study, participants also reported in a multichoice questionnaire the countries to which they intended to migrate. To estimate an average percentage of health workers willing to migrate by country of destination, a meta-analysis was conducted for countries

to which a large percentage (above 1%) of health workers from at least four countries intended to migrate. Five destination countries were therefore included in a meta-analysis: Australia, Canada, South Africa, the United Kingdom and the United States.

2.5   Limitations

Some countries did not report data on certain occupations in 2022, so the latest available data was used. For others, inconsistent data was reported when compared with previously reported data from the same countries through the NHWA. To address this limitation, data triangulation was done with data from HLMA reports, strategies and other available government data sources. In addition, low reporting rates for some occupations, especially for non-clinical occupations, affected data completeness. Moreover, relying on self-reported data, such as in the case of migration data from "receiving" countries, may only have captured workers who qualified to register in host countries.

2.6   Assessment of data availability by number of occupations reported, 2013–2024

Reporting on the number of occupations in all countries across the Region improved tremendously between 2013 and 2022, increasing from 26% in 2013 to 75% in 2018 and 81% in 2022. No countries reported all occupations in 2013; in 2018, only one country (Gabon) reported all occupations, while in 2022, three countries (Cameroon, Gabon, and Zimbabwe) reported all occupations (see Figure 5).

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Fig. 5. Data availability in the Region for 2013, 2018 and 2022

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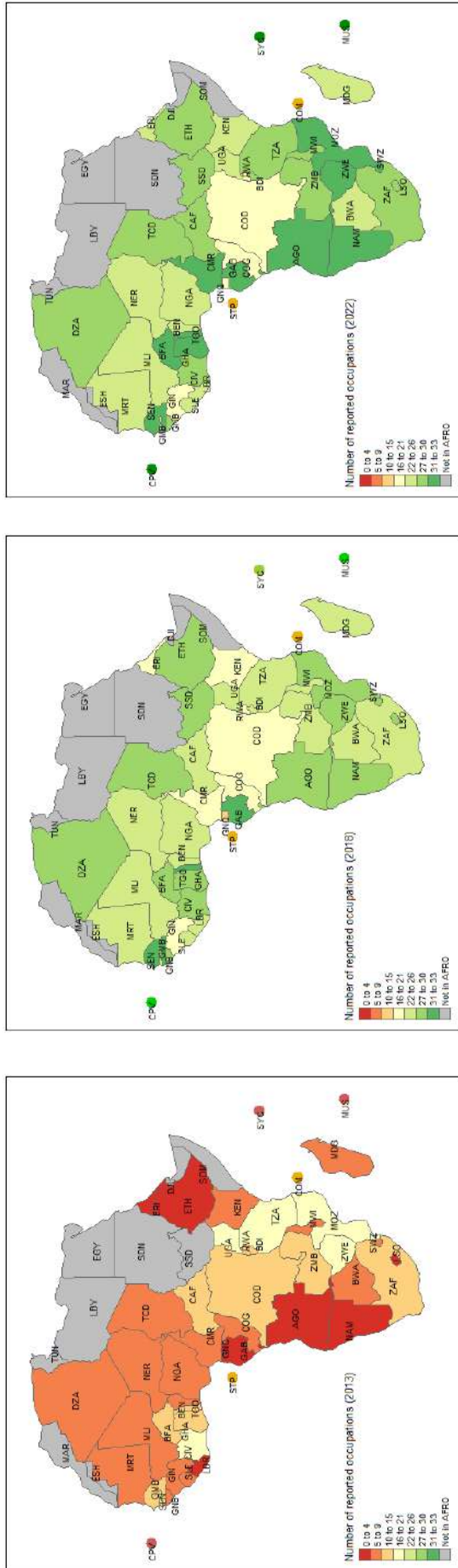
03 Regional Health Workforce Profile (Stock And Density)

3.1. Regional health workforce stock and density

In 2022 there were almost 5.1 million health workers of any kind in the African Region, compared to 4.3 million in 2018 and 1.6 million in 2013. The HWF stock increased by 300% between 2013 and 2022 owing to improved data reporting and workforce development.

Between 2018 and 2022, when data quality had improved and HWF training accelerated, the overall stock of health workers grew by 4.3% per annum across all professions and by 6.9% when the SDG 3.c occupations (medical doctors, nurses, midwives, pharmacists, and dentists) were considered (Figure 6). Owing to substantial gaps in the 2013 data, comparison with 2022 should be taken with caution – for this reason, subsequent sections of this report compare 2018 with 2022.

In 2022 there were 27 doctors, nurses, midwives, dentists and pharmacists per 10 000 population in the African Region compared to 23 per 10 000 population in 2018 and 11 per 10 000 population in 2023.

The density of these health workers in 2022 represents a 14% increase compared to 2018 and more than double when compared to 2013, when data availability was not as robust. However, the current density varies widely from low-density countries such as Niger (2.36), the Central African Republic (2.41) and Chad (3.58) to relatively high-density countries such as Namibia (72.5), South Africa (78.19) and Seychelles (242.01).

Fig. 6. Trends of stock (a) and density (b) between 2013 and 2022
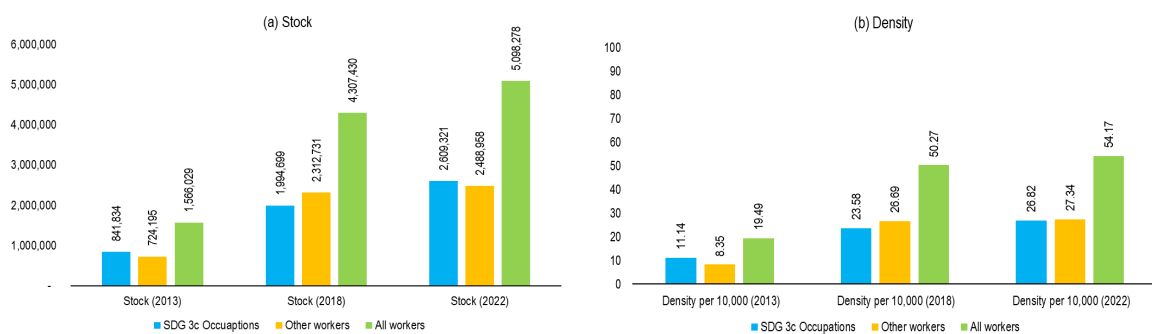
The top 12 countries have 12 times better health worker densities than the bottom 12 countries.

As demonstrated in Figure 7, the upper quartile (12 countries) with better densities has an average of 67.19 doctors, nurses, midwives, dentists, and pharmacists per 10 000 population compared to a density of 5.57 for countries in the lower quartile (12 countries). The top quartile countries are therefore 12 times better off in terms of densities than their counterparts in the lower quartile. Even after removing the top outlier (Seychelles), these top countries are nine times better.

Fig. 7. The changes in SDG 3c densities for the upper and lower quartiles
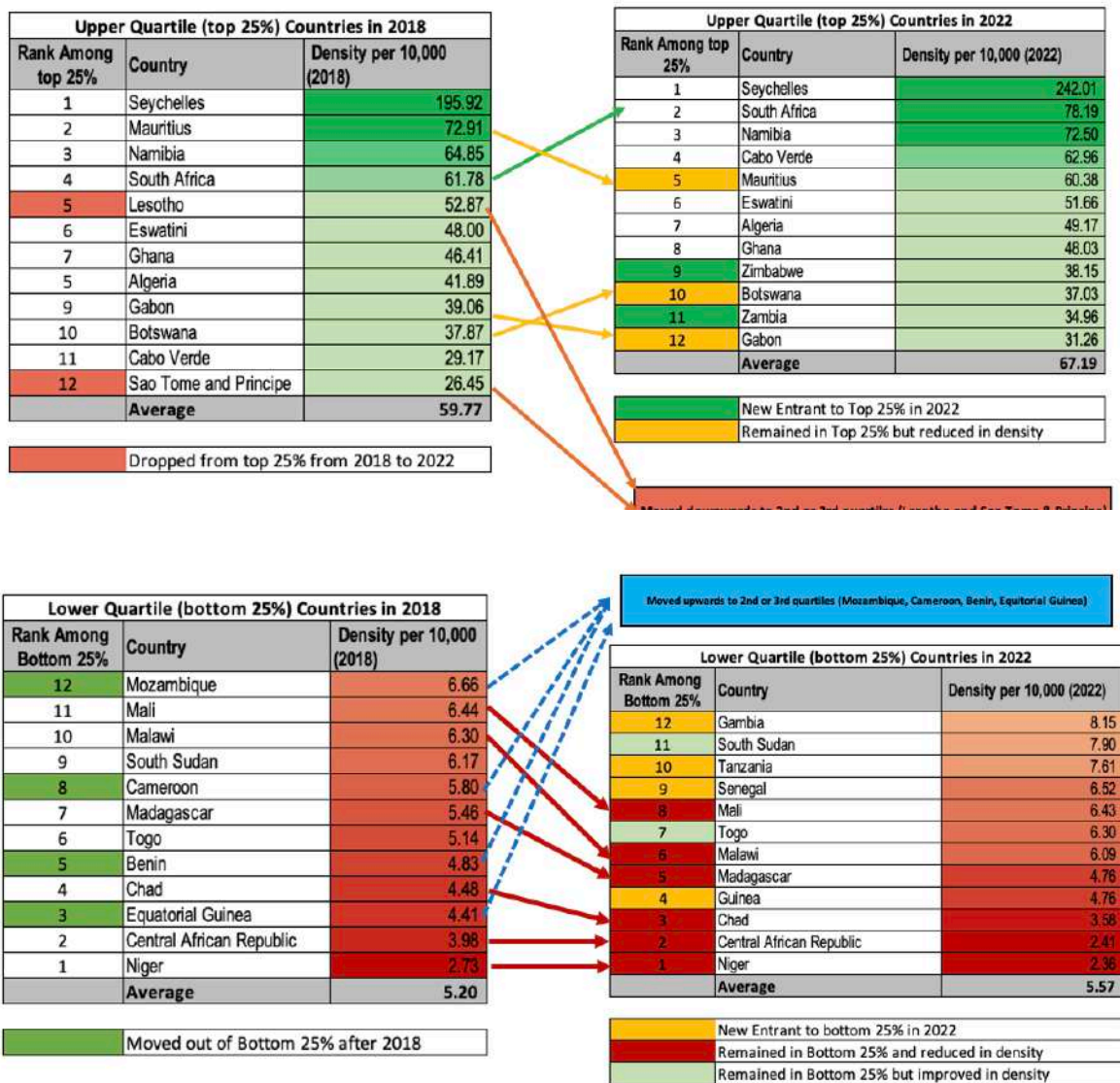
The density of all occupations grew by 1.9% per annum between 2018 and 2022, with SDG 3.c occupations growing by 3.2% and the other workforce by 0.6% per annum (Figure 6). Countries with high SDG 3.c tracer occupation densities as of 2022 include Algeria, Botswana, Cabo Verde, Eswatini, Gabon, Ghana, Mauritius, Namibia, Seychelles, South Africa and Zimbabwe. Countries with low SDG 3.c tracer occupations densities include the Central African Republic, Chad, Guinea, Madagascar, Malawi and Niger.

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While 37 (79%) countries showed a positive trajectory towards increasing their stock between 2018 and 2022, when population is considered, 29 (62%) countries improved their densities while 38% had no improvement.

The HWF headcount improved in 37 countries (by 79%) between 2018 and 2022, while 10 (21%) countries had no improvement. Twenty-nine (62%) countries improved their densities per 10 000 population between 2018 and 2022, while 18 (38%) countries lost momentum. Eight (17%) countries (Botswana, Burundi, DRC, Malawi, Mali, Niger, Rwanda and Senegal) increased their stock, but this improvement was outpaced by population growth. For 10 (21%) countries, the stock of health workers and their densities reduced between 2018 and 2022. They include the Central Africa Republic, Chad, Eritrea, Gabon, The Gambia, Guinea, Lesotho, Liberia, Madagascar and Mauritius.

Fig. 8. Trends in SDG 3.c tracer occupations density per 10 000 population between 2013 and 2022
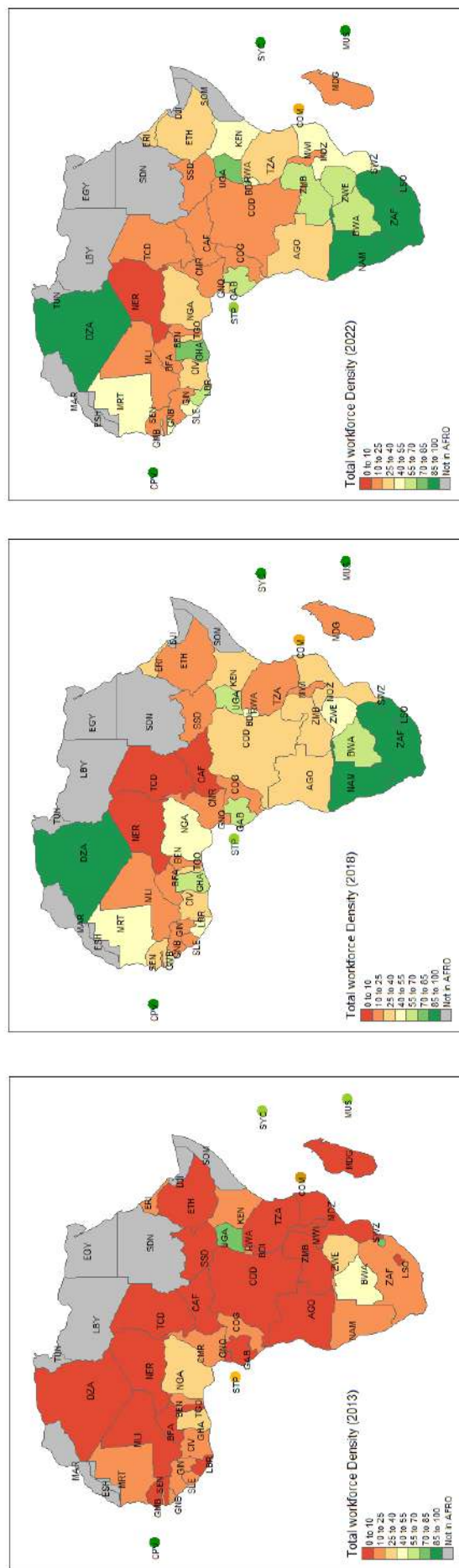
Fig. 9. Densities for all occupations in 2013, 2018 and 2022

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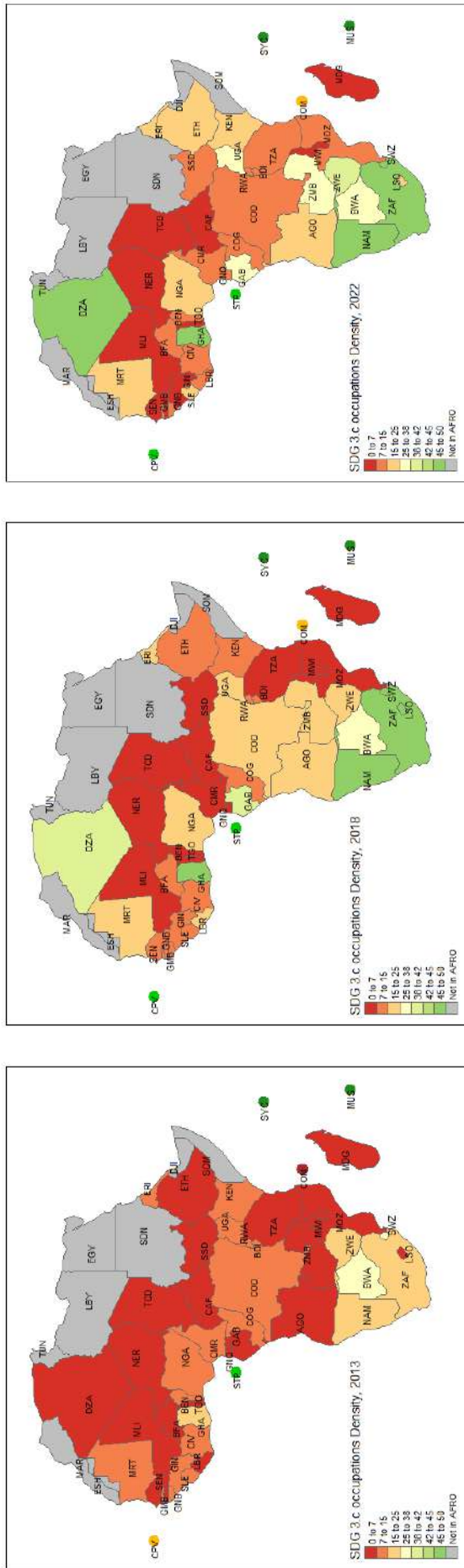
There are 2.6 million doctors, nurses, midwives, dentists and pharmacists in the African Region, which is a threefold increase over a 10-year period, representing an annual growth rate of 13%. Of the total share of this HWF, one in two are in lower middle-income countries and one in three are in low-income countries.

An estimated 50% of the stock of doctors, nurses, midwives, dentists and pharmacists in the Region are in lower-middle-income countries. However, this is a 6% reduction in their stock compared with 2013. Twenty-seven per cent are in low-income countries, which is the same as their share in 2013. High and upper middle-income countries nearly doubled their share of their stock of this specific HWF in the same period, from 13% in 2013 to 20% in 2022 (see Figure 10).

Fig. 10. Stock of SDG 3.c occupations and percentages of the total stock in the Region with income levels

(a) Stock

(b) Percentage of the regional total
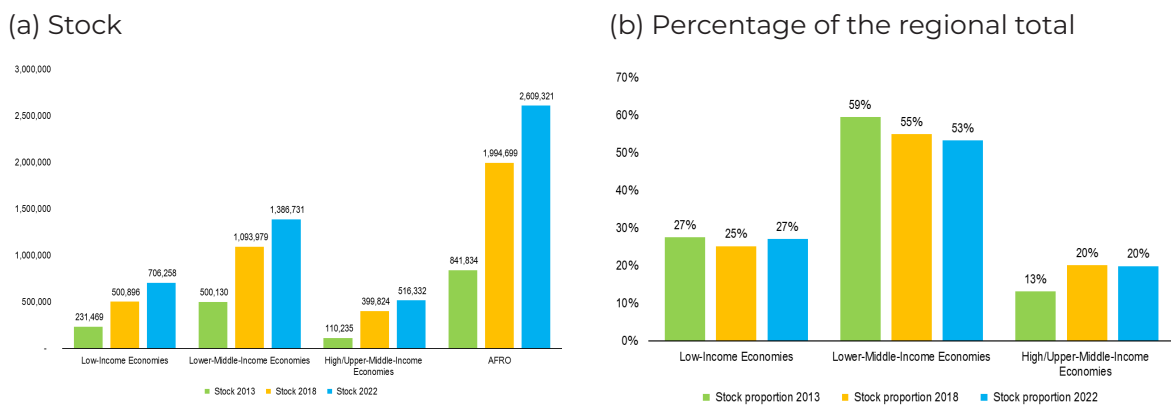
There has been significant growth in density across all income groups, with overall density in the Region doubling from 11.14 in 2013 to 26.82 in 2022. High-income and upper middle-income countries tripled their average workforce density from 26.08 to 76, followed by lower-middle-income countries that more than doubled their workforce density from 10.92 in 2013 to 26.46 in 2022. Although low-income countries also recorded improvements, it was at a slower pace, from 6.35 to 10.76 in the same period (see Figure 11).

Fig. 11. Density of doctors, nurses, midwives, dentists and pharmacists per 10 000 population with income groups
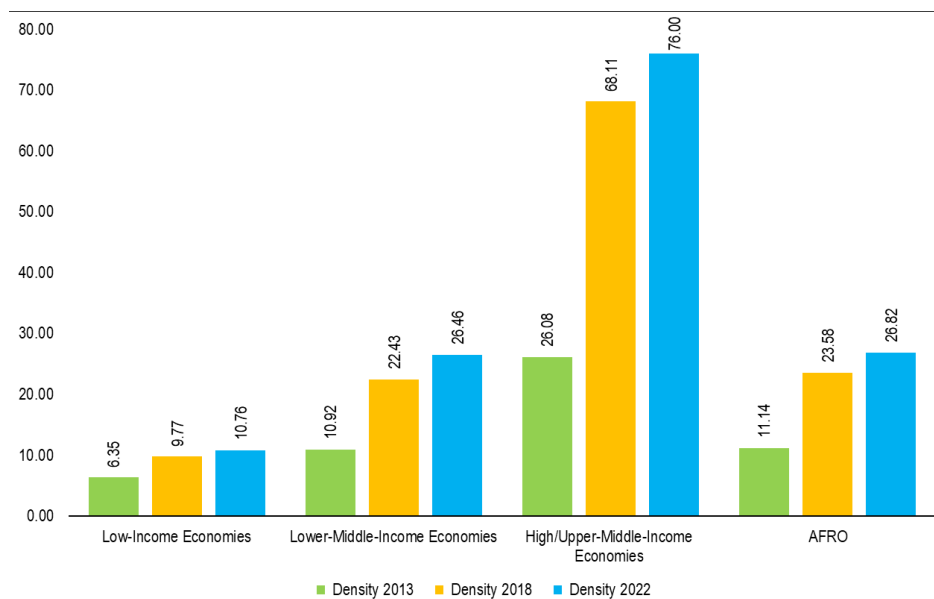
3.2 Trends in the stock and density of health workers in Member States by occupation

3.2.1. Medical doctors

The aggregate stock of medical doctors in the region grew from 115 272 in 2013 to 369 145 in 2022, equating to an annual increase of 13.8%. The increase was not at the same pace between 2018 and 2022 as compared to the previous five years. This could be due to an increase in emigration, the impact of COVID-19 (deaths, long COVID-19, delayed graduation and socioeconomic factors) and poor quality of data.

Despite improved capacity to train health workers, the overall stock of medical doctors decreased marginally between 2018 and 2022. The magnitude ranging between 13 000 and 30 000, with 13 (28%) countries reporting a decrease. The density of medical doctors recorded a higher annual growth of 15.7%, compared to the stock, with a regional density of 1.44 in 2013 increasing to 5.33 per 10 000 population in 2022. The following countries recorded the largest increase in density: Algeria, Angola, Cabo Verde, Comoros, Eswatini, Gabon, Namibia, South Africa, Seychelles and Zambia. The countries that recorded the least improvement in density include Central African Republic, Côte d'Ivoire, Mauritius, Niger, and The Gambia (Figure 12).

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Fig. 12. Density of medical doctors per 10 000 between 2013 and 2022
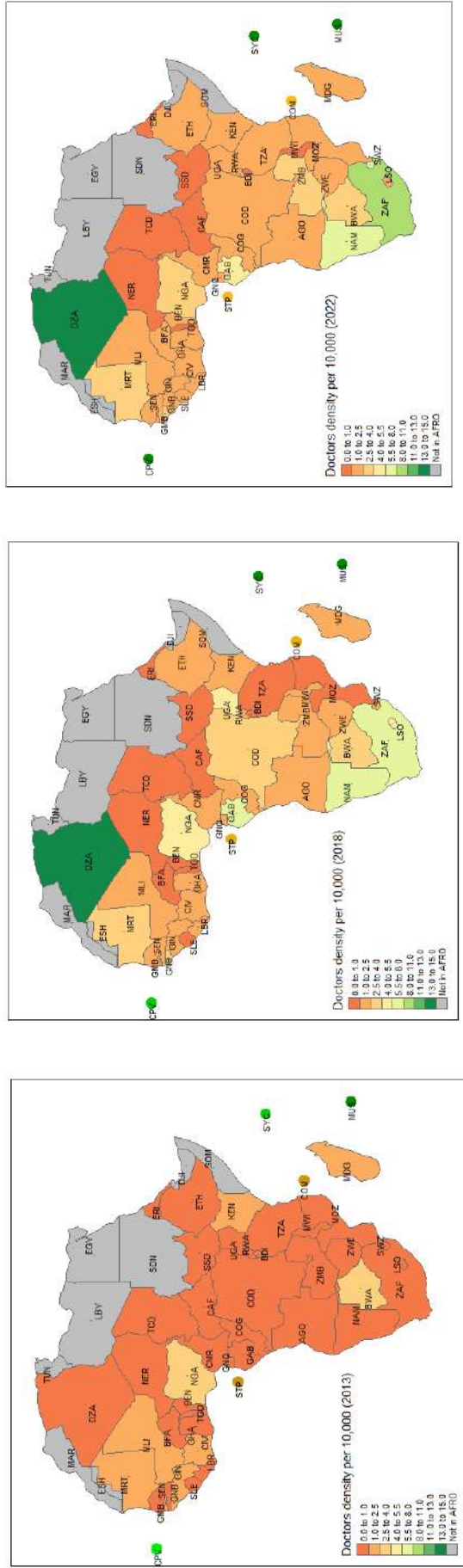
3.2.2. Nursing personnel

The nursing personnel stock in the African Region increased from 479 279 in 2013 to 1 698 828 in 2022, (nurses and their associate professionals) which is an annual increase of 15.1%. However, nine countries recorded a decrease in their stock in 2022 compared to 2018. These countries include the Central African Republic, Chad, Gabon, Gambia, Ghana, Guinea, Lesotho, Liberia and Mauritius. This could be due to increasing emigration, the impact of COVID-19 (deaths, long COVID-19, delayed graduation and socioeconomic challenges) and poor quality of data (see Figure 13).

Conversely, density grew by 8.8% annually from 7.89 in 2013 to 16.81 in 2022. The 10 countries with the greatest improvement in the density of nurses include Angola, Algeria, Kenya, Gabon, Ghana, Namibia, Seychelles, South Africa, Zambia and Zimbabwe. The five countries with the least improvement in the same period include Cameroon, Chad, Gambia, Guinea and Sao Tome and Principe.

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Fig. 13. Density of nurses per 10 000 between 2013 and 2022
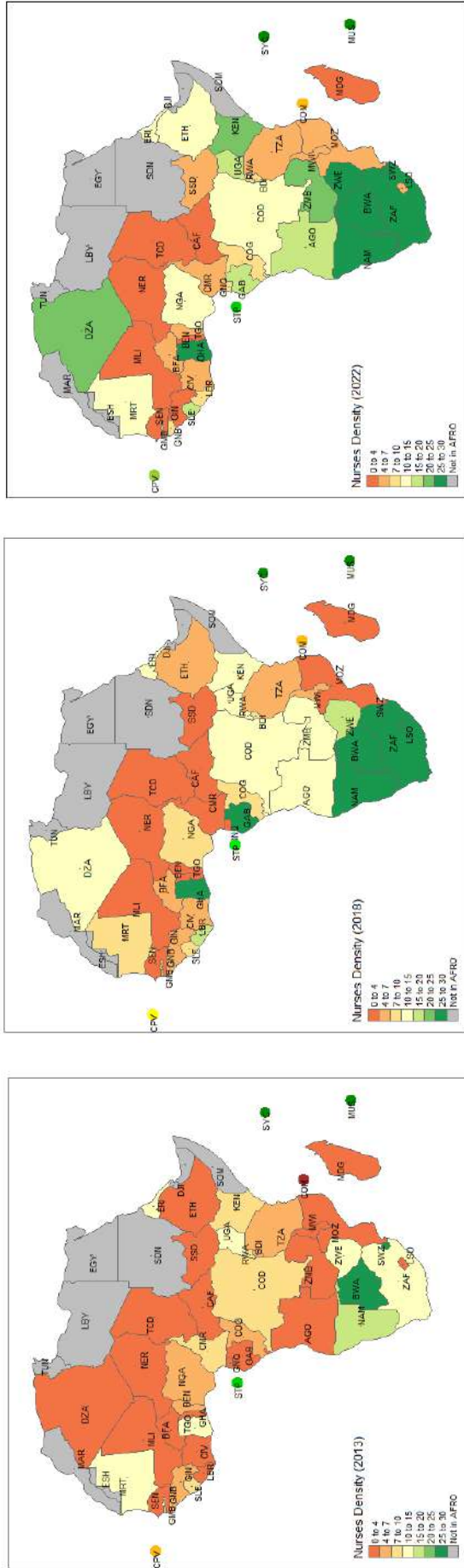
3.2.3 Dentists

The Region had 34 405 dentists in 2022, an increase from 9015 in 2013. This represented an annual increase of 16%. The figure reported in 2022, however, was a decline from 37 007 in 2018. This decline was experienced in 17 (36%) countries and could be attributable to the impact of the COVID-19 pandemic. However, if dental assistants and therapists are included, the stock increases to 56 772 in 2022 from 14 817 in 2013. Meanwhile, density increased at an annual rate of 10.3% to stand at 0.37 per 10 000 population in 2022 from 0.15 in 2013. The 10 countries with the most improved densities include Algeria, Cabo Verde, Eswatini, Eritrea, Lesotho, Mauritius, Namibia, Nigeria and Seychelles, while the least improved (or those whose density dropped) were Côte d'Ivoire, Equatorial Guinea, Niger, South Africa, Togo and Zimbabwe (see Figure 14)

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Fig. 14. Density of dentists per 10 000 population between 2013 and 2022
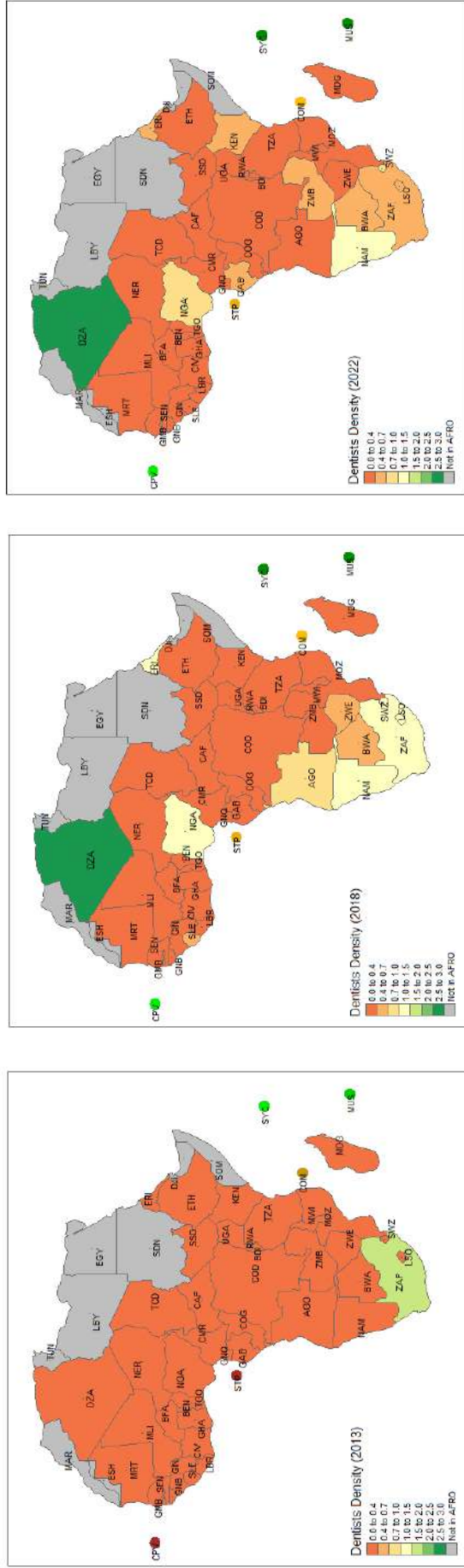
3.2.4. Pharmacists

Over the 10-year period, the stock of pharmacists increased at an annual rate of 9.9% to reach 101 401 in 2022 from 43 321 in 2013. The high annual growth rate is attributed to improved reporting between 2018 and 2022, when the annual growth rate was 2.7%. Despite the sustained overall growth in the stock, data shows a decline in the density in 23 (49%) countries between 2018 and 2022. During the same period, their density increased at an annual rate of 11.9% from 0.26 in 2013 to 0.73 in 2022. The 10 countries that had the greatest density improvement include Botswana, Ethiopia, Eritrea, Eswatini, Gabon, Ghana, Lesotho, Namibia, Sao Tome and Principe and Seychelles. The least improved countries that experienced a drop in density include Benin, Cameroon, Côte d'Ivoire, Gambia, Mauritius, Senegal and South Africa (see Figure 15).

Fig. 15. Density of pharmacists per 10 000 population between 2013 and 2022
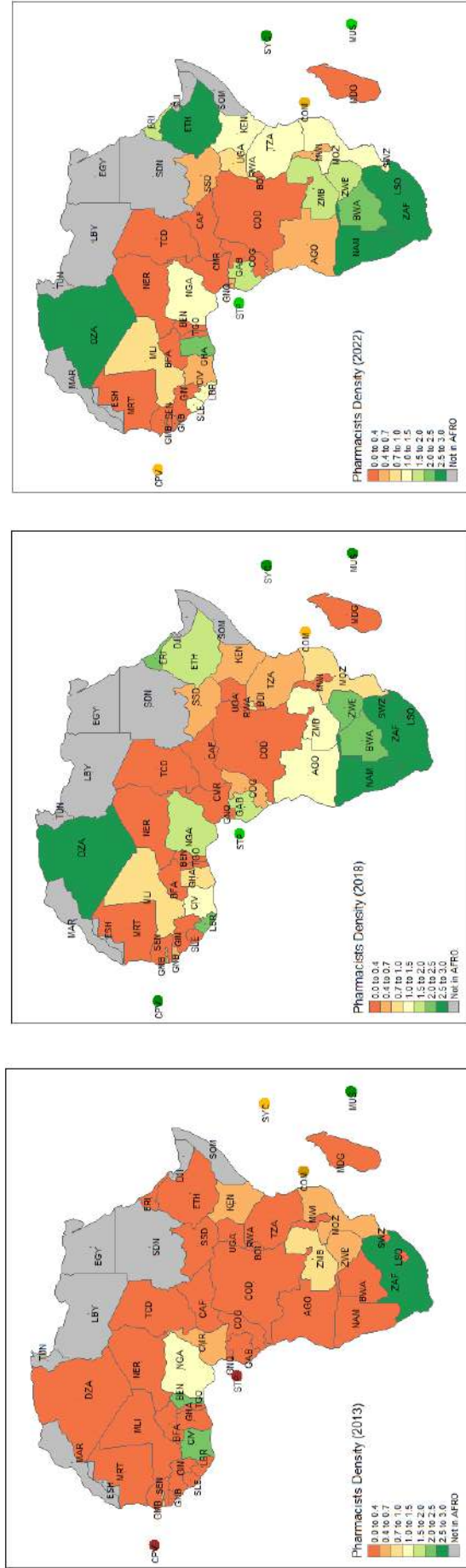
3.2.5.   Nurses and midwives

As some countries reported nurses together with their midwifery personnel stock, the combined stock and density of nurses and midwives is presented here. The stock of nurses and midwives increased to 2 033 359 in 2022 from 652 548 in 2013, reflecting an annual growth rate of 13.5%. The 10 countries with the highest increase in the stock of nurses and midwives include Algeria, Angola, the Democratic Republic of the Congo, Ethiopia, Ghana, Kenya, Nigeria, South Africa, Uganda, Zambia and Zimbabwe. Over the same period, their density increased from 9.12 per 10 000 population in 2013 to 19.37 in 2022. The highest increases in density were in Angola, Gabon, Ghana, Lesotho, Namibia, Seychelles, South Africa, Zambia and Zimbabwe. The countries with the least improvement were Botswana, Cameroon, Gambia, Guinea and Sao Tome and Principe (see Figure 16).

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Fig. 16. Density of nurses and midwives per 10 000 between 2013 and 2022
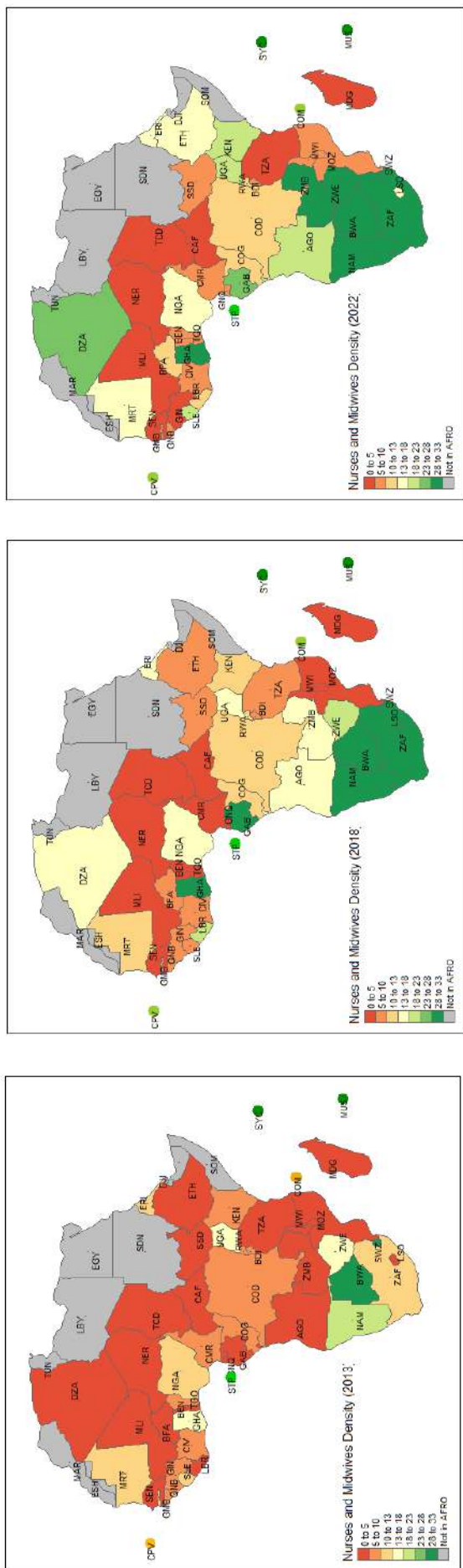
3.2.6. Doctors, nurses and midwifery personnel

The stock and density of doctors, nurses and midwives were used as the tracer occupations under this subsection. There were 2.4 million doctors, nurses and midwives in 2022, which was an increase from 1.8 million in 2018 and about 800 000 in 2013. In the African Region, there were 25 doctors, nurses and midwives in 2022 per 10 000 population, compared to 21 per 10 000 in 2018 and 11 per 10 000 in 2013. Thirteen countries (Botswana, Cabo Verde, Eswatini, Gabon, Ghana, Mauritius, Namibia, Sao Tome and Principe, Seychelles, South Africa, Uganda, Zambia and Zimbabwe) had already achieved the MDG target, with seven (Cabo Verde, Eswatini, Ghana, Mauritius, Namibia, South Africa and Seychelles) already achieving the SDG target of 44.5 per 10 000 population (see Figure 16).

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Fig. 17. Density of medical doctors, nurses, and midwives per 10 000 population between 2013 and 2022

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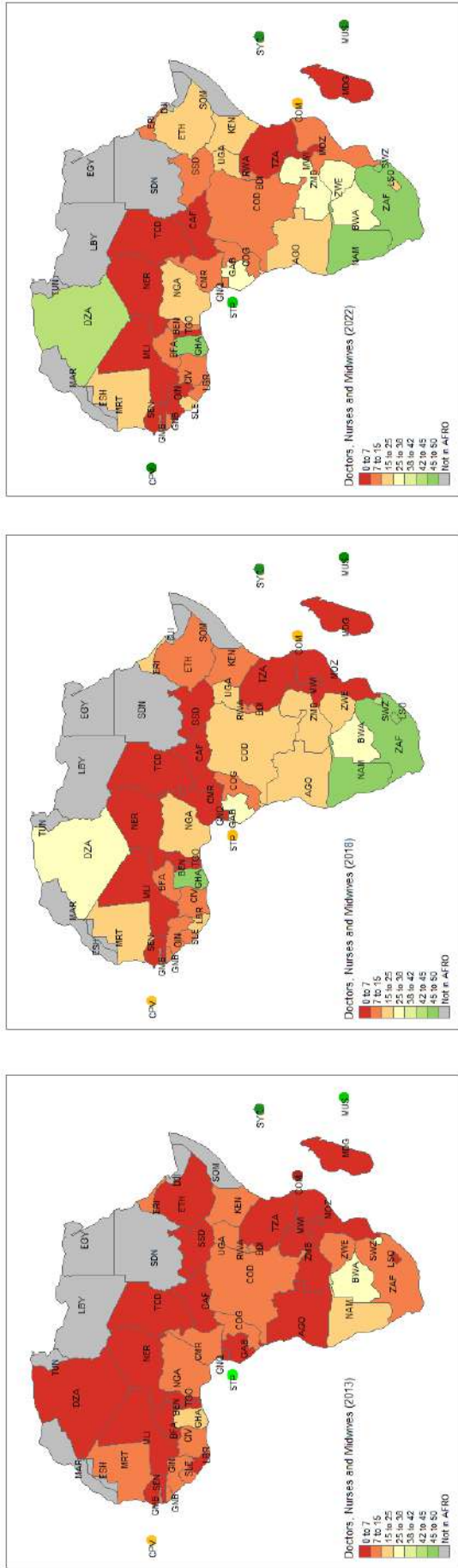
3.2.7. Midwifery personnel

The midwifery personnel stock increased from 173 269 in 2013 to 334 530 in 2022, which represents an annual growth rate of 7.6%. Their density per 10 000 population increased by 8.4% annually to 2.56 in 2022 from 1.24 in 2013 (see Figure 18). Some countries reported the midwifery personnel stock together with nurses.

Fig. 18. Density of midwives per 10 000 between 2013 and 2022
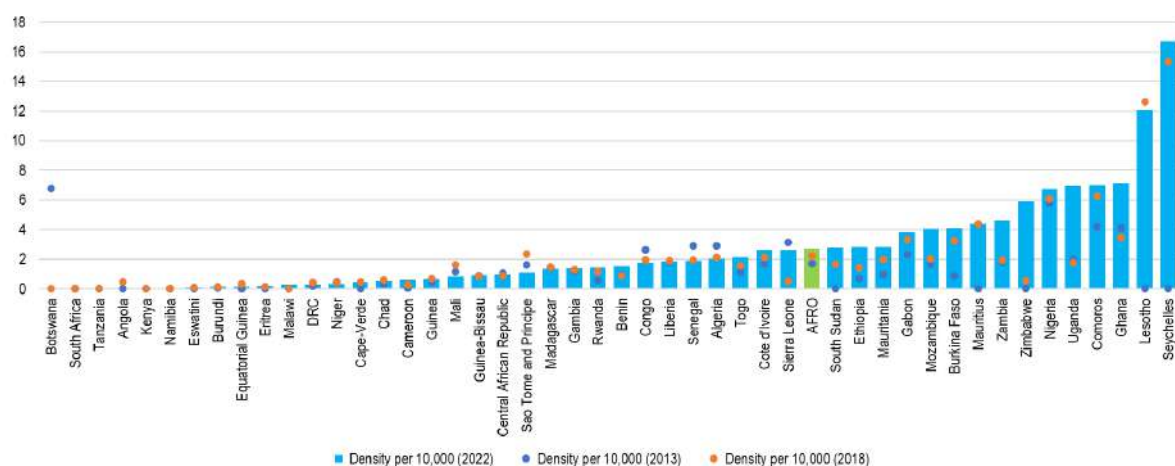
Note: Countries with zero entries did not report separate data on midwives.

3.2.8. Community health workers

The stock of CHWs was highly influenced by countries that included them in their reporting. This included nine countries in 2013, 36 in 2018 and 40 in 2022 (see Figure 19). Among the reporting countries, the stock of CHWs grew from 213 167 in 2013 to 850 462 in 2022. The density per 10 000 population rose from 8.17 in 2013 to 10.43 in 2022.

Fig. 19. Density of CHWs between 2013 and 2022
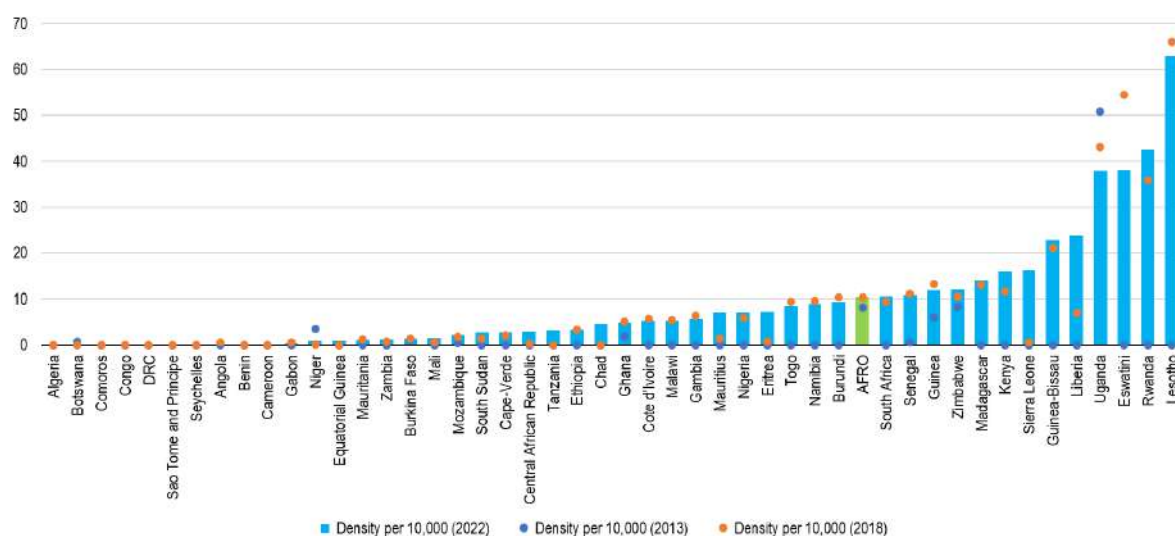
Note: Countries with zero entries did not report on CHWs

3.2.9. Other health workers

All other health workers combined also grew at an average annual rate of 14.7% to 2 488 958 in 2022 from 724 195 in 2013. This translated to an increase in density from 8.35 to 27.34 per 10 000 population which reflects an annual growth rate of 14%. Countries with the highest density include Algeria, Cabo Verde, Eswatini, Lesotho, Liberia, Mauritius, Mozambique, Rwanda, Seychelles and Uganda and those with the lowest density include Burkina Faso, Cameroon, Congo, the Democratic Republic of the Congo and Niger, as of 2022 (see Figure 20).

The other health workers are a sum of the following occupations: audiologists and speech therapists, dental assistants and therapists, dietitians and nutritionists, Environmental and occupational health & hygiene workers, managerial staff, medical and dental prosthetic technicians, medical and pathology laboratory scientists, medical and pathology laboratory technicians, medical assistants, medical imaging and therapeutic equipment technicians, medical records and health information technicians, optometrists and ophthalmic opticians, other nonmedical professional staff, other nonmedical support staff, paramedical practitioners, personal care workers in health service, pharmaceutical technicians and assistants, physiotherapists and physiotherapy assistants, psychologists, social workers and traditional and complementary medicine practitioners.

Fig. 20. Other workforce density per 10 000 population between 2013 and 2022
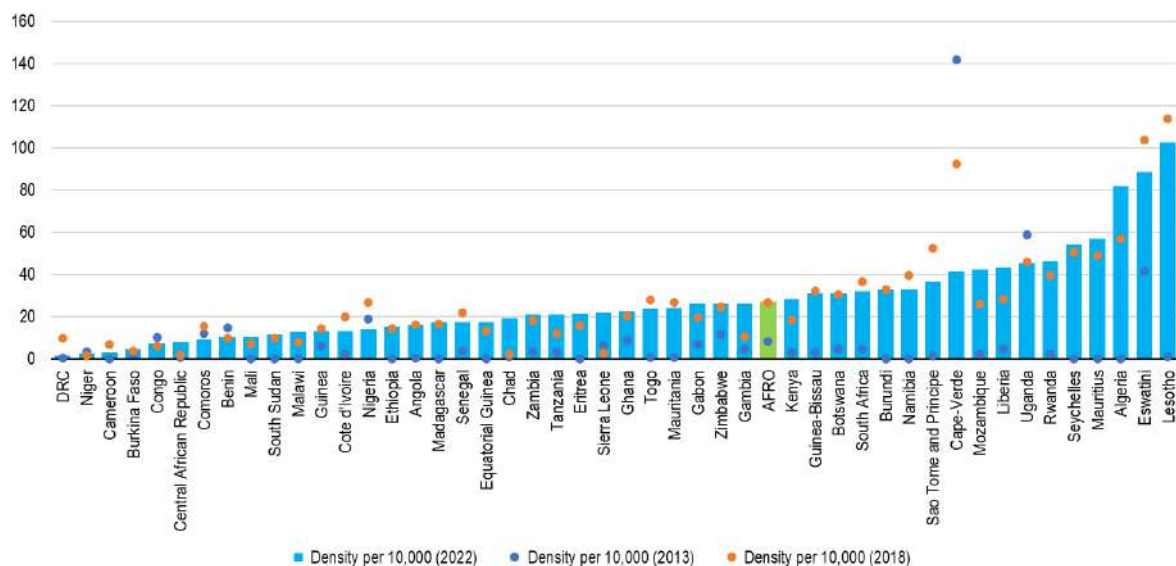
3.3   Trends in the stock and density of health workers within Regional economic blocs

Most regional economic communities recorded improvements in the densities of their HWF between 2013 and 2022, but some improved more quickly. The largest improvement in the density per 10 000 for the SDG 3.c tracers occupations were witnessed in countries within the Arab Maghreb Union Region (increasing from an average of 7.93 per 10 000 workers in 2013 to 34.48 per 10 000). This was followed by countries within the SADC, which increased from an average of 17.24 per 10 000 workers to 47.01 per 10 000 people. Countries within the Common Market for Eastern and Southern Africa also increased their densities from an average of 16.01 per 10 000 population in 2013 to 38.79 per 10 000 population in 2022.

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The least improvement in density was recorded by countries in the East African Community where the average density increased from 8.27 per 10 000 population in 2013 to 14.53 per 10 000 people in 2022 (see Figure 21). The SADC and the Community of Sahel-Saharan States blocs both have a stock of close to 1 million SDG 3.c occupations. However, these numbers are dependent on the size of the economic bloc and the stock of individual countries within each bloc.

Fig. 21. SDG 3.c tracer occupations density per 10 000 population between 2013 and 2022 within the regional economic blocs
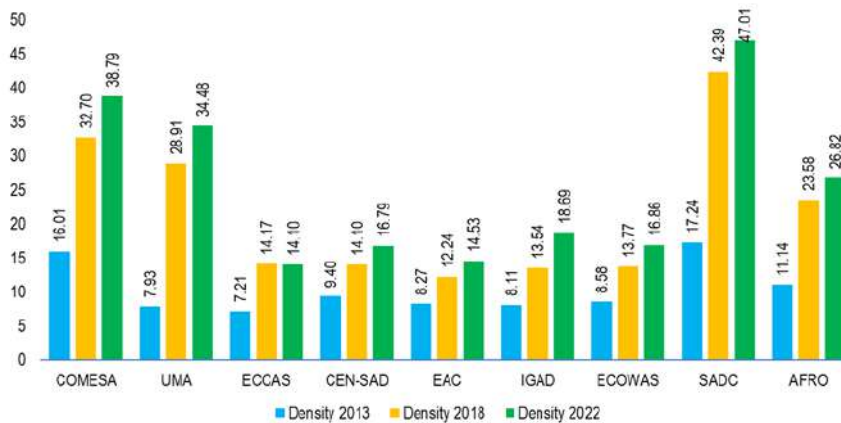
Fig. 22. SDG 3.c occupations stock between 2013 and 2022 within the regional economic blocs
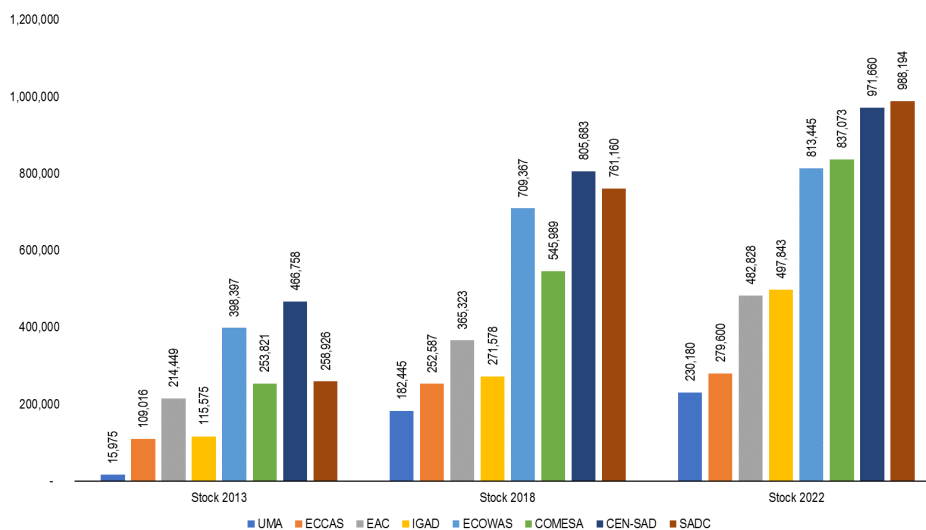
3.4   Paradox of health workforce unemployment

Investments in HWF recruitment have not kept pace with the outputs from training (supply), which has led to a growing paradox where 1 in 3 trained health workers fail to find jobs amid a needs-based shortage of health workers.

In 2018, 39 countries reported data on trends in recruitment and the output of their HWF education pipeline. The data found that almost 30% of the trained HWF across the Region remained unemployed or under-employed [41]. For example, some country reports found that 27% of nurses in Lesotho [42] and 22% of all health workers in Ethiopia [43], 14% in Kenya [44], 30% in Malawi [45], 19% in South Africa [46], and 39% in Ghana [47] were unemployed at some point. In addition, an analysis by the World Bank [48] found that trained but

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unemployed nurses in the East, Central and Southern African subregion could reach 236 281 (or 28.5%) by 2030.

During a policy dialogue in Accra, Ghana on 16 November 2022 on HWF challenges, numerous countries, including Côte d'Ivoire, Ethiopia, Ghana, Kenya, Malawi, Senegal and United Republic of Tanzania indicated that they had done reasonably well in producing additional health workers but that their main challenge was creating employment opportunities [49].

Systematic HWF unemployment data from many countries is unavailable in publicly accessible form. To arrive at an approximate summary metric, data on the unemployment of health workers was extracted from HLMA reports from 10 countries that used a similar methodology for assessment. From the subset of 10 countries, the crude rate of health worker unemployment was estimated to be 26.57% (14.03%–39.11%). After standardization, the unemployment rate was estimated to be roughly 24.21% (15.32%–33.10%),[4] which is in the same order of magnitude as the crude estimates (see Table 5).

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4   However, this should be interpreted with caution, as the data was collected for different years across these countries and may not necessarily be from comparable sources.

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Table 5. HWF unemployment in selected countries in the African Region

S/N	COUNTRY	YEAR	TOTAL UNEMPLOYED HEALTH WORKERS	UNEMPLOYED PROPORTION (FROM HLMA)	ACTIVE STOCK OF ALL HEALTH WORKERS (SDG 3C OCCUPATIONS)	ESTIMATED TOTAL HEALTH WORKFORCE (ACTIVE STOCK + UNEMPLOYED)	ESTIMATED UNEMPLOYMENT RATE (STANDARDIZED)	DATA SOURCE(S)
1	Ghana	2023	118 488	39.71%	160 787	279 275	42.43%	Draft HLMA report (2023)
2	Uganda	2023	75 577	47.55%	121 326	196 903	38.38%	Draft HLMA report (2023)
3	Zambia	2023	46 713	56.57%	69 982	116 695	40.03%	Draft HLMA report (2023)
4	South Africa	2019	45 000	11.08%	468 294	513 294	8.77%	HRH Strategy Paper (2020)
5	Kenya	2021	27 243	14.34%	132 496	159 39	17.05%	HLMA report (2023)
6	Mozambique	2023	10 622	17.53%	40 57	51 79	20.67%	Draft HLMA report (2023)
7	Sierra Leone	2019	4899	33.86%	20 253	25 152	19.48%	HLMA report (2019)
8	Rwanda	2019	2891	13.41%	18 462	21 353	13.54%	HLMA report (2019)
9	Lesotho	2021	1096	7.16%	5302	6398	17.13%	HLMA report (2021)
10	Eswatini	2023	907	12.67%	6208	7115	12.75%	HLMA report (2023)
	Overall		333 436	26.57% (95% CI: 14.03% - 39.11%)	1 043 867	1 377 03	24.21% (95% CI: 15.32%, 33.01%)	

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3.5   Demographic characteristics of the health workers

The composition of medical doctors (ISCO codes 2211 and 2212), nurses (ISCO codes 2221 and 3221), midwives (ISCO codes 2222 and 3222), dentists (ISCO codes 2261 and 3251) and pharmacists (ISCO codes 2262 and 3213) – the SDG 3.c tracer occupations, and CHWs were examined from the perspective of gender and age distribution.

3.5.1   Sex composition of the HWF

With data from 36 out of 47 countries, it is clear that many health worker occupations are majority female. The SDG 3.c tracer occupations (doctors, nurses and midwives, dentists and pharmacists) in the African Region have more females (72%) than males (28%) This is driven by the composition in lower-middle income countries, where the proportion of females exceeds other income groups.

Upper middle-income and high-income countries have more female doctors (52%) compared to other income group levels. This is much higher than the regional average (35%). Low-income countries recorded a higher male nursing personnel proportion (43%) compared to other income groups. Midwifery was found to be a female-dominated occupation in the Region, with 94% of the workforce being female, while the majority of dentists were male. Despite pharmacists being marginally more male-dominated (59%) in the Region, there were more female pharmacists in upper middle-income and high-income countries (58%) compared to other income levels (see Figure 23).

Fig. 23. Distribution for the SDG 3.c tracer occupations among countries' income levels by sex
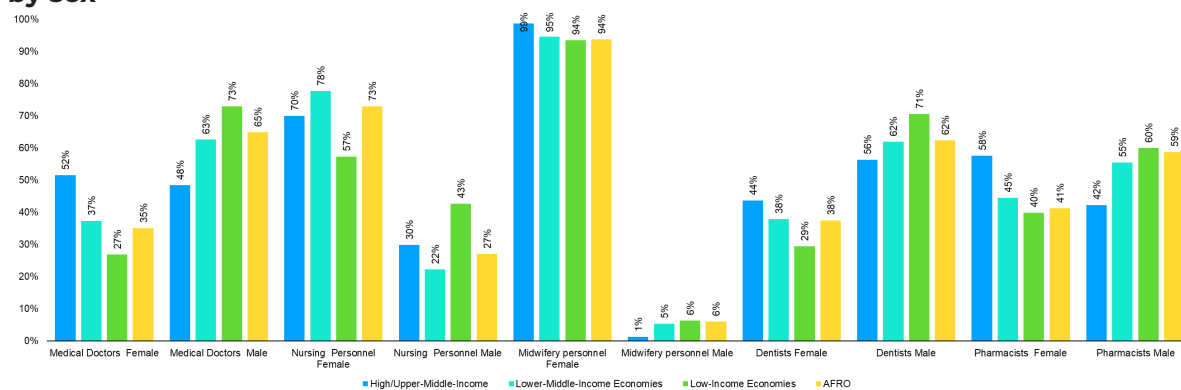
About 35% of doctors in the Region are female, which is an improvement from 28% in 2019. Midwives (94%), CHWs (79%) and nurses (73%) are predominantly female, while pharmacists, dentists and doctors are predominantly male (see Figure 24 and Figure 25).

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Fig. 24. Sex composition for select occupations in the African Region
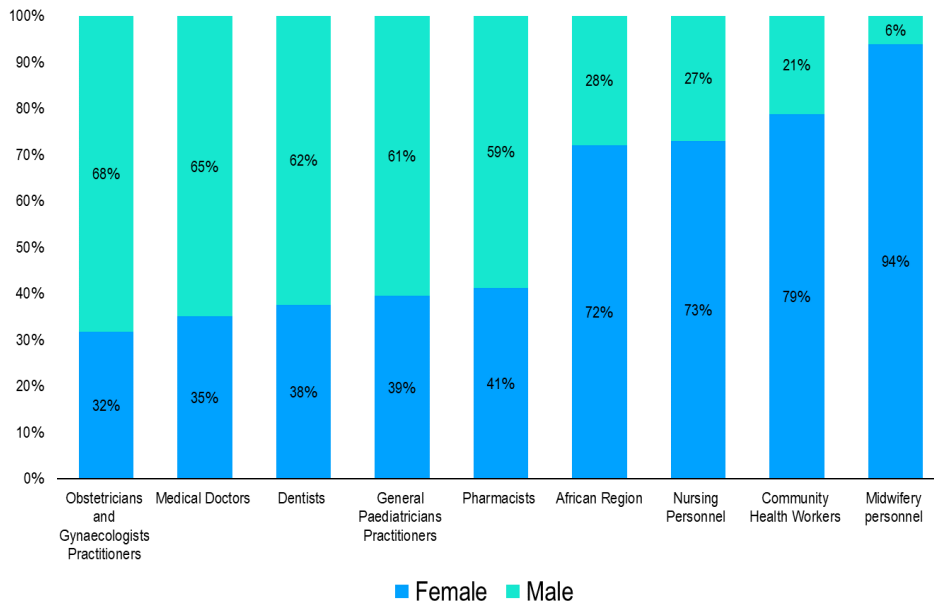
Fig. 25. Average sex composition according to income levels of countries

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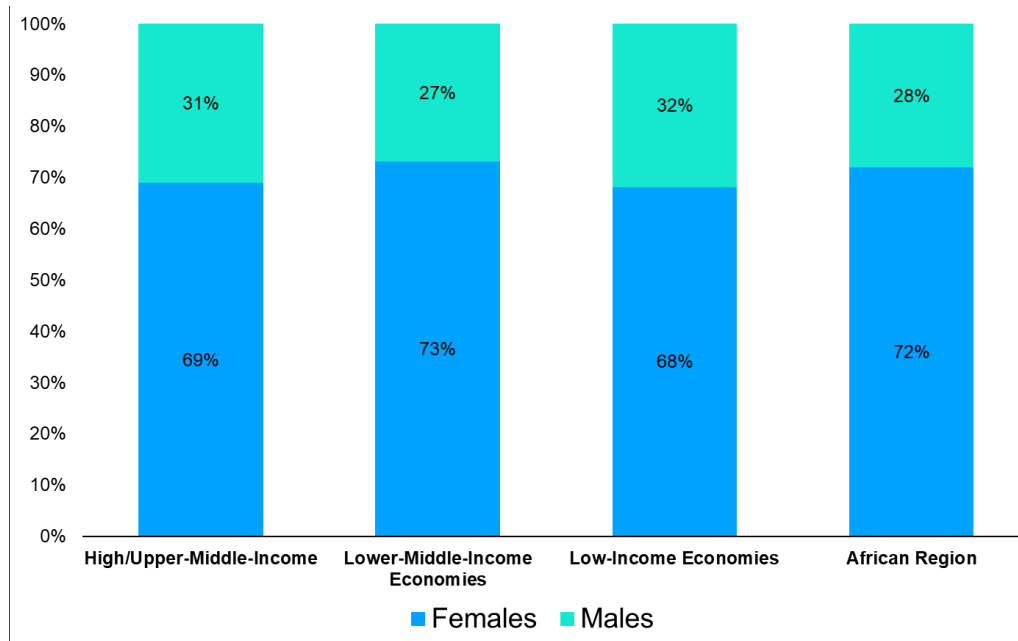
3.5.2 Distribution of the health workforce by age

Generally, 82% of the workforce in the Region is below 45 years of age. Nurses have the highest composition (89%) of workers below 45 years of age, followed by pharmacists (88%), midwives (85%), medical doctors (80%), CHWs (76%) and dentists (72%) (see Figure 26). Less than 10% are older than 55 years of age across the selected occupations, except for nurses, dentists and CHWs in high/upper middle-income countries and medical doctors in lower-middle-income economies.

Fig. 26. Age distribution of selected occupations in the Regions

Legend: < 25, 25–34, 35–44, 45–54, 55–64, ≥ 65

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While 37 (79%) countries showed a positive trajectory towards increasing their stock between 2018 and 2022, when population is considered, 29 (62%) countries improved their densities while 38% had no improvement.

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04 Health workforce education, training and accreditation

4.1 Training and education capacity

The ability of the African Region to produce graduates has improved, with the number of annual graduate health workers increasing from 148 357 in 2018 to more than 255 000 in 2022. This increase of more than 70% is owing to a combination of expanded production capacity and enhanced data availability and quality. Almost three quarters (71%) of training and education outputs are producing doctors, nurses and midwives.

Data from 45 countries (excluding Mali and Sao Tome & Principe) revealed that the African Region produced 255 108 health workers in 2022, of which 59% are nursing and midwifery personnel (46% and 13% respectively), 12% medical doctors and 29% other health workers. Six countries (Burkina Faso, the Democratic Republic of the Congo, Ethiopia, Ghana, Nigeria and Uganda) produced more than 1000 medical graduates per annum, while six countries (the Democratic Republic of the Congo, Ethiopia, Ghana, Nigeria, Uganda, and Zambia) produced more than 5000 nurses annually (see Figure 27). For some high producing countries, however, their level of production is inadequate relative to their population health needs.

Fig. 27. Annual graduates from HWF training and education institutions

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4.2   Number of health training institutions

There are more than 4 000 health workforce training entities (including semi-autonomous campuses and programmes within institutions), of which the private contributes 44%.

The count of training institutions in the region is complex, as some training institutions such as universities have more than one autonomous campus and programme, similar to some nursing colleges. Deciding to count an institution with multiple autonomous campuses and programmes as one entity or multiple training entities have created disparities in information reported by countries. Data reported in the 2018 WHO regional survey, in which Member countries reported a mixture of university campuses, faculty, and semi-autonomous programmes as distinct entities yielded about 4001 health training institutions/faculties and programmes in the African Region. About 44% of these "institutions" were either private for-profit (34%) or private-not-for-profit (10%). The survey also found that nursing and midwifery education institutions constituted the majority (53%). More than 400 universities and faculties have been identified as medical training institutions[50], only 36% of them in the private sector[51].

A separate study based on records review in 2022 revealed that there were 157 education institutions specializing in the health professions in East and Southern Africa (20 countries), with 288 programmes. In the same analysis, it was found that Kenya, Uganda, United Republic of Tanzania and South Africa have the highest capacity to produce specialist health professionals in the subregion [52]. Nursing and medical sciences also constituted about 77% of the specialist programmes in the subregion.

4.3   Pass rate in health professions education institutions

Data from five countries suggest that one in five health science students who completes their programme of education do not pass the requisite licensing examination the first time.

The completion rate of students of health sciences in their respective programmes and their pass rate in the licensing examination (if required) are major determinants of how rapidly or the extent to which the education pipeline can add to the stock of qualified health workers. There is a paucity of data and empirical literature on the completion rates of health science students in Africa and the pass rates for the various professional licensing examinations.

A study conducted in South Africa shows that up to 45.5% of health sciences students drop out of their respective programmes [53,54]. Additionally, although there is a paucity of data on licensing examination pass rates in the African Region, data from HLMA from five countries (Ethiopia, Ghana, Kenya, Mali and Zimbabwe) shows that on average, only 78% of health professions students who successfully complete their training are able to pass their board or council licensing examinations enabling them to register as health professionals. Thus, about 22% of the graduates had to resist the examinations (see Table 6). Coupled with dropouts, this is a considerable number of potential health professionals often lost through the HWF education pipeline. Identifying causes and addressing these losses could generate quick results in improving the efficiency of educational institutions for the health professions so that they can increase their throughput and licensing examination pass rate, thereby improving the replenishment rate of the region.

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Table 6. Pass rate from educational institutions for the health professions

OCCUPATION	AVERAGE PASS RATE (%) FROM FIVE COUNTRIES BY YEAR								GRAND TOTAL
	2013	2014	2015	2018	2019	2020	2021	2022	
Clinical officer*	92.2	91.9	93.9						
Laboratory scientist	61.9	52.3	53.7	57.8				97.0	64.5
Medical doctor				84.2				70.0	74.7
Midwife				74.3				98.0	86.1
Nurse	83.6	84.5	82.8	61.6	61.2	80.3	83.7	81.8	79.1
Pharmacist	77.7	75.1	61.6	61.4				97.0	74.6
Pharmacy technician	78.7	79.9	79.9						79.5
Grand total	80.2	79.0	76.8	66.8	61.2	80.3	83.7	85.1	77.7

*Data sources: triangulated from HLMA reports from Ethiopia, Ghana, Kenya, Mali and Zimbabwe. *only reported from Kenya*

4.4 Replenishment rate from domestic HWF education pipeline

For every 10 health workers employed in the Region, an additional one is trained. In addition, on average, for every medical doctor trained, an estimated three nurses are trained – but a wide variation exists across the Region. For example, four countries (Ghana, Lesotho, Rwanda and Zambia) are training more than 10 nurses for every medical doctor trained.

Across all countries, the health worker education annual output is about 10% of the existing stock (replenishment rate). However, 15 of 42 (36%) countries with comparable data are producing doctors and nurses at a faster rate than the rate of accumulation of the stock. This means that some trained health workers are either not finding jobs and are not included in the practicing stock or are finding job opportunities outside of the health sector and/or abroad.

Meanwhile, training output is slower than the increase in health worker stock in 14 of 42 (33%) countries with comparable data (see Figure 28), indicating that some countries rely on foreign training and foreign recruitment to complement the local HWF training.

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Fig. 28. Relationship between the production and stock of doctors and nurses

Relationship between the graduates and stock
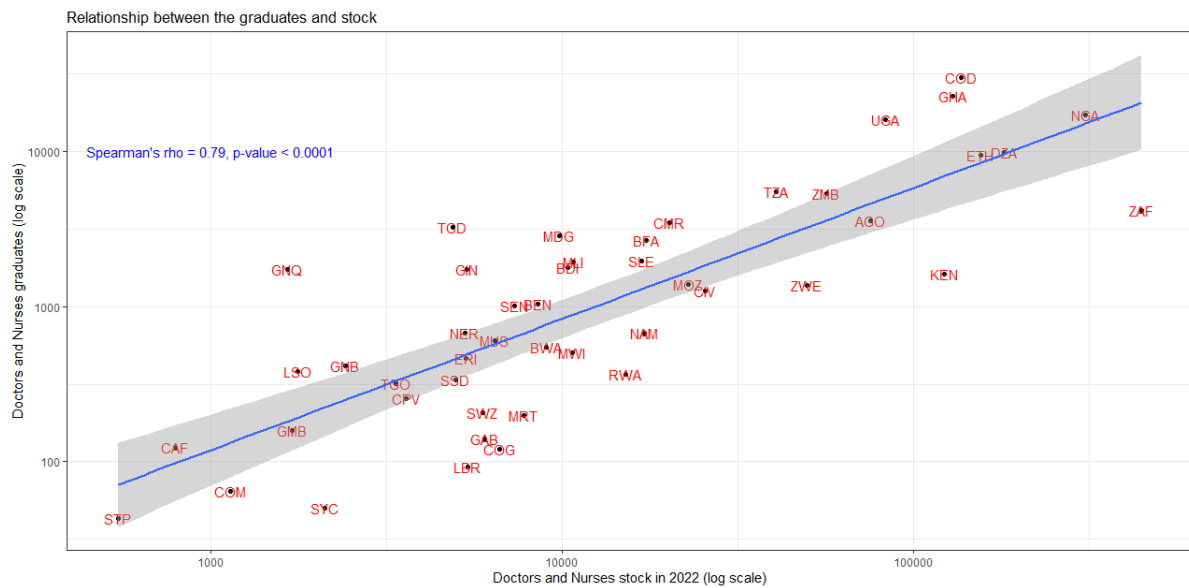
The median cost of training a medical doctor in the Region is US$ 10 572, but it ranges widely, from US$ 5106 to US$ 32 000.

Data and empirical literature on the cost of training health workers is not readily available in publicly accessible sources. However, based on HLMA data from a small number of countries (Kenya, Ghana, Mozambique, Zambia, Uganda, and Zimbabwe), the median cost of training a health worker is roughly US$ 5272, but ranges widely from US$ 2353 to US$ 22 066. For a nurse, the median cost of training for 3 years is estimated to be US$ 4972, ranging from US$ 1200 to US$ 29 541. Also, the median cost of training a doctor for 6 years is estimated to be US$ 10 572 (range: US$ 5100 to US$ 31 950), as shown in Table 7. These estimates, however, are based on only a few countries and do not necessarily reflect the full economic cost of training. For example, previous estimates in the context of migration discussions suggested that the lost return on investment for every doctor trained in the African Region is US$ 1.85 million and US$ 1.21 million for nurses [55,56]. Thus, it is apparent that the cost of training far outweighs the tuition fees alone estimated in this report.

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Table 7. Tuition fees for the training of select occupations

OCCUPATION	MEDIAN	AVERAGE	MINIMUM	MAXIMUM
Generalist medical practitioners	$10 572	$17 351	$5106	$31 950
Specialist medical practitioners	$5286	$8675	$2553	$15 975
Nursing personnel	$4973	$10 172	$1200	$29 541
Midwifery personnel	$2292	$6272	$808	$19 694
Pharmacists	$3852	$7888	$2548	$21 300
Dentists	$10572	$17 351	$5106	$31 950
Community health workers	$1000	$1000	$500	$1500
	$5272	$9616	$2353	$22 066

Source: Data taken from HLMA reports from Kenya, Ghana, Mozambique, Zambia, Uganda and Zimbabwe.

4.5 Quality of education and training

Quality of education can be viewed from different perspectives and there is seldom consensus on what constitutes "quality". Nonetheless, four areas can be considered: "who is chosen to enter the field [health occupations], what they are taught [curriculum], how they are taught, how they are determined to be qualified [licensing] to enter the field, how they maintain and update their skills [re-licensing], and how they are disciplined [governance and accreditation]" [57].

Countries are progressively implementing competency-based health worker education. For example, 30 countries in the Region have adopted WHO prototype curriculums on nursing and midwifery and eye health, which is critical to improving the quality of HWF education.

Available evidence suggests that the education curriculum is progressively being transformed from being static, outmoded and fragmented [58] towards a competency-based curriculum [59–61]. This is particularly true for nursing, midwifery and eye health occupations, thanks to the development of a prototype competency-based curriculum [62–64]. Adopting a competency-based curriculum is critical to improving quality education in the African Region. WHO's Framework for action on interprofessional education and collaborative practice, alongside other frameworks, has garnered global effort towards a transition from siloed (or intra-professional) education towards interprofessional education where students learn from, with and about each other to promote collaborative practice in clinical settings [65]

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4.6 Accreditation of health training institutions

In 2022, 90% of medical and 75% of nursing education programmes in the African Region were reported by Member States to be accredited through national accreditation processes.

Data from 2015 suggested that one of the key areas with limited progress was strengthening HRH regulatory capacity [66]Nyoni J, Ahmat A. The state of strategic plans for the health workforce in Africa. Organisation mondiale de la Sante pour Afrique, Brazzaville, Congo Correspondence to Ms Doris Osei Afriyie; dosei@ who. int © Author(s. In 2018, 32 countries (82% of 39 Member States that provided data) reported that they had (or were establishing) an institutional mechanism for accrediting HWF education institutions. Seven countries (Algeria, Benin, Burkina Faso, Congo, Mali, Mauritania and Togo) had none [23].

In 2022, the assessment explored the availability of accreditation mechanisms for specific HWF education programmes in Member States. Data from 45 countries in the Region indicated that three out of every four (75%) HWF education and training programmes have accreditation mechanisms. A milestone in the African Regional Framework for the Implementation of the GSHRH was for at least 50% of Member States to have accreditation mechanisms for education in the health professions by 2022 and for all countries to reach this goal by 2030. Current evidence suggests that the 2022 milestone has been surpassed (see Table 8).

Table 8. National and/or subnational mechanisms for accreditation of HWF education and training institutions and their programmes across the Region

HEALTH OCCUPATIONS	NO ACCREDITATION SYSTEM	PARTIAL ACCREDITATION SYSTEM	FULL ACCREDITATION SYSTEM	TOTAL	% EXISTING ACCREDITATION SYSTEM
1342 – Health service managers	4	1	11	16	75%
2131 – Epidemiologist	6		12	18	67%
2211 – Generalist medical practitioners	2	2	17	21	90%
2212 – Specialist medical practitioners	19	14	89	122	84%
2221 – Nursing professionals	19	4	53	76	75%
2222 – Midwifery professionals	2		13	15	87%
2230, 3230 – Traditional and complementary medicine practitioners	5	1	10	16	69%
2240 – Paramedical practitioners	6		12	18	67%
2261 – Dentists	5	1	15	21	76%

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HEALTH OCCUPATIONS	NO ACCREDITATION SYSTEM	PARTIAL ACCREDITATION SYSTEM	FULL ACCREDITATION SYSTEM	TOTAL	% EXISTING ACCREDITATION SYSTEM
2262 – Pharmacists	2	1	17	20	90%
2263, 3257 – Environmental and occupational health & hygiene workers	4	1	14	19	79%
2264 – Physiotherapists	4	1	8	13	69%
2264, 3255 – Physiotherapists and physiotherapy assistants	2		4	6	67%
2265 – Dietitians and nutritionists	6		14	20	70%
2266 – Audiologists and speech therapists			1	1	100%
2267 – Optometrists and ophthalmic opticians	5	1	6	12	58%
2267, 3254 – Optometrists and opticians	2		4	6	67%
3211 – Medical imaging and therapeutic equipment technicians	5	1	13	19	74%
3212 – Medical and pathology laboratory technicians	2	1	19	22	91%
3213 – Pharmaceutical technicians and assistants	4	1	16	21	81%
3214 – Medical and dental prosthetic technicians	5		13	18	72%
3221 – Nursing associate professionals	5	1	10	16	69%
3222 – Midwifery associate professionals	5		12	17	71%
3251 – Dental assistants and therapists	5	2	12	19	74%
3252 – Medical records and health information technicians	8	1	5	14	43%
3253 – Community health workers	6	1	9	16	63%
3254 – Dispensing opticians	3		7	10	70%
3255 – Physiotherapy technicians and assistants	4	1	7	12	67%
3256 – Medical assistants	6	1	8	15	60%
5321, 5322, 5329 – Health care assistants and other personal care workers in health services	7	1	14	22	68%
Total	158	38	445	641	75%
Percentage	25%	6%	69%	100%	75%

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05 Health workforce migration

The migration of health workers is a widespread and growing phenomenon, driven by fundamental market forces linked to wage differentials, unemployment and working conditions [67–69]. The migration of health workers out of the African Region has been a challenge for decades and, while several solutions have been tried, they have been only moderately or temporarily successful [70–72].

5.1 Health workforce migration trends

For every 10 doctors or nurses working in the African Region, at least one other is working in a country other than their country of origin. During the COVID-19 pandemic, there was an acceleration in out-migration of health workers from the Region to high-income countries.

Box 2. Global perspectives on the migration of health workers

Data from 133 countries for four occupations (dentists, doctors, nurses and pharmacists) suggests that at least 2.7 million health workers are currently working outside their home country or outside the country where they first qualified. About 63% of the 2.7 million migrant health workers are nurses and 30% are doctors. Regarding their destination countries, 10 high-income countries host 64% of migrant doctors and 46% of migrant nurses. Similarly, 1.1 million migrant nurses are in OECD countries. Compared to the pre-COVID-19 years, there has been a 31% increase in the net inflow of foreign-trained doctors reported by 20 OECD countries and a 36% increase in a net inflow of foreign-trained nurses in 23 OECD countries. However, these figures still underestimate the global HWF migration situation, as the data is based on self-reports from destination countries and not triangulated with data from source countries.

Sources: WHO (2023). Report on global health worker mobility; WHO National Health Workforce Accounts 2023 data release

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Fig. 29. In-country stock compared to the migrated stock ratio for doctors and nurses
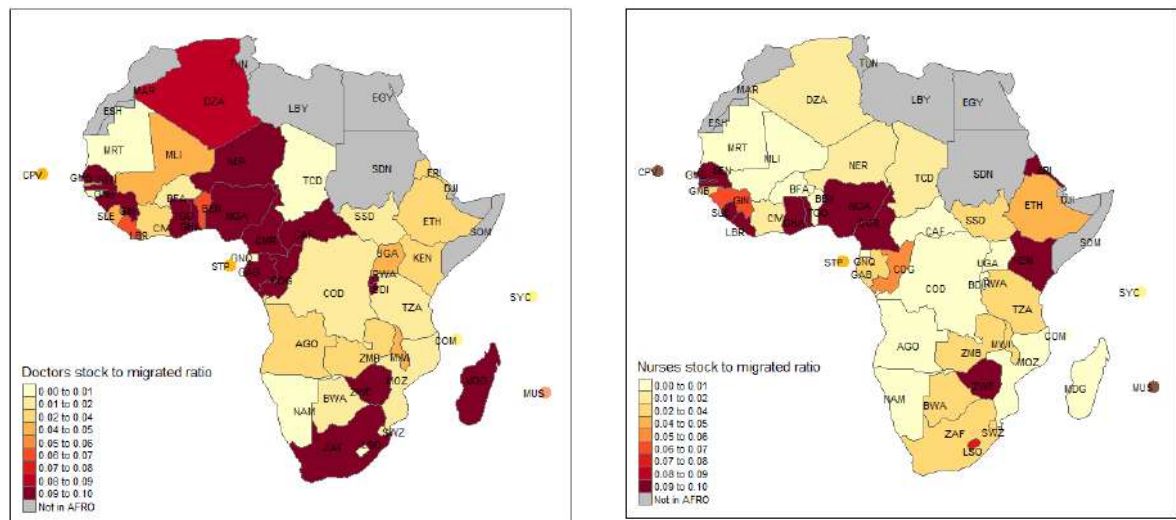
Figure 29 illustrates the relative magnitude of migrated health workers compared to existing domestic stock. This shows a cluster of countries with high migration, especially in Southern and West Africa for doctors, and West and East Africa for nurses, as well as Zimbabwe in Southern Africa. In addition, some countries with a low density of current health workers have a high proportion of their workforce abroad, particularly the Central African Republic for doctors.

Growing demand for health workers in high-income countries, coupled with the double burden of an ageing workforce and an ageing population, has stimulated international health worker mobility, predominantly from low- and middle-income countries, with the African Region supplying a substantial number.

As shown in Figure 30, at least 34 653 doctors have been working in nine high-income countries (as self-reported by those destination countries). These nine countries have almost 10% of the headcount of doctors in the African Region as of 2022.

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Fig. 30. Doctors reported by selected countries as having come from the African Region
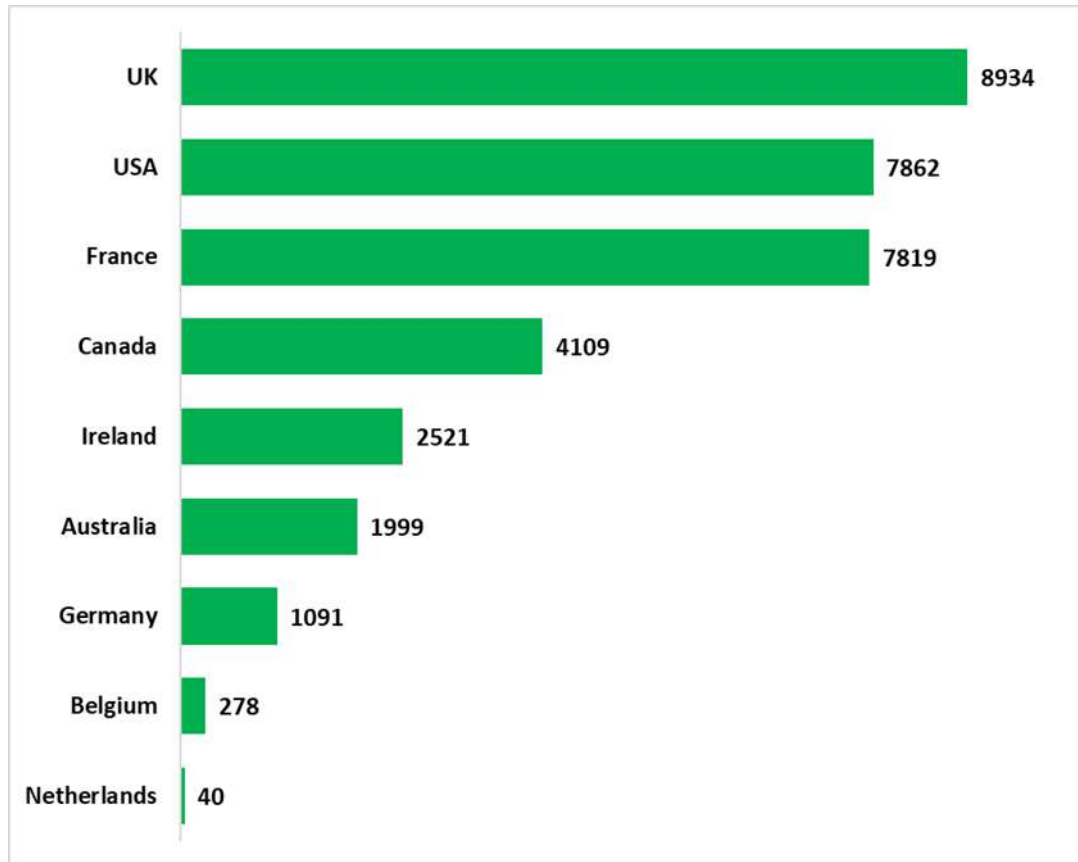
Source: OECD, 2022[73]

Figure 31 appears to show an increasing trend of nurses from five African countries applying to undertake the NCLEX-RN examination for migration to the United States from 2018–2022, with a sharp decline recorded in 2020 owing to travel restrictions related to the COVID-19 pandemic. Box 3 presents some country case studies on health worker migration from the African Region.

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Fig. 31. Total NCLEX-RN applicants from five African countries 2014–2022.
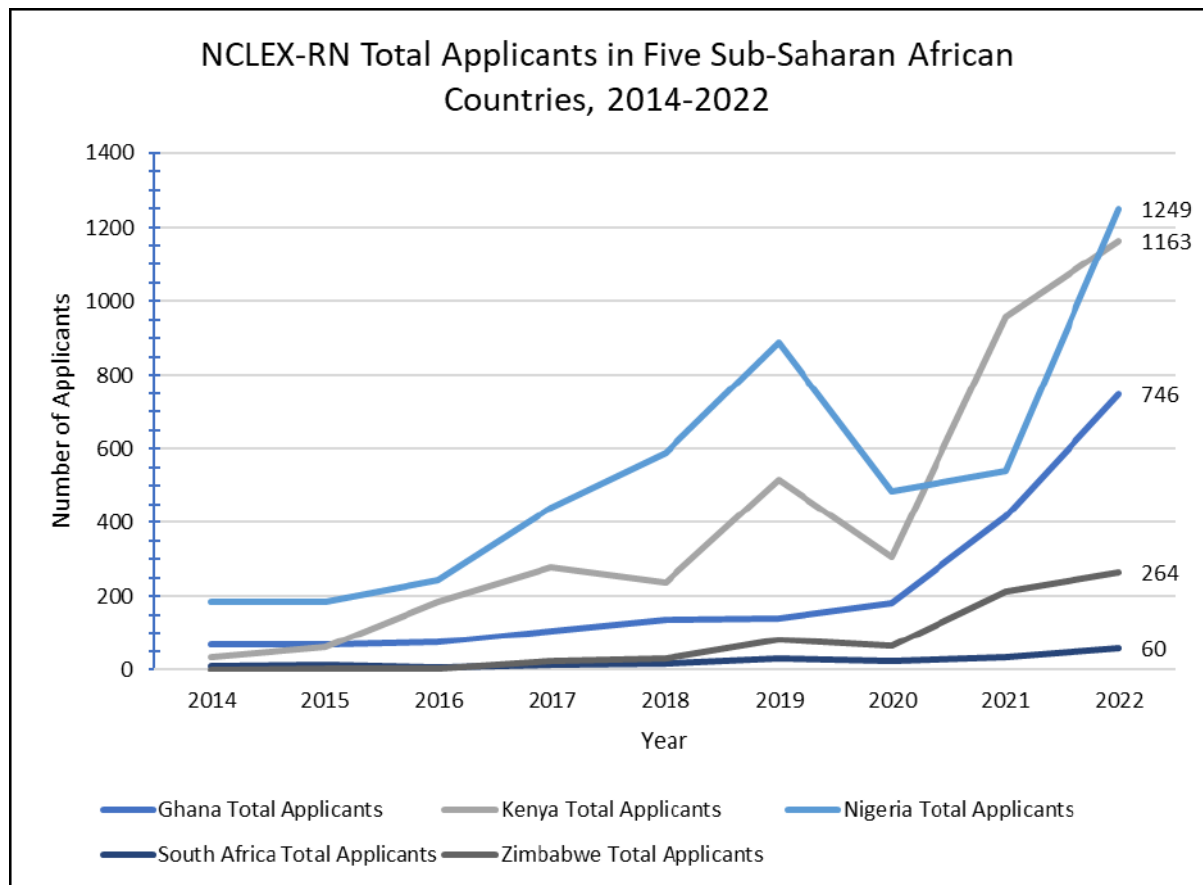
Box 3. A case study of health workers' migration from Ghana and Zimbabwe

Recent HLMA in Ghana and Zimbabwe show a recent escalation of HWF attrition that is predominantly driven by out-migration.

Prior to the COVID-19 pandemic, Ghana had a voluntary attrition rate of about 4%. However, data showed that during the first quarter of 2022, at least 3000 professional nurses and midwives emigrated, mainly to the United Kingdom, the United States, Ireland and Canada. Between 2021 and 2023, overall attrition was almost three times higher than previously recorded. More specifically, the number of nurses seeking verification of good standing with the intention to migrate increased from 2678 in 2020 to 6208 in 2022, an increase of 232%.

Similarly, evidence from Zimbabwe showed accelerated out-migration in 2021, with the main destinations being Australia, the United Kingdom and the United States. Data showed that 20% of doctors and nurses trained in Zimbabwe are working for the NHS in the United Kingdom, the second largest proportion of health workers from Africa, surpassed only by Nigeria. Pre-pandemic data found that about 3.6% of nurses in Zimbabwe requested letters of good standing with the intention to migrate annually. This figure almost doubled to 6.5% in 2021. Following concerted efforts to retain health workers, the country has put administrative measures in place to mitigate this out-migration, reducing the figure to 3.4% as of September 2022.

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5.2   Health worker intention to migrate.

As part of exploratory HLMA, 9102 health workers from six countries (Eswatini, Ghana, Kenya, Mozambique, Zambia, and Zimbabwe) responded to surveys on their intention to migrate (see Table 1), revealing that 35% of workers from Zambia and 63% of workers from Ghana intended to migrate at some point in the future.

Table 9. Percentage of health workers in six countries reporting intention to migrate

COUNTRY	YEAR	SAMPLE SIZE	PER CENT WITH INTENT TO MIGRATE
Eswatini	2023	543	42%
Ghana	2023	2720	63%
Kenya	2021	372	34%
Mozambique	2023	1060	38%
Zambia	2023	1720	35%
Zimbabwe	2022	2687	41%

Sources: Data from surveys conducted during 2021–2023

Meta-analysis of health worker survey data from six countries revealed that the average intention to migrate among health workers was 42% (95% CI 32%, 53%) (see Table 10). The destination country mostly reported by health workers was the United Kingdom (16%) followed by the United States (12%), Canada (10%), Australia (6%) and South Africa (3%). For Mozambique, the preferred destination country was Portugal (26%).

Table 10. Percentage of health workers reporting intention to migrate and by preferred country of destination (results from a meta-analysis of six surveys).

DIMENSION	NUMBER OF STUDIES	PERCENTAGE REPORTING INTENTION TO MIGRATE [95% CI]	I²
Intention to migrate	6	42% [32%, 53%]	99%
Intention to migrate to:			
UK	6	16% [8%, 24%]	99%
USA	6	12% [4%, 20%]	99.5%
Canada	6	10% [2%, 17%]	99.5%
Australia	6	6% [2%, 9%]	98%
South Africa	5	3% [2%, 5%]	95.8%

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06 Projections of health workforce stock and needs-based requirement in the African Region, 2022 and 2030

6.1 Projected health workforce stock up to 2030

An additional 2 million health workers are expected to be added to the HWF in the African Region between 2022 and 2030, of which 75% would be doctors, nurses, midwives, pharmacists and dentists.

The projections across key occupations included in the estimates show that the stock of the practicing HWF in the African Region is likely to increase by nearly 1.7 million (40%), from about 4.9 million[5] in 2022 to almost 5.8 million by 2030 (see Table 11). The occupations tracked in the SDG 3.c tracer indicators show that the baseline stock of the Region is anticipated to increase by 18.2%, from 2.5 million in 2022 to 3 million in 2026 and 3.5 million by 2030. However, countries do not share the same trajectory and even those on a similar path show varying levels of improvement.

Kenya, Liberia, Seychelles and South Africa are projected to experience a reduction in their stock of practicing health workers, especially in the fields of nursing and midwifery. Also, 13 countries (30%) are projected to increase their HWF stock by less than 30% between 2022 and 2030, compared to an anticipated regional average growth of almost 40% (a separate technical report provides more details of the projected stock [39]). Thirty countries (64%) are on a relatively fast pace and are expected to have at least 30% growth in their HWF between 2022 and 2030. This is in contrast to a declining growth rate for nurses in six countries and a slower than expected growth rate in 20 countries (43%). There is also a downward trajectory of doctors in six countries, a slower than expected growth rate in 20 countries (43%) and an anticipated increase of at least 40% in 21 countries (45%).

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5   The headcount of all health workers in the Region was 5.1 million, but seven occupations with a total of 931 557 workers (or 18% of the overall number of practicing health workers in the Region) were excluded.

Table 11. Projected practicing stock of health workers

BROAD OCCUPATIONAL CATEGORY	BASELINE (2022)	PROJECTED 2026	PROJECTED 2030	ANTICIPATED % CHANGE
Medical doctors	368 849	437 935	515 890	40%
Nursing personnel	1 698 828	1 951 363	2 212 905	30%
Midwifery personnel	334 530	421 408	506 796	51%
Pharmacist	101 401	147 485	187 436	85%
Dentist	26 182	46 667	53 054	103%
Other health workers*	1 575 512	1 935 201	2 290 343	45%
Overall	4 105 303	4 940 057	5 766 424	40%

*7 Other health occupations (with a reported headcount of 931 557, **(18% of the entire workforce)** were not included in the need estimates*

Box 4. Health workers excluded from projections

The headcount of all health workers in the Region was 5.1 million, but seven occupations with a total of 931 557 workers (or 18% of the overall number of practicing health workers in the Region) were excluded. They include managerial staff, medical records and health information technicians, other nonmedical professional staff, other nonmedical support staff, medical assistants, personal care workers in health services and traditional and complementary medicine practitioners.

6.2   Needs-based health workforce projection

Considering the disease burden and population health needs, the African Region required 9.75 million health workers (including CHWs) in 2022. This is projected to increase to 11.82 million by 2030. Excluding CHWs, the Region needed nearly 8.7 million health workers in 2022 and would require 10.6 million health workers in 2030 to appropriately address the disease burden and population health needs.

Considering the burden of disease, essential package of health service interventions and professional standards for health service delivery, the overall need for health workers in Africa was estimated at 9 748 602 in 2022 and is projected to increase by 21% to 11 824 973 by 2030. Of this, about 7 million (71.8%) are expected to be medical doctors, nurses, and midwives at a ratio of 1 doctor: 6 nurses.

In 2022, the Region required about 1 million medical doctors, with 47% (485 400) needed as generalist medical practitioners and the remaining 53% (540 800) as specialist medical practitioners. The number of required doctors is projected to increase by 24% to 1.3 million by 2030, with 46% being generalist medical practitioners and 54% specialist medical practitioners. The Region required 160 000 pharmacists in 2022, with that need projected to increase by 16% (185 000) by 2030. A total of 127 995 pharmaceutical technicians and assistants were needed to complement the work of pharmacists in 2022 and the need for their services is anticipated to increase by 21.4% to 155 334 by 2030.

In scenario analysis, the most optimistic but unlikely scenario (minimum scenario), where

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the lower bounds of disease prevalence and minimum time requirements from health workers were assumed, the region required 6.9 million health workers in 2022. This figure could increase to 8.3 million by 2030. The minimum scenario generally estimated an average of 42% lower requirements compared to the best estimates. In the most pessimistic (or maximum scenario), with escalated disease prevalence and maximum time requirement from health workers (assuming low competencies and/or lack of logistics to work), the region required about 14.5 million health workers in 2022, a figure that could increase to 17.5 million by 2030. Compared to the best estimate, this extreme scenario yields an average of 48% higher need for health workers (see Table 12).

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Table 12. Estimates of needs-based health workforce requirements in the African Region 2022–2030

OCCUPATIONS	BASE ESTIMATE (MEDIUM SCENARIO)			MINIMUM SCENARIO			MAXIMUM SCENARIO		
	2022	2026	2030	2022	2026	2030	2022	2026	2030
Audiologists and speech therapists	16 583	18 359	20 411	11 391	12 604	14 002	23 138	25 618	28 462
Community health workers	1 063 537	1 158 928	1 261 868	716 888	777 288	844 766	1 692 087	1 838 648	1 982 955
Dentists	83 099	92 344	103 858	53 890	59 885	67 365	141 124	156 805	176 316
Dietitians and nutritionists	163 569	172 819	181 833	123 260	130 090	136 730	237 504	251 046	264 247
Environmental and occupational health & hygiene workers	94 322	104 102	115 029	51 062	56 532	62 697	145 658	160 475	176 941
Generalist medical practitioners	485 407	535 842	592 278	330 272	363 848	401 464	683 188	754 167	832 788
Medical and dental prosthetic technicians	225 536	252 347	282 713	146 080	163 307	182 840	328 585	367 758	412 022
Medical and pathology laboratory scientists	149 959	166 809	187 327	102 113	113 114	126 622	215 414	239 479	268 278
Medical and pathology laboratory technicians	192 428	212 285	235 843	127 208	139 207	154 453	299 202	327 744	358 144
Medical imaging and therapeutic equipment technicians	89 420	101 007	115 371	60 794	68 538	78 104	135 797	153 689	176 091
Midwifery personnel	878 039	958 395	1 048 335	629 199	687 989	754 109	1 257 208	1 368 540	1 494 845
Nursing associate professionals	1 430 103	1 577 416	1 741 763	1 078 297	1 187 684	1 309 767	1 956 824	2 159 270	2 384 378
Nursing professionals	3 667 003	4 033 695	4 460 768	2 623 424	2 889 386	3 199 095	5 566 851	6 112 001	6 750 496
Optometrists and ophthalmic opticians	19 134	21 614	24 413	11 465	12 975	14 690	30 526	34 499	38 989
Paramedical practitioners	210 198	227 528	248 726	131 314	141 777	155 113z	328 533	353 603	382 204
Pharmaceutical technicians and assistants	127 995	140 879	155 334	90 469	99 498	109 587	200 673	221 028	243 965
Pharmacists	160 052	171 780	185 286	108 003	115 792	124 653	232 801	249 945	269 951
Physiotherapists and physiotherapy assistants	30 139	33 509	37 403	20 749	23 062	25 717	43 377	48 269	53 946
Psychologists	76 365	83 876	92 643	54 795	60 142	66 364	97 484	107 149	118 459

Note: The needs analysis was conducted for 61 specific cadres and then aggregated based on the ISCO-08 classifications (depending on how the stock data is reported by countries through NHWA).

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6.3 Needs-based health workforce shortage in the African Region

The needs-based shortage of 5.6 million health workers in 2022 is projected to increase to 6.1 million by 2030 if education is not expanded and if the disease burden and population health needs are to be addressed. The anticipated 40% increase in the number of health workers by 2030 will lead to a 5% growth in needs-based HWF adequacy levels from 43% in 2022 to 48%.

Of the 9.75 million health workers required in 2022, only 4.2 million were available to meet needs-based population health requirements. This constitutes a shortage of 5.6 million health workers and 43% coverage of the needed health workers. Considering the uncertainties in disease burden and variations in professional practices and technologies, the available stock of health workers in 2022 covered about 29% of the maximum scenario of need and 61% of the minimum scenario of need (see Table 13).

Table 13. Stock of health workers compared with needs-based requirements, 2022 and 2030.

OCCUPATION	ESTIMATES FOR 2022				ESTIMATES FOR 2030			
	REPORTED STOCK (A)	ESTIMATED NEED (B)	SHORTAGE (B-A)	HWF NAR (A/B)	PROJECTED STOCK (A)	PROJECTED NEED (B)	SHORTAGE (B-A)	HWF NAR (A/B)
Medical doctors	369 145	1 026 224	657 079	36%	515 890	1 275 843	759 953	40%
Nursing personnel	1 698 828	5 097 106	3 398 278	33%	2 212 905	6 202 531	3 989 626	36%
Midwifery personnel	334 530	878 039	543 509	38%	506 796	1 048 335	541 539	48%
Pharmacist	101 401	160 052	58 650	63%	187 436	185 286		
Dentist	34 404	83 099	48 695	41%	53 054	103 858	50 804	51%
Other health workers**	1 628 411	2 504 083	875 672	65%	2 290 343	3 009 120	718 777	76%
Total	**4 166 20**	**9 748 602**	**5 581 882**	**43%**	**5 766 424**	**11 824 973**	**6 060 699**	**49%**
Doctors, nurses, midwives, dentists, pharmacists	2 538 309	7 244 520	4 706 210	35%	3 476 081	8 815 853	5 341 922	39%

**7 Other health occupations (with a reported headcount of 931 557 18% of the entire workforce) were excluded from the stock projections because they were not included in the need estimates*

6.4   Scenario analysis for addressing the needs-based health workforce shortage in 2030.

According to a scenario analysis, there is no single solution to adequately address the needs-based shortage of health workers by 2030, even if it were to be cut by half. However, if training output is doubled (by reducing losses and expanding capacity) and the absorption rate of trained health workers is improved from the current 70% to 90%, the needs-based shortage could be reduced by at least 40%.

Overall, any scenario that involves increasing the absorption of all trained health workers to at least 90% and reducing losses from the training outputs (such as lessening drop-out and improving pass rates) while increasing training capacity by at least 20% could make a difference in addressing the projected needs-based shortage of health workers by 2030. In a scenario where all trained health workers are absorbed while current training outputs are maintained, the needs-based shortage would reduce by 0.84 million, or 14% (see Table 14).

In a scenario where all trained health workers are absorbed, out-migration is halved but current training outputs are maintained, the 2030 needs-based shortage is likely to reduce by 0.9 million (15%). A 25% needs-based reduction requires a scenario in which there is a 90% absorption of all trained health workers, a 20% reduction of education output loss and a 20% increase in additional capacity. This scenario would likely cut the needs-based shortage by 1.5 million (26%) in 2030. Most scenarios that target a higher production capacity without any improvement in absorption tend to have a relatively low impact on the reduction of health worker shortage.

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Table 14. Scenario analysis for tackling the needs-based shortage of health workers.

SCENARIO	NEEDS-BASED SHORTAGE (ALL OCCUPATIONS)	% CHANGE IN SHORTAGE FROM BASE SCENARIO	ABSOLUTE DIFFERENCE	IMPLICATION
70 % absorption & maintain current training outputs (base case scenario)	6 060 699			
100% absorption of trained health workers – maintain current training outputs	5 219 267	-14%	841 431	If all trained health workers are absorbed, it would likely reduce the needs-based shortage in 2030 by 0.84 million, or 14%
100% absorption & 50% increase in retention	5 158 134	-15%	902 564	Ensuring 100% absorption and focusing on addressing migration without expanding training output will likely cut the 2030 needs-based shortage by 0.9 million
90% absorption & increase education output by 20%	5 003 986	-17%	1 056 712	90% absorption and eliminating the drop-out rate of approximately 20% will likely have a positive impact by reducing 1 million from the needs-based shortage
90% absorption & increase education output by 30%	4 756 107	-22%	1 304 591	90% absorption and eliminating the drop-out rate of 20% increasing additional capacity of 10% will likely have a positive impact by reducing 1.3 million from the needs-based shortage
90% absorption & increase education output by 40%	4 508 228	-26%	1 552 471	90% absorption and eliminating the drop-out rate of 20%, increasing additional capacity of 20%, will likely have a positive impact by reducing 1.5 million from the needs-based shortage
80% absorption & increase education output by 50%	4 678 537	-23%	1 382 162	80% absorption and eliminating the drop-out rate of 20%, increasing additional capacity by 30% will likely have a positive impact by reducing 1.4 million from the needs-based shortage
90% absorption & double education output	3 639 180	-40%	2 421 518	Doubling the training output (by reducing losses and expanding capacity) and improving the rate of absorption of trained health workers to at least 90% from the current 70% can reduce the needs-based shortage by at least 40%

6.5 Relationship between needs-based health workforce requirements and attainment of universal health coverage.

The needs-based HWF estimates could support the attainment of at least 60 out of 100 universal health care service coverage index scores across all the countries.

To explore the sensitivity of the needs-based estimate of the HWF required to support the attainment of UHC, a comparison between the proportion of HWF needed (doctors, nurses, midwives, dentists, and pharmacists) covered by existing stock in 2022 and the country's respective UHC Service Coverage Index (UHC SCI) score in 2021 was conducted.

The analysis indicated that the HWF need availability ratio (NAR) was highly correlated with the attainment of UHC (r = 0.73) and explained about 53% of the variations in UHC SCI scores observed in 2021 across countries in the African Region (see Figure 32 and relationship between HWF education capacity and density

As shown in (Figure 33), addressing the HWF shortage requires differentiated approaches, which countries have clustered into four distinct groups based on their existing density of health workers and the ratio of new graduates (output from education pipeline) to the need for health workers.

Fig. 32. Relationship between HWF NAR and UHC SCI.
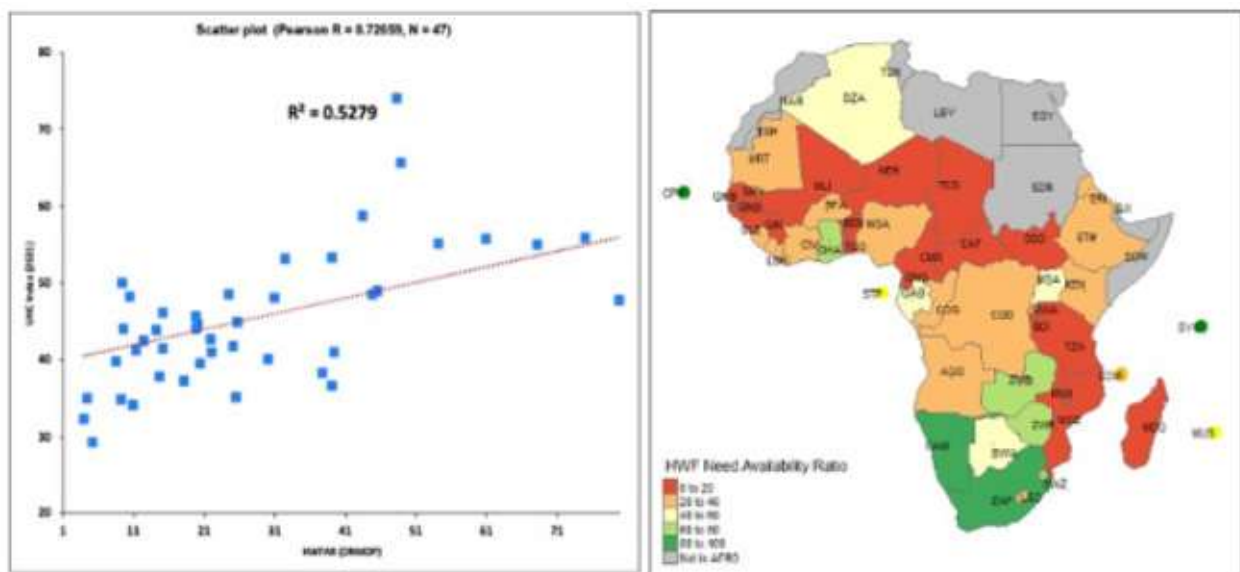
6.6 Relationship between health workforce education capacity and density

As shown in (Figure 33), addressing the HWF shortage requires differentiated approaches, which countries have clustered into four distinct groups based on their existing density of health workers and the ratio of new graduates (output from education pipeline) to the need for health workers.

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Fig. 33. Categories of countries based on their capacity to meet their HWF needs
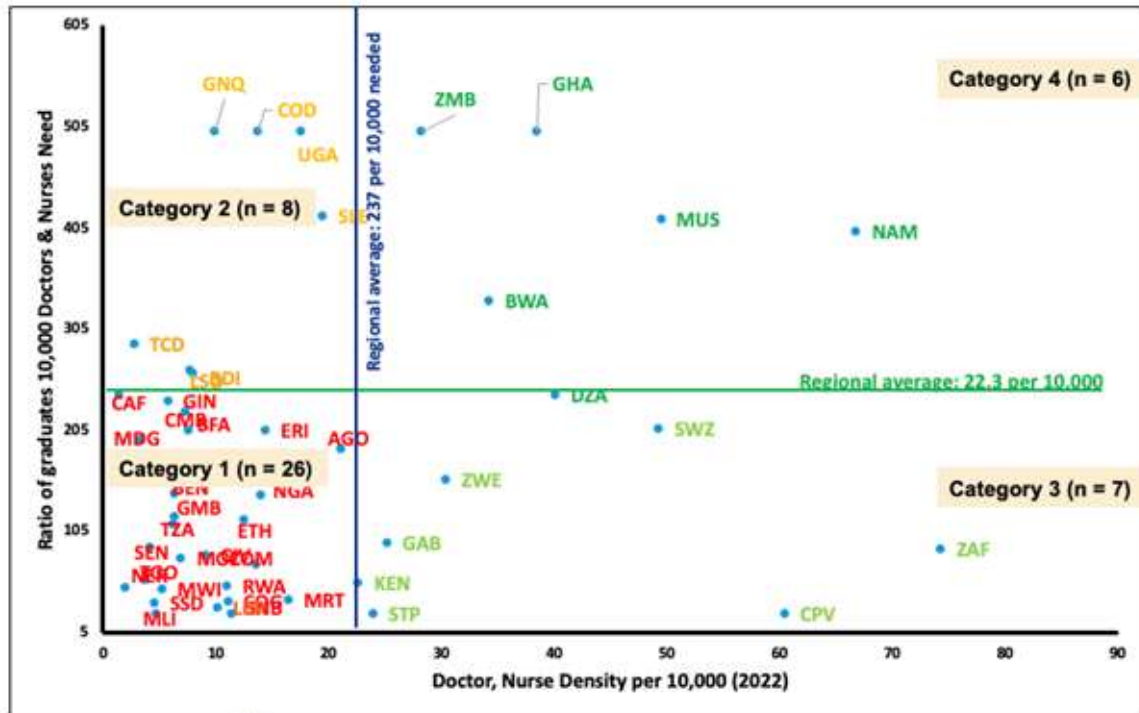
Category 1: These countries have lower than average HWF density and have lower than average production capacity (low ratio of new graduates per 10 000 of their HWF needs). They are contributing to about 72% of the regional needs-based shortage of health workers. These countries need to urgently scale up training and employment towards doubling the HWF, especially in PHC settings and in underserved areas.

Category 2: These countries have a density of existing health workers that is lower than the regional average but they tend to have higher-than-average capacity to train according to their needs. These countries account for 16% of regional needs-based shortages. They need to maintain their production momentum and focus on investing in employment retention. They also need to manage health worker mobility and explore its potential dividend through mutually beneficial bilateral labour agreements (BLA).

Category 3: Although these countries have a higher-than-average density of health workers, their production relative to their needs is lower than average and could constrain the long-term sustainability of their current progress if education and training are not expanded or optimized. These countries currently contribute only 9% to the Regional needs-based shortage; policy and investment focus could centre on scaling up training to sustainable levels, investing in their employment and retention.

Category 4: These countries tend to have higher-than-average density of health workers and the capacity to train more health workers relative to their needs. The countries contribute only 3% to the anticipated regional needs-based shortage **by 2030.** Category 4 countries need to maintain their momentum of production and optimize their investment in employment and retention.

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07 Investments needed in health workforce: implications for optimizing budget space

7.1 Overall funding gaps for health workforce investments to reduce shortage by half

There is a large deficit in funding for HWF in the African Region. In 2022, only US$ 20.85 billion (57%) of the required US$ 36.3 billion was available for HWF employment in the African Region. The funds were from domestic resources, the private sector and external development assistance. The funding gap to employ all the trained health workers in 2022 was 43%. This estimates has not changed since 2022, when a similar analysis was conducted for countries in East and Southern Africa [74].

With the current levels of funding for HWF, the African Region is unlikely to halve the current health worker shortage, given that the Regional Committee estimated in 2017 that up to US$ 120.4 billion is required to achieve this by 203,. Of the investment required, US$ 22.58 billion is needed for training health workers and another US$ 97.83 billion to employ those to be trained and protect existing positions (see Table 15). Despite the seemingly large amount of funds required for HWF, the required investment is less than 2% of the GDP of countries in the African Region. African countries are currently spending roughly 4% of GDP on health, of which 29% is spent on workforce employment [75].

Box 5. Investment gaps to absorb currently trained and unemployed health workers

The public sector envelope for the health sector alone covers approximately 39% of the resources required to employ the current stock of health workers, leaving a budgetary gap of 61%.

If the existing volume and mix of HWF spending from the private sector and ODA are considered, the anticipated budget envelope could cover 57% of the cost of the existing stock of health workers, still leaving a gap of almost 43%.

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Table 15. Investments required to maintain the existing wage bill, absorb trained health workers and for scaling up training and employment

OCCUPATION	MEDIAN TUITION COST (USD)	MEDIAN ANNUAL SALARY (USD)	INVESTMENT TO EMPLOY ALL THE STOCK HEALTH WORKERS IN 2022 (AND MAINTAIN CURRENT JOBS) – IN MILLION US$	INVESTMENT TO EMPLOY ALL THE STOCK OF HEALTH WORKERS IN 2030 (AND MAINTAIN EXISTING JOBS) – IN MILLION US$	INVESTMENT TO TRAIN TO HALVE THE NEEDS-BASED SHORTAGE FOR 2030 - IN MILLION US$*	RECURRENT INVESTMENT TO EMPLOY NEWLY TRAINED HEALTH WORKERS AND MAINTAIN EXISTING JOBS IN 2030 - IN MILLION US$	TOTAL INVESTMENTS REQUIRED TO REDUCE SHORTAGE BY 50% (CURRENT WAGE BILL, TRAINING AND EMPLOYMENT COST)
Medical doctors	10 572.00	16 711.45	6168.95	12 069.78	5623.96	18 419.74	24 043.70
Nursing personnel	4972.50	7534.15	12 799.22	23 341.29	13 886.89	38 370.50	52 257.40
Midwifery personnel	2292.00	8216.37	2748.62	5829.63	868.84	8054.37	8923.21
Pharmacists	3852.00	11 129.03	1128.50	2920.37	0.00	2920.37	2920.37
Dentists	10 572.00	24 675.15	848.94	1832.77	375.97	2459.57	2835.54
Other health workers	3632.25	741.29	12 606.00	24 822.29	1827.54	27 604.42	29 431.96
Total			36 300.22	70 816.13	22 583.21	97 828.97	120 412.18

*The cost of training reflects on tuition fees, which are mostly borne by students and their guardians.

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7.2   Estimates of the potential budget envelope for health workforce employment

Three scenarios were analysed and compared. The "business as usual" scenario assumed a constant level of prioritization for health from the General Government Final Consumption Expenditure (which was used as a proxy of the overall envelope for government spending on consumption, including in the social sectors such as health). The level of prioritization of HWF from the health sector allocation/budget was also held constant, leaving macroeconomic factors such as GDP growth as the only driver of the budget space.

In the "business as usual" scenario, the public sector budget space, private sector contribution and ODA together suggested a potential budget envelope of US$ 20.85 billion in 2022 which, if all the macroeconomic parameters considered in the analysis remain fairly constant, could increase by almost a quarter (26%) to US$ 26.4 billion in 2026 and a further 21% to US$ 31.81 billion by 2030. However, volatility in the volume and flows of ODA heightens uncertainties of the ballpark estimate. Under the "business as usual" scenario, if only the public sector envelope is considered, the potential funding is estimated at US$ 14.17 billion in 2022 which would likely improve by 21% to US$ 17.24 billion by 2026 and could reach US$ 20.67 billion by 2030. Table 16 sets out these ballpark estimates. The methods and scenario analysis are detailed in a separate technical report [39].

Given that the existing stock of health workers required US$ 36.3 billion compared with the estimated envelope from all sources of US$ 22.6 billion, there was a rough financing deficit of 43% in 2022 if all trained health workers were to be employed – whether in the public sector, the private sector or through ODA. This financing gap is translating into unemployed health workers, estimated at 27% (95% CI: 14%–39%) based on data from a subset of 10 countries that have conducted HLMAs.

In a "HWF prioritization" scenario where all parameters are held constant, but countries prioritize at least the regional average of 43% of their health budget for the HWF employment, the overall HWF envelop could increase by 39% from the "business as usual" scenario. In 2022, the "HWF prioritization" scenario would have resulted in a combined regional HWF envelope of US$ 28.98 billion and could increase to US$ 36.27 billion by 2026 and US$ 44.86 billion in 2030, if the macroeconomic parameters remain fairly favourable.

In a "Health prioritization" Scenario, countries prioritize at least 15% of public sector consumption (general government spending) for health – in line with the targets set in the Abuja Declaration and Plan of Action of 2000 but maintain prevailing levels of HWF prioritization from the health budget. This scenario would have increased the HWF envelope by 60% in 2022 from the "business as usual" scenario and would likely yield US$ 55.32 billion by 2030. The evidence, therefore, shows that countries need to prioritize health within the overall government expenditure and then better prioritize health workforce to at least regional median levels of 43% or the global average of 57%. This should be underpinned by ensuring efficiency in the use of resources.

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Table 16. Ballpark estimates of potential budget and financial space scenarios for the HWF (in millions of US$)

COUNTRY	PUBLIC SECTOR (BUSINESS AS USUAL SCENARIO)			PUBLIC SECTOR + PRIVATE SECTOR + ODA (BUSINESS AS USUAL SCENARIO)			PUBLIC SECTOR + PRIVATE SECTOR + ODA (ENHANCED HWF PRIORITIZATION SCENARIO)			PUBLIC SECTOR + PRIVATE SECTOR + ODA (OVERALL HEALTH PRIORITIZATION SCENARIO)		
	2022	2026	2030	2022	2026	2030	2022	2026	2030	2022	2026	2030
Algeria	1744.01	2282.74	2250.44	2447.51	203.56	3158.23	3421.25	4478.09	4414.72	3421.25	4478.09	4414.72
Angola	268.51	220.41	268.77	376.82	309.31	377.19	1053.69	864.92	1054.72	1053.69	864.92	1054.72
Benin	37.79	55.46	73.07	53.03	77.83	102.54	174.65	256.32	337.71	174.65	256.32	337.71
Botswana	352.12	438.23	568.56	383.30	477.04	618.90	478.89	596.00	773.24	478.89	596.00	773.24
Burkina Faso	144.48	204.62	264.07	221.40	313.56	404.66	221.51	313.72	404.88	289.68	410.28	529.48
Burundi	27.01	26.10	37.99	56.66	54.77	79.69	63.65	61.52	89.52	102.24	98.82	143.80
Cabo Verde	14.76	20.45	25.87	24.89	34.49	43.64	27.46	38.05	48.14	35.93	49.79	62.98
Cameroon	114.55	155.65	191.13	160.75	218.43	268.23	651.83	885.72	1087.65	651.83	885.72	1087.65
Central African Republic	5.99	8.31	10.29	8.40	11.66	14.44	26.02	36.11	44.72	26.02	36.11	44.72
Chad	8.23	9.82	11.64	16.89	20.16	23.90	42.70	50.96	60.43	51.99	62.06	73.59
Comoros	3.19	4.23	4.57	5.52	7.31	7.91	20.06	26.58	28.76	20.06	26.58	28.76
Côte d'Ivoire	181.85	265.10	347.36	231.34	337.25	441.90	451.99	658.92	863.39	521.07	759.61	995.32
Democratic Republic of the Congo	192.85	262.55	375.15	270.64	368.46	526.48	647.47	881.48	1259.53	647.47	881.48	1259.53
Equatorial Guinea	69.69	61.72	67.24	97.80	86.61	94.36	277.19	245.49	267.46	277.19	245.49	267.46
Eritrea	2.47	2.65	2.84	3.47	3.73	3.98	22.11	23.74	25.36	22.11	23.74	25.36
Eswatini	27.94	31.24	35.46	56.49	63.18	71.70	59.30	66.33	75.27	85.00	95.07	107.89
Ethiopia	1079.10	2094.42	2760.07	2737.33	5312.87	7001.43	2623.63	5092.21	6710.63	6045.12	11 732.97	15 461.98
Gabon	103.53	103.66	117.06	128.11	128.26	144.85	200.34	200.59	226.52	200.34	200.59	226.52
Ghana	286.90	324.81	414.30	291.29	329.79	420.65	637.72	722.00	920.92	637.72	722.00	920.92
Guinea	81.21	117.32	153.09	155.83	225.15	293.78	346.57	500.73	653.37	380.17	549.27	716.71
Guinea-Bissau	3.69	5.50	7.16	5.18	7.72	10.05	28.25	42.08	54.75	28.25	42.08	54.75
Kenya	501.98	574.54	719.11	763.12	873.44	1093.21	1390.46	1591.46	1991.89	1390.46	1591.46	1991.89
Lesotho	23.91	26.85	30.52	59.94	67.32	76.51	45.45	51.04	58.01	81.19	91.17	103.63
Liberia	9.35	12.55	16.64	12.81	17.20	22.79	42.52	57.09	75.65	42.52	57.09	75.65

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COUNTRY	PUBLIC SECTOR (BUSINESS AS USUAL SCENARIO)			PUBLIC SECTOR + PRIVATE SECTOR + ODA (BUSINESS AS USUAL SCENARIO)			PUBLIC SECTOR + PRIVATE SECTOR + ODA (ENHANCED HWF PRIORITIZATION SCENARIO)			PUBLIC SECTOR + PRIVATE SECTOR + ODA (OVERALL HEALTH PRIORITIZATION SCENARIO)		
	2022	2026	2030	2022	2026	2030	2022	2026	2030	2022	2026	2030
Madagascar	89.55	116.81	159.26	125.67	163.93	223.50	214.46	279.75	381.41	214.46	279.75	381.41
Malawi	21.68	20.39	25.17	100.45	94.49	116.63	47.16	44.37	54.76	173.83	163.52	201.84
Mali	70.63	96.44	118.82	112.94	154.21	190.01	70.34	369.15	454.84	298.84	408.06	502.78
Mauritania	39.25	47.95	55.60	67.92	82.97	96.21	119.56	146.06	169.37	146.03	178.39	206.86
Mauritius	89.89	109.82	118.61	126.16	154.12	166.45	185.48	226.59	244.73	185.48	226.59	244.73
Mozambique	162.04	229.91	373.72	227.40	322.65	524.48	467.90	663.88	1079.17	467.90	663.88	1079.17
Namibia	151.42	182.82	213.21	175.01	211.29	246.42	246.44	297.53	347.00	246.44	297.53	347.00
Niger	46.60	69.66	91.88	149.56	223.55	294.86	86.95	129.98	171.44	219.28	327.76	432.32
Nigeria	688.37	755.67	1209.69	690.69	758.22	1213.77	2452.44	2692.21	4309.72	2452.44	2692.21	4309.72
Congo	76.14	93.57	115.34	106.85	131.31	161.86	195.06	239.72	295.48	195.06	239.72	295.48
Rwanda	15.11	17.36	23.05	121.58	139.71	185.45	35.81	41.15	54.62	205.31	235.91	313.15
Sao Tome and Principe	5.27	8.72	11.86	7.40	12.23	16.65	10.31	17.05	23.20	10.31	17.05	23.20
Senegal	131.46	201.95	265.86	207.89	319.36	420.43	481.14	739.14	973.06	481.14	739.14	973.06
Seychelles	20.24	24.90	31.96	32.39	39.86	51.15	41.85	51.50	66.08	47.73	58.74	75.37
Sierra Leone	5.13	5.11	7.00	12.23	12.17	16.69	26.82	26.69	36.58	34.70	34.54	47.33
South Africa	6647.54	7097.00	7965.90	9035.37	9646.27	10 827.28	9035.37	9646.27	10 827.28	9035.37	9646.27	10 827.28
South Sudan	3.74	3.47	4.42	10.95	10.14	12.92	45.24	41.90	53.41	77.96	72.20	92.03
Tanzania	343.05	449.92	649.36	481.43	631.41	911.31	768.04	1007.32	1453.85	768.04	1007.32	1453.85
The Gambia	1.91	2.73	3.42	6.75	9.65	12.09	7.33	10.48	13.13	18.47	26.41	33.09
Togo	14.32	20.13	26.12	41.24	57.97	75.20	67.06	94.27	122.29	114.94	161.57	209.59
Uganda	83.46	120.19	166.09	146.52	211.02	291.60	700.21	1008.44	1393.51	700.21	1008.44	1393.51
Zambia	97.54	118.80	159.18	157.72	192.11	257.39	205.60	250.43	335.52	330.21	402.21	538.88
Zimbabwe	85.04	136.32	126.98	134.27	215.24	200.50	316.92	508.02	473.22	389.35	624.14	581.38
Overall	14 174.44	17 238.57	20 674.87	0 846.90	6 342.98	31 813.86	28 982.23	36 273.04	44 860.92	33 478.35	4 268.07	55 322.04

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7.3   Current levels of prioritization for health and health workforce investments in the African Region

The latest available data show that, on average, countries in the African Region are allocating about 7% (ranging from 2.1% to 15.3%) of general government health expenditure to health. Countries are spending an average of 43% (12% to 71%) on HWF remuneration, which determines the levels of employment of health workers.

A comparison of the level of prioritization for health from general government spending and the level of HWF prioritization from the health spending revealed that in 49% of countries, there is room to improve HWF investments by better prioritization of HWF within the existing health expenditure envelope. Of these, 19% (n = 9) can also improve the prioritization of health spending from the overall government expenditure envelope. Also, for 51% of countries, improving HWF investments could principally stem from exploring efficiency gains while 30% of countries (n = 14) could benefit from advocating for improvement of the prioritization of health spending from the overall government expenditure envelope (see Figure 34).

Fig. 34. Prioritization of health and HWF in the African Region

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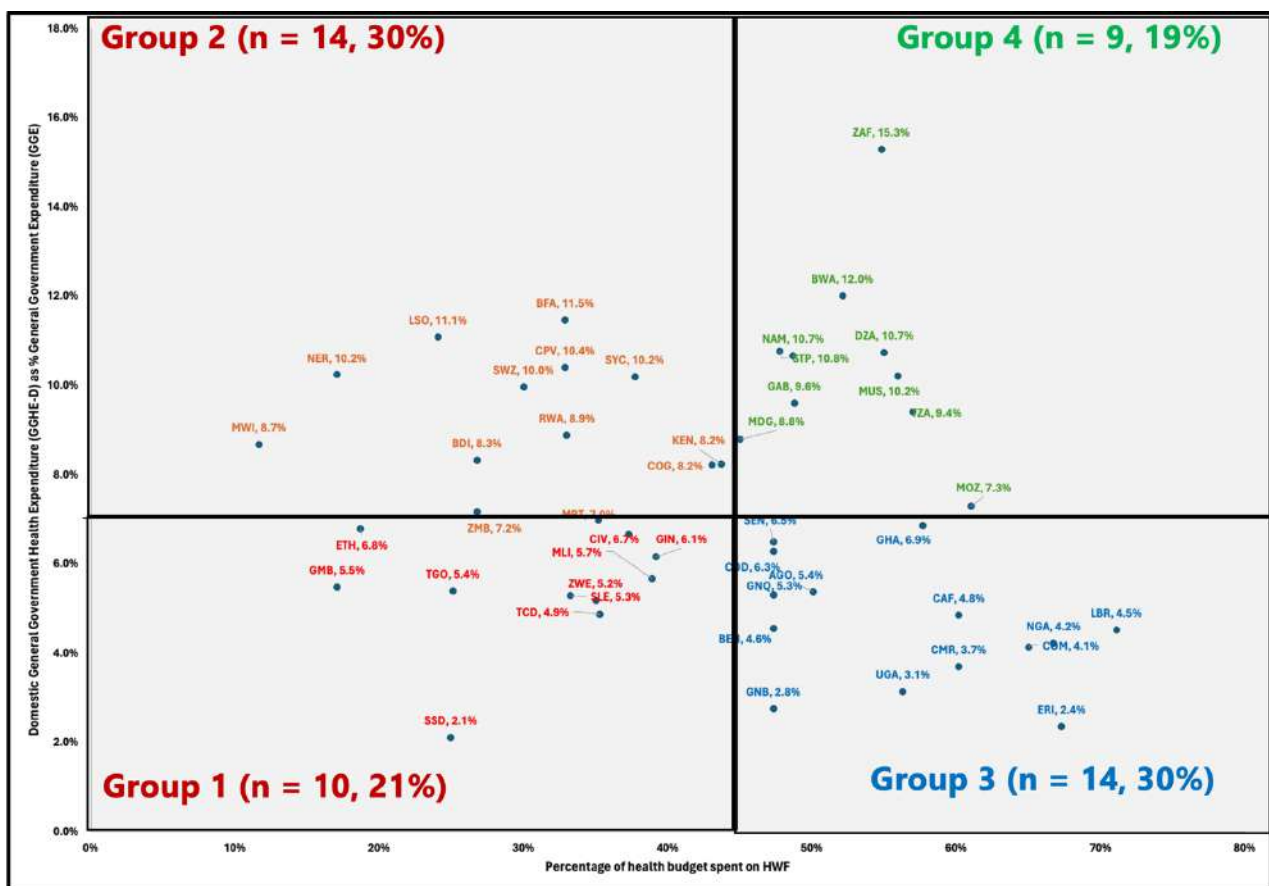
As illustrated in Figure 34, countries fall into four main groups of budget space potential.

• **Budget space group 1 countries**: These countries have higher than the regional average level of prioritization of health within government spending (>7%) but less than the regional average level of prioritization of HWF within the health spending (<43%). Almost one in three countries (30%, n = 14) are in this group, where the quick wins for expanding HWF investments could stem from better prioritization of HWF within existing health budgets, followed by advocacy to increase the overall health budget or to secure external aid, as appropriate (see Figure 34).

• **Budget space group 2 countries**: These countries have higher than the regional median level (>7%) of prioritization of health within government spending and also higher than the regional median level of prioritization of HWF within the health spending (>43%). Ten countries (21% of the region) are in this group, also known as the frontier group, where the quick wins for expanding HWF investments could stem mainly from allocative efficiency gains from existing HWF spending, followed by advocacy to increase the overall health budget or to secure external aid, as appropriate (see Figure 34).

• **Budget space group 3 countries**: These countries have lower than the regional median level (<7%) of prioritization of health within government spending and also lower than regional median level of prioritization of HWF within the health spending (<43%). **About 1 in 4** countries (n = 9, 19% of the region) are in this group, where HWF investment is highly constrained for countries that need maximum political commitment to increase prioritization of health within government spending, but most importantly, increase the proportion of health spending allocated to HWF (see Figure 34).

• **Budget space group 4 countries**: These countries have lower than the regional average level of prioritization of health within government spending (<7%) but higher than the regional median level of prioritization of HWF within the health spending (>43%). **Almost a third of countries are in this group (n = 14, 30%)** where room to increase HWF investments could mainly come from increasing the level of prioritization of health investments from overall government spending or mobilizing external development assistance for HWF (see Figure 34).

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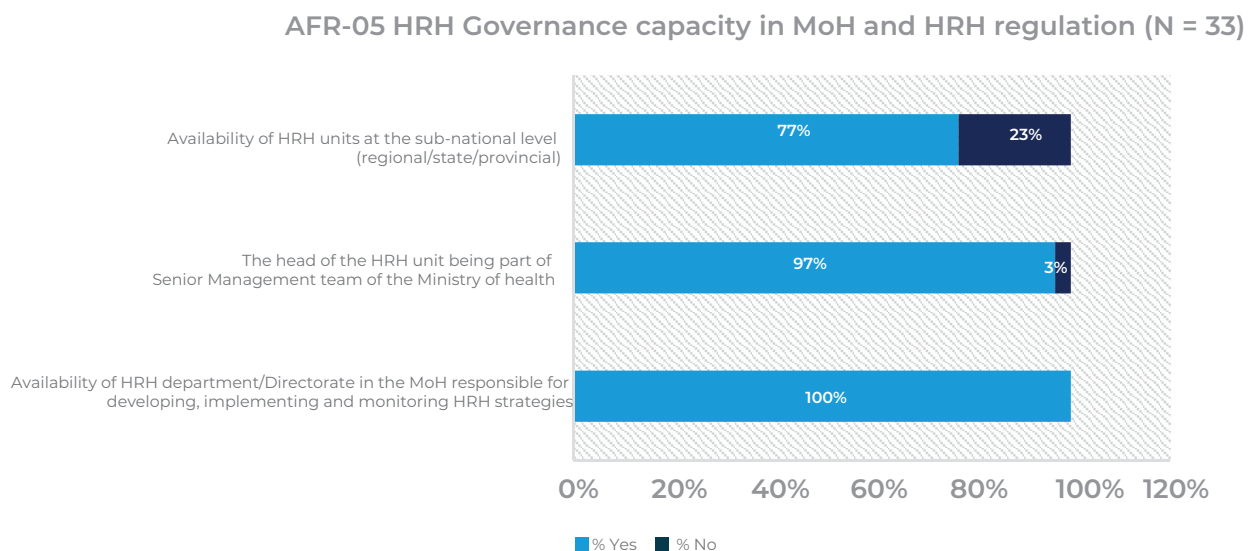# 08 Capacity for health workforce governance, planning and management

At the centre of a functioning health system is leadership and governance. Leadership and governance involve ensuring that a strategic policy framework exists and is combined with effective oversight, coalition building, regulation, attention to system design and accountability. Setting the HWF agenda in the African Region requires accurate data capture, analysis, projections and ensuring stakeholders are involved. These elements are essential for HWF development, recruitment, remuneration, motivation and maintenance. Countries shared information on some of these elements of HWF leadership and governance, which is presented in this section.

8.1 Health workforce governance and leadership capacity

The African Region has improved leadership and governance of its HWF through the increase in the development of HWF units within the MoH and the development of HWF policies.

All 33 countries that responded indicated they had a HWF unit within their MoH to lead the HWF agenda. This finding is similar to 2018, when 39 countries provided information on the same indicator. In addition, 32 countries (97% of those that responded) indicated that the heads of HWF in the MoH were part of the senior management of the MoH and thus had opportunities to represent HWF issues at the highest levels of health administrations. However, only 25 of the 33 countries that responded (77%) had decentralized HWF units at the subnational levels (as shown in Figure 35).

Fig. 35. Availability of a central department/unit for stewardship of HWF agenda [N= 33]

AFR-05 HRH Governance capacity in MoH and HRH regulation (N = 33)

	% Yes	% No
Availability of HRH units at the sub-national level (regional/state/provincial)	77%	23%
The head of the HRH unit being part of Senior Management team of the Ministry of health	97%	3%
Availability of HRH department/Directorate in the MoH responsible for developing, implementing and monitoring HRH strategies	100%	

■ % Yes ■ % No

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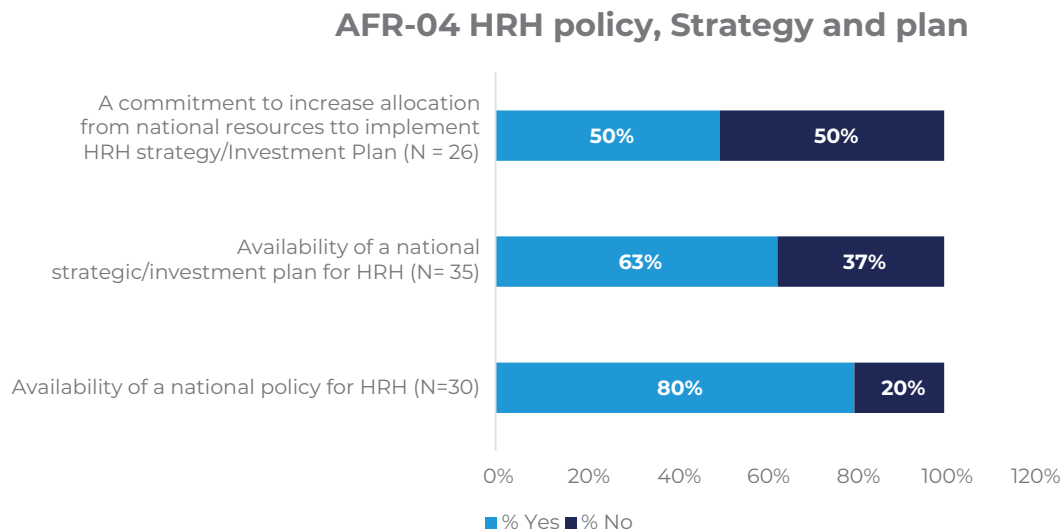
8.2 Health workforce policy and planning

In the past decade, the Region has also improved the development of structures, policies and procedures necessary for the planning, governance and management of the HWF. Despite improvement, critical issues persist in these areas and require urgent attention.

Most countries have HWF policies (80%) and strategic plans (63%) in place, but half (50%) have no commitment to increase budget allocation to implement HWF strategic plans.

About 80% of countries (24 out of 30 that responded) indicated that they had HWF policies in place to guide the overall direction and management of health workers (Figure 36). This is an improvement from 63% of countries that responded in 2018. Also, 63% of the countries that provided information (22 out of 35 countries) reported having up to date HWF strategic plans or investment plans as of 2022, as compared to 70% in 2018. A further five countries (Burkina Faso, Cameroon, Congo, Guinea-Bissau and Liberia) indicated that they were in the process of developing their HWF strategic plans.

Fig. 36. Availability HWF policies and strategic plans

AFR-04 HRH policy, Strategy and plan

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Nearly four out of 10 countries reported a lack of institutional models and norms for assessing staffing needs approaches to HWF projections and planning.

As shown in Figure 37, 22 out of 29 countries(76%) responded that they reported having institutional mechanisms or bodies to coordinate an intersectoral HWF agenda; 24 countries (83%) had mechanisms and models for HWF planning; and another 22 countries (76%) had national education plans for the HWF that were aligned with the national health plan and the national HWF strategy/plan. However, nearly four out of 10 countries (38%, n =11) had no institutional models for assessing and monitoring staffing needs for health service delivery.

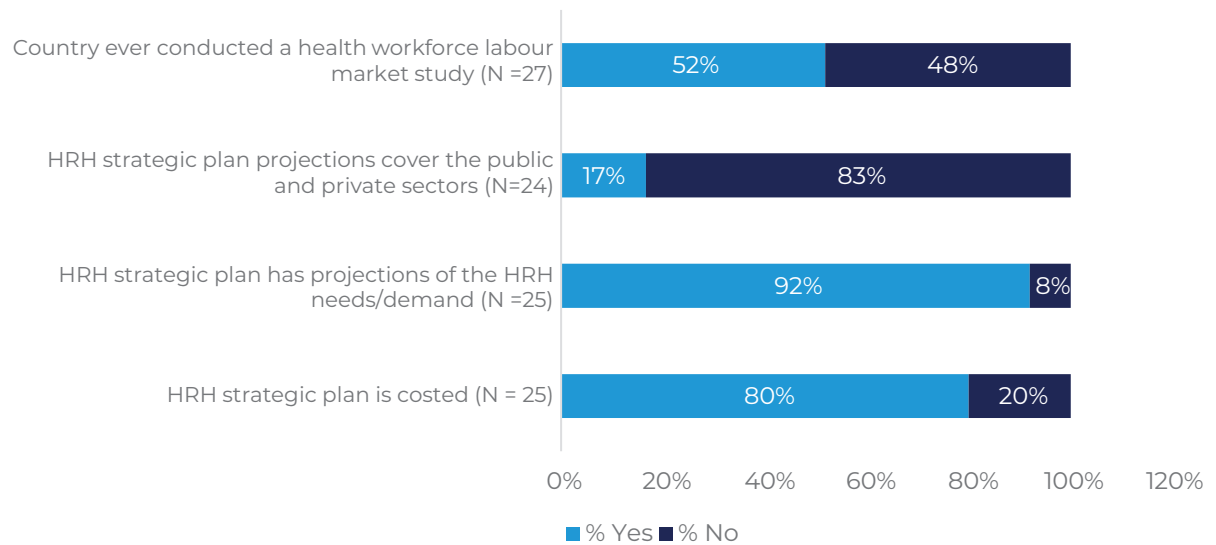**Fig. 37. Availability of planning tools and frameworks**
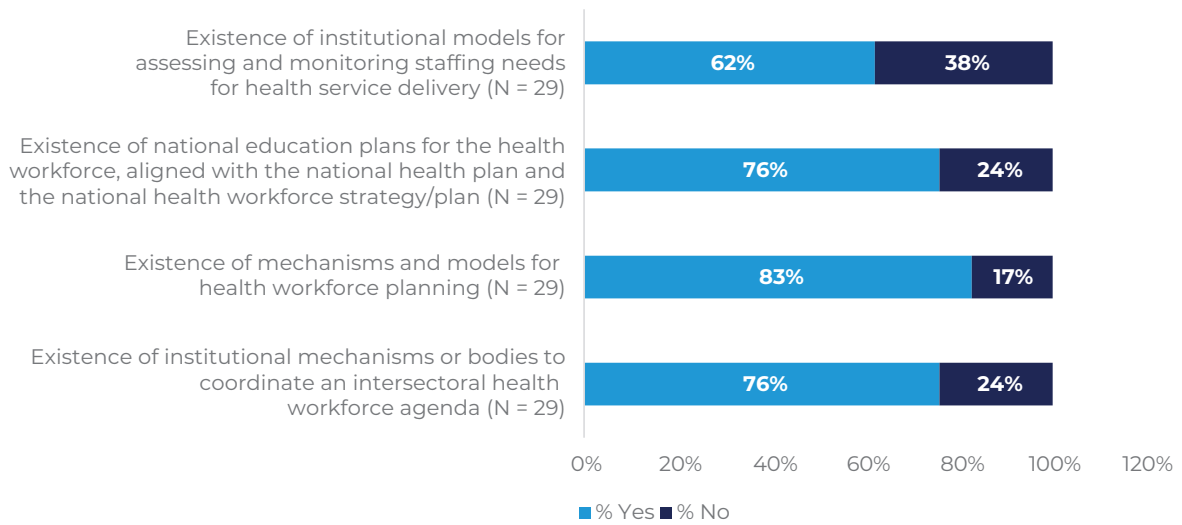
Most countries have costed their strategic plans. Nearly half of the countries have never conducted an HLMA.

Although 92% of countries report having conducted HWF needs and demand analysis to inform the strategic plan, in about 20 countries (83% of those that responded), the analysis was not comprehensive and did not cover the needs of the private sector in planning. Moreover, only 14 countries (out of the 27 that responded) indicated that they had ever conducted an HLMA to provide insights into their HWF education, supply, demands, needs and financial implications to make a case for multisectoral action for investing in the HWF.

Although four out of every five countries (80%) reported that their HWF strategic plans were costed, only half (50%) indicated that there was a commitment to increase the budgetary allocation to HWF, a reduction from the 63% reported in 2018. In terms of duration of planning, 22 countries (47% of the countries that responded) implement their HRHSPs over a period of five years, while plans for two countries cover seven years, three have plans covering eight years and five countries have plans covering 10 years.
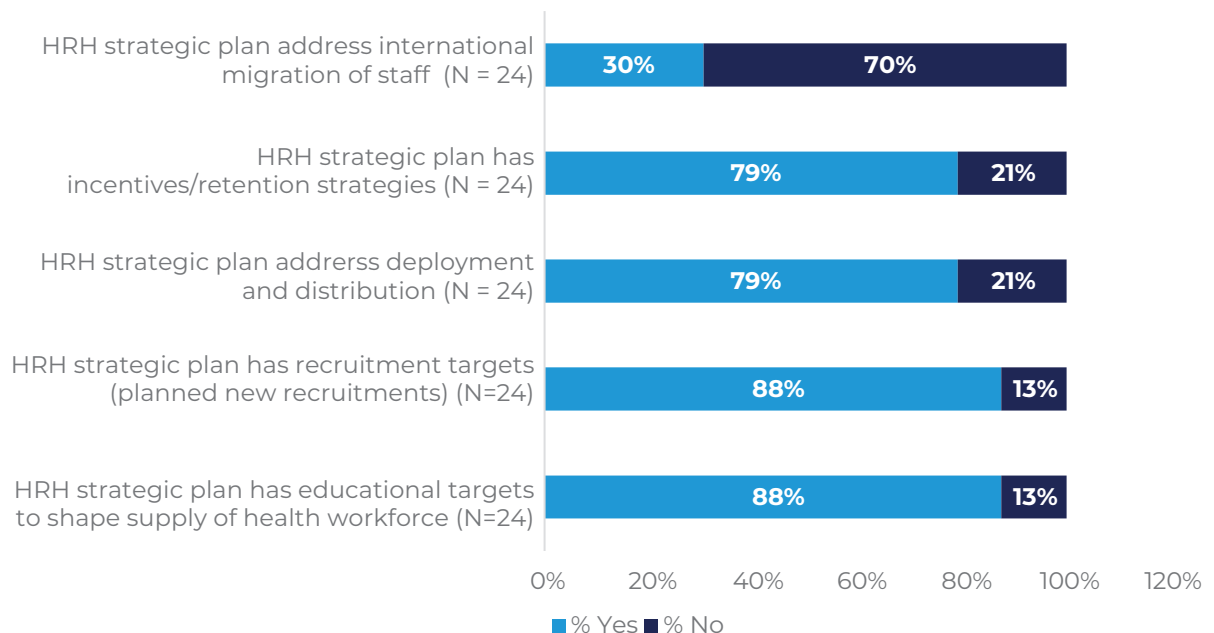
Fig. 38. Quality of HWF strategic plans

Country ever conducted a health workforce labour market study (N =27): 52% Yes, 48% No

HRH strategic plan projections cover the public and private sectors (N=24): 17% Yes, 83% No

HRH strategic plan has projections of the HRH needs/demand (N =25): 92% Yes, 8% No

HRH strategic plan is costed (N = 25): 80% Yes, 20% No

Only one in three countries have prioritized in their strategic plans to address health worker migration.

Out of 24 countries that provided details, the majority covered educational targets (supply of HWF – 21 countries); recruitment targets (planned new recruitments – 21 countries); deployment and distribution (19 countries); and incentives/retention strategies (19 countries). However, only seven countries (30% of countries that responded) prioritized issues on international migration of staff (see Figure 39). These countries are Botswana, the Democratic Republic of the Congo, Eritrea, Ghana, Guinea, Senegal and Zimbabwe.

Fig. 39. Areas covered by HRHSPs

HRH strategic plan address international migration of staff (N = 24): 30% Yes, 70% No

HRH strategic plan has incentives/retention strategies (N = 24): 79% Yes, 21% No

HRH strategic plan addrerss deployment and distribution (N = 24): 79% Yes, 21% No

HRH strategic plan has recruitment targets (planned new recruitments) (N=24): 88% Yes, 13% No

HRH strategic plan has educational targets to shape supply of health workforce (N=24): 88% Yes, 13% No
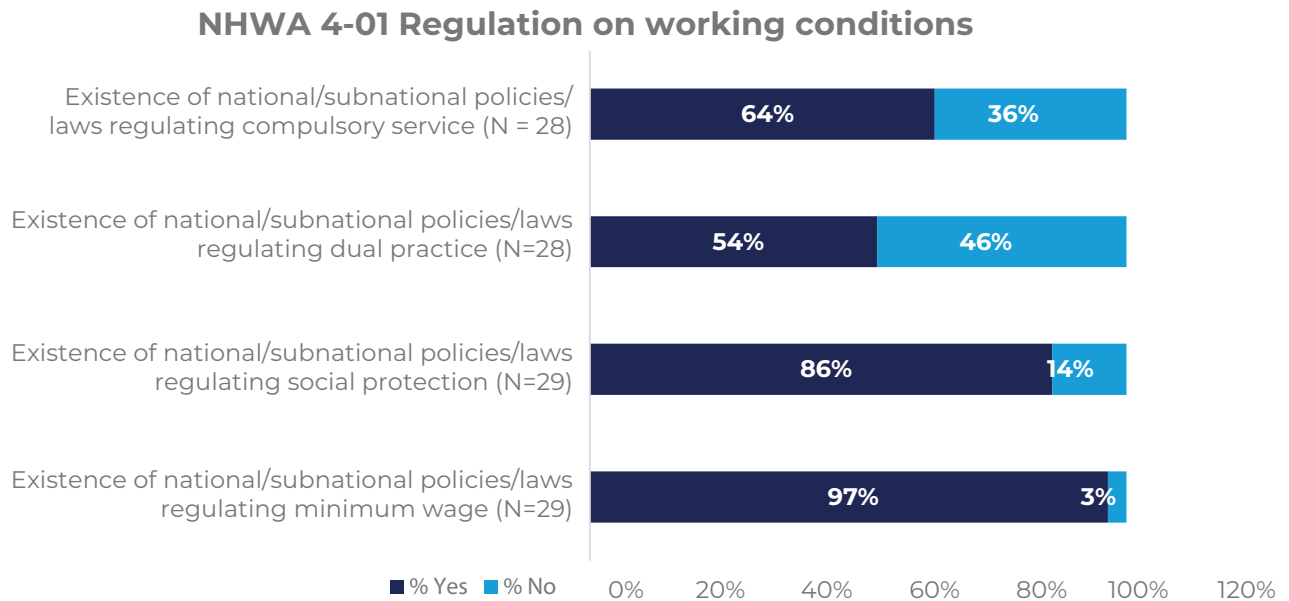
8.3 HWF working conditions

Data from 29 of the 47 Member States shows that more than 75% of countries (n = 22) have laws and/or regulations on the working conditions of health workers (see Figure 40). In addition, 13 countries (46%) reported that they do not have any form of regulation on dual

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practice (the phenomenon of an employee holding jobs or working in both the public and private sectors). However, available evidence considers dual practice as a double-edged sword where, on the one hand, it can facilitate health workers working longer hours to provide services in both public and private sectors and on the other hand, it has been cited as a contributory factor in health worker absenteeism in the public sector and could fuel health worker corruption if not appropriately regulated [76–78]investigate its reasons and consequences, and compare high-income (HIC.

Fig. 40. Regulations on working conditions

NHWA 4-01 Regulation on working conditions

|	% Yes	% No
Existence of national/subnational policies/laws regulating compulsory service (N = 28)	64%	36%
Existence of national/subnational policies/laws regulating dual practice (N=28)	54%	46%
Existence of national/subnational policies/laws regulating social protection (N=29)	86%	14%
Existence of national/subnational policies/laws regulating minimum wage (N=29)	97%	3%

8.4   Health worker strikes and industrial action

Twelve out of 26 countries that responded indicated that they had not experienced any health worker strike or industrial action in the 12 months preceding the assessment. However, 14 countries (53%) experienced an average of four strikes (range: 1 to 17) within the 12 months preceding the assessment.

Eight countries indicated they experienced 1-2 strikes and six countries experienced three or more strikes within the period (Figure 41). In four countries, the strikes reportedly lasted up to three days, while in another four countries, they extended up to six days. In six additional countries, the strikes lasted up to 14 days while in two countries, the strikes persisted for more than 15 days.

Fig. 41. Occurrences of health worker strikes in the preceding 12 months
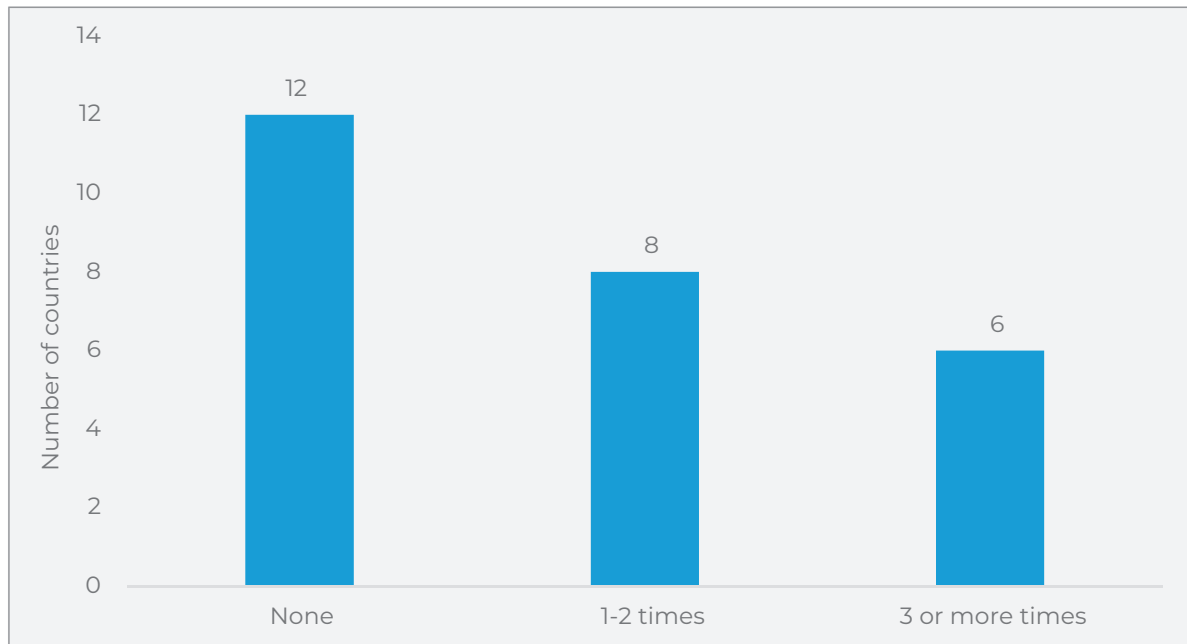
Twelve out of the 26 countries that reported indicated that the health worker strikes had a significant adverse impact on health service delivery while 10 countries reported that the adverse impact had been limited. Four countries noted that the strike had no adverse impact on health service delivery (Figure 42).

Fig. 42. Impact of health worker strikes (N = 26)
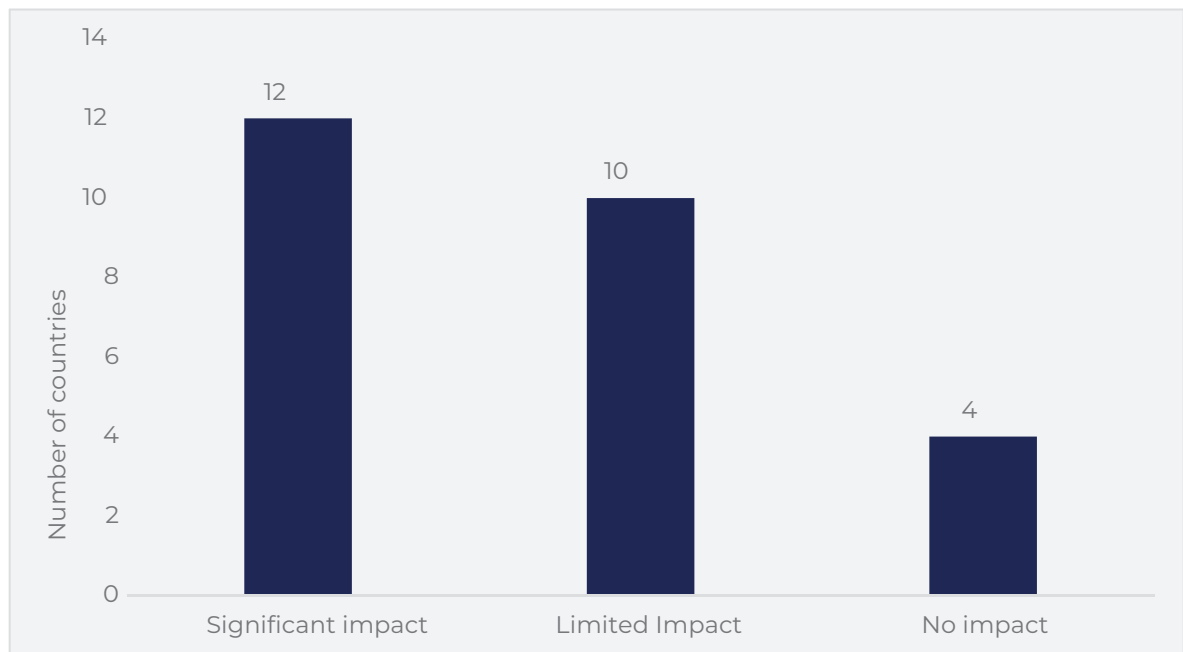
"

Most countries have HWF policies (80%) and strategic plans (63%) in place, but half (50%) have no commitment to increase budget allocation to implement HWF strategic plans.

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09 Exploring the relationship between health workforce and key indicators

9.1 Determinants of HWF density

SDG 3.c tracer occupations in this analysis constitute doctors, nurses, midwives, dentists and pharmacists. There is a strong association (Spearman's rho = 0.74, p-value = 0.000) between current health expenditure (CHE) per capita and workforce density. Countries with high per capita expenditure also reported high densities; these countries are also in the high-/upper-middle income bracket. This was the same for the other metrics of HWF investment, which includes domestic general government health expenditure as a percentage of CHE and domestic health expenditure as a percentage of CHE. Therefore, more investment in health translates into significantly enhanced workforce densities for the tracer occupations (see Figures 43-46).

Fig. 43. SDG 3.c tracer occupations density as explained by current health expenditure per capita
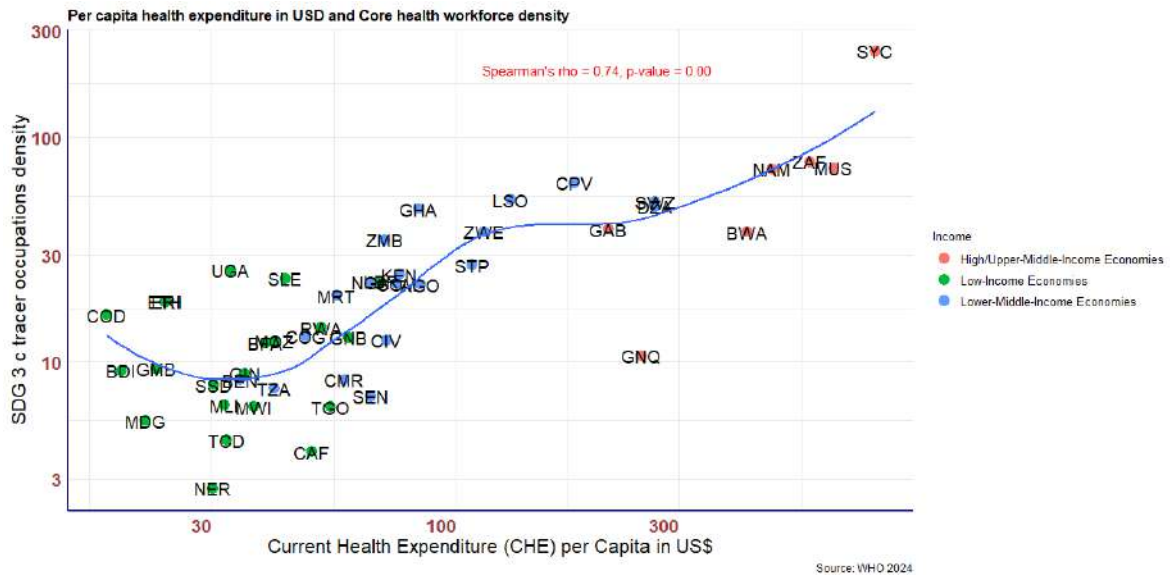
Fig. 44. SDG 3.c tracer occupations density as explained by domestic general government health expenditure as a percentage of CHE

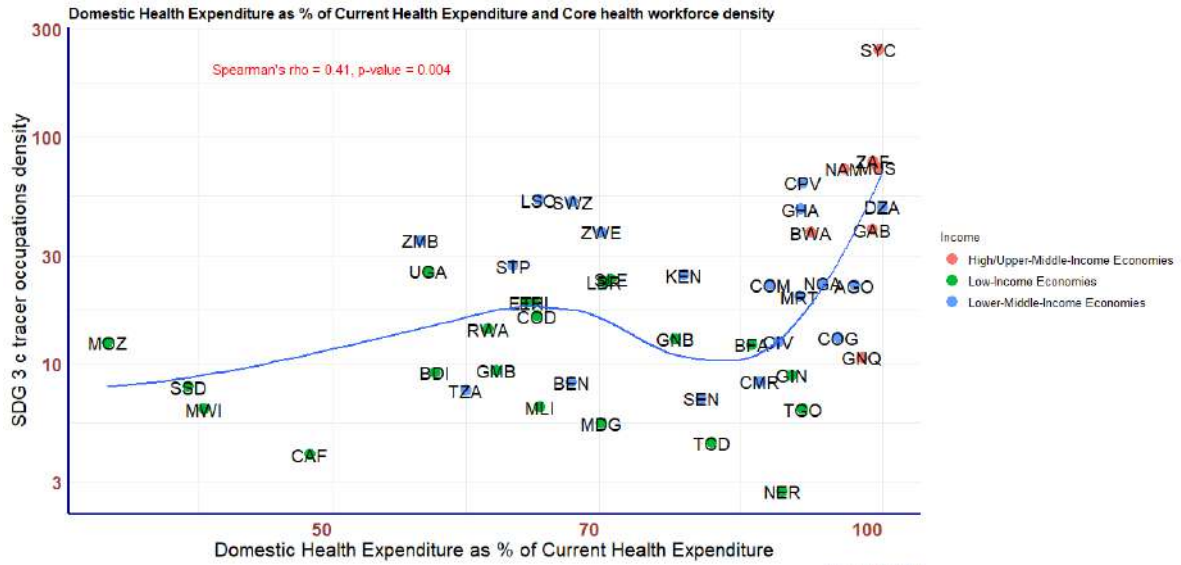**Fig. 45. SDG 3.c tracer occupations density as explained by domestic health expenditure as a percentage of CHE**

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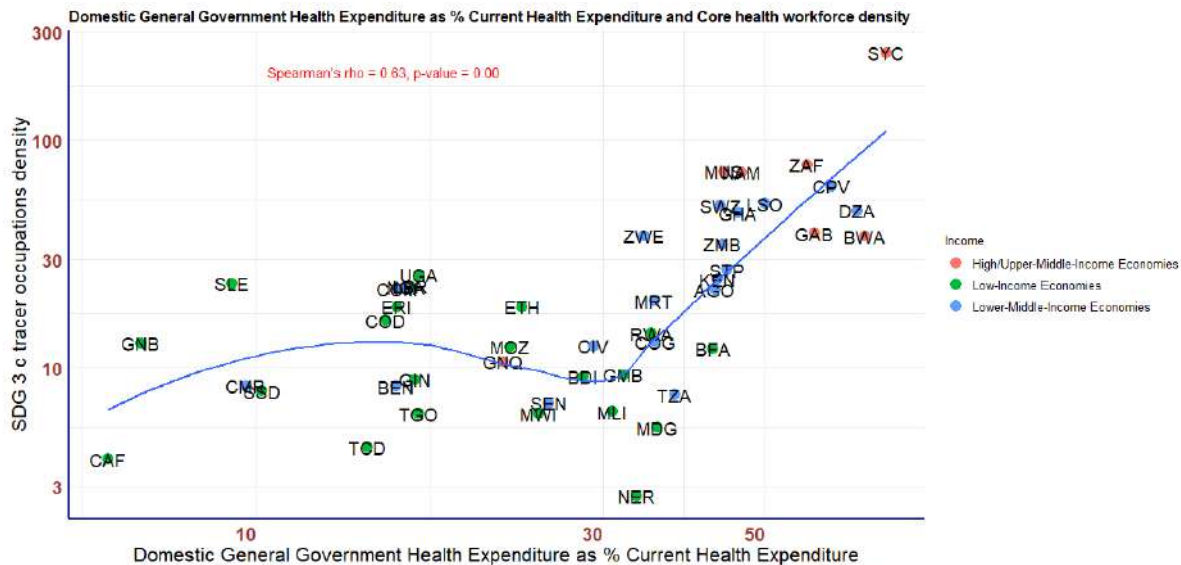
Figure 46: SDG 3.c tracer occupations density as explained by external health expenditure as a percentage of CHE
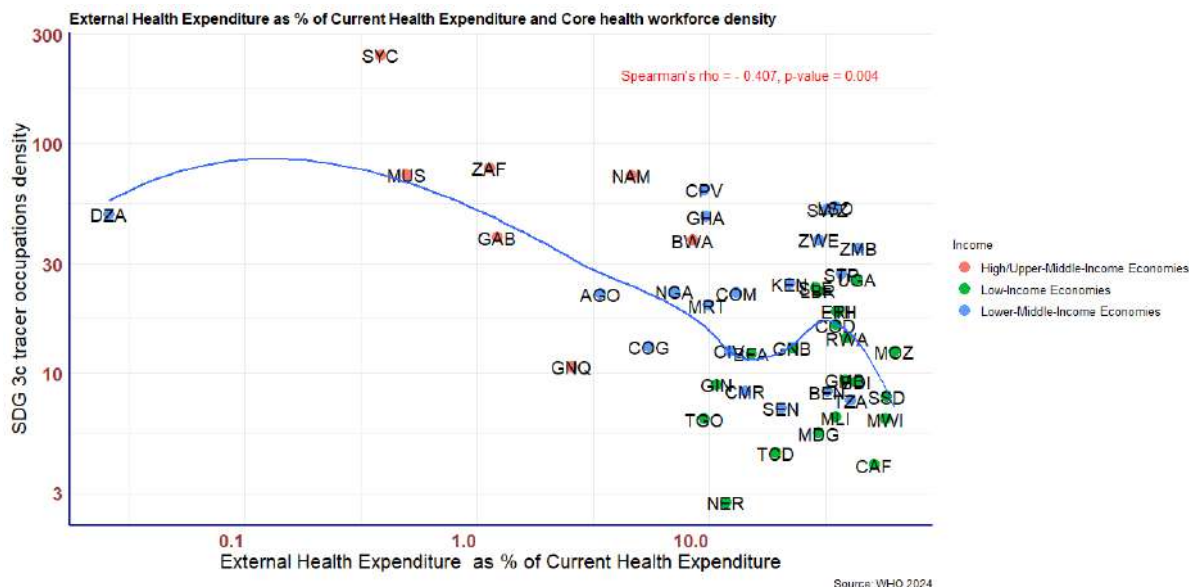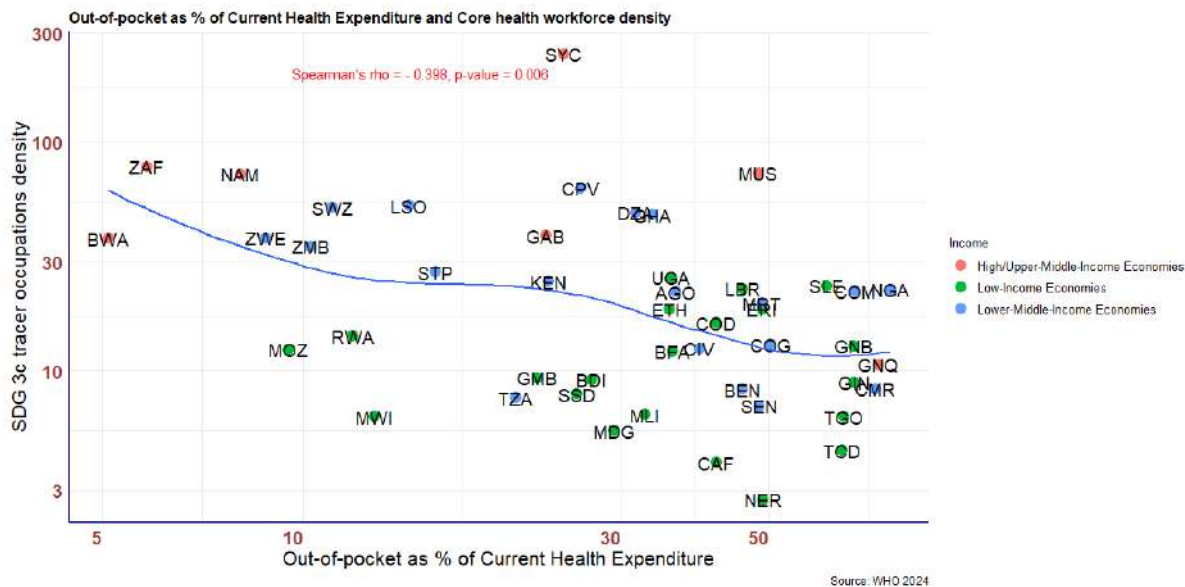

Fig. 47. SDG 3.c tracer occupations density as explained by out-of-pocket as a percentage of CHE

9.2   Impact of health workforce density

Countries with high HWF densities were also found to have better service coverage levels. High density of the SDG 3.c occupations was significantly associated with high service capacity and access (Spearman's rho = 0.721, p-value = 0.000), high noncommunicable disease detection capacity (Spearman's rho = 0.407, p-value = 0.004), high reproductive, maternal, newborn and child health services coverage (Spearman's rho = 0.664, p-value = 0.000), and high communicable diseases service coverage (Spearman's rho = 0.298 p-value = 0.042). Overall, this improved quality of life, as evidenced by healthy life expectancy (see Figures 47-51).

Fig. 48. The association of SDG 3.c tracer occupations and service capacity and access index
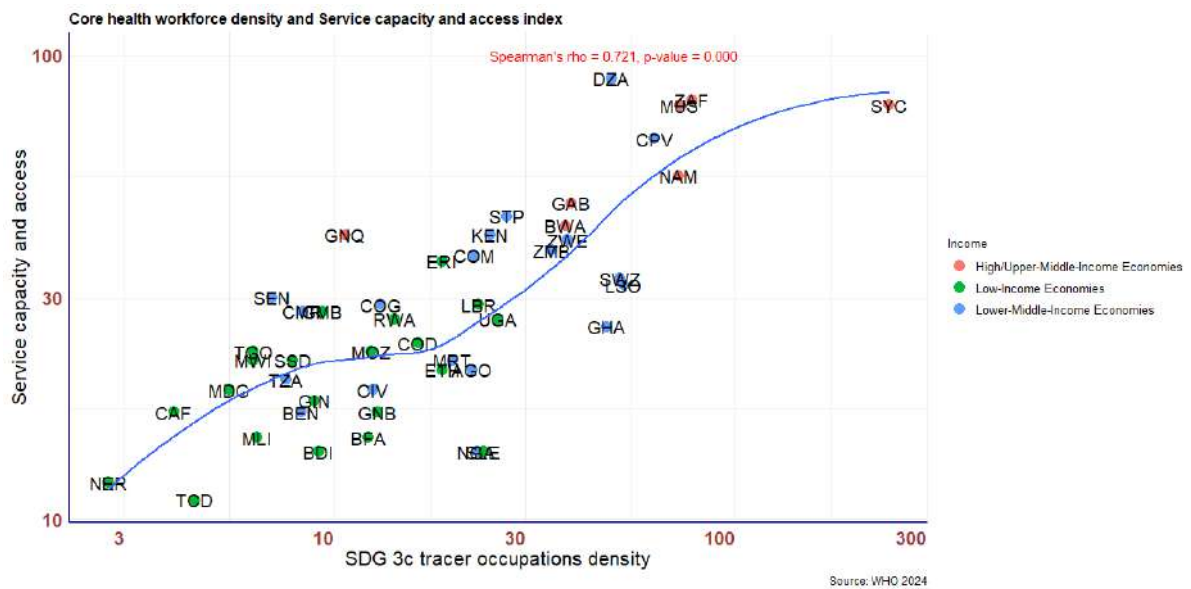
Fig. 49. The association of SDG 3.c tracer occupations and noncommunicable diseases index

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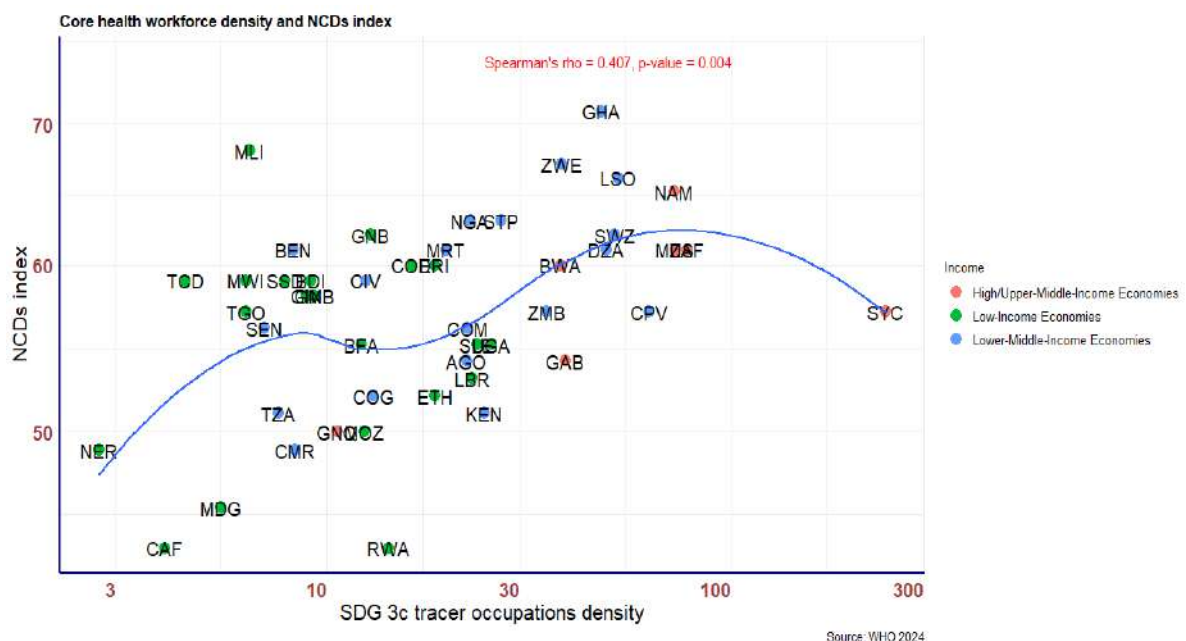
Fig. 50. The association of SDG 3.c tracer occupations and reproductive maternal, newborn, child and adolescent health index
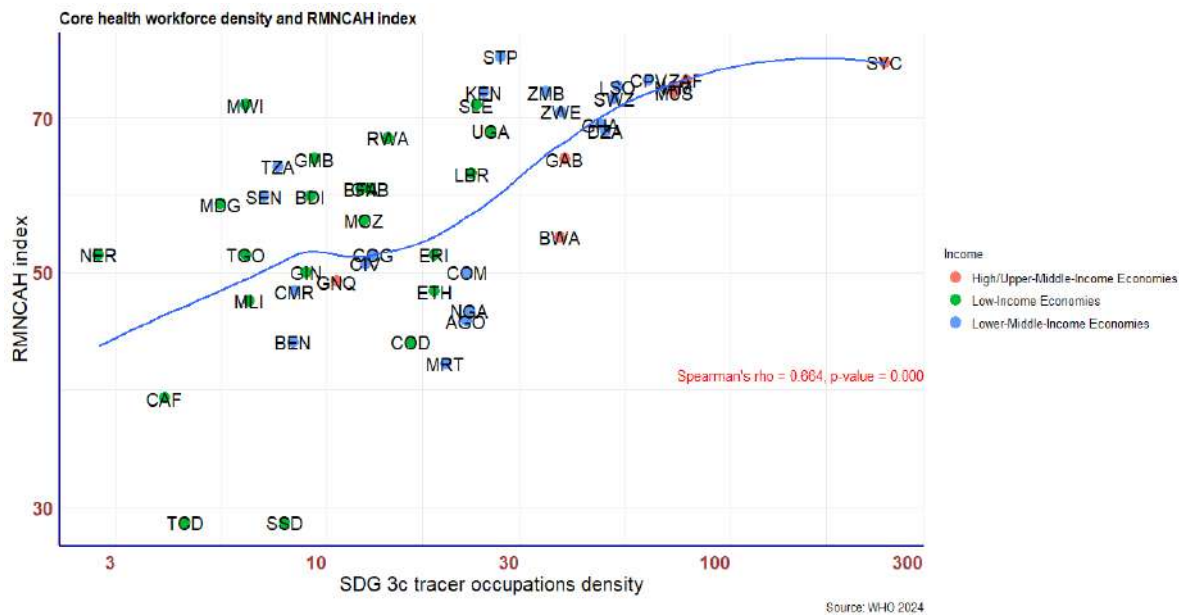
Fig. 51. The association of SDG 3.c tracer occupations and communicable diseases index
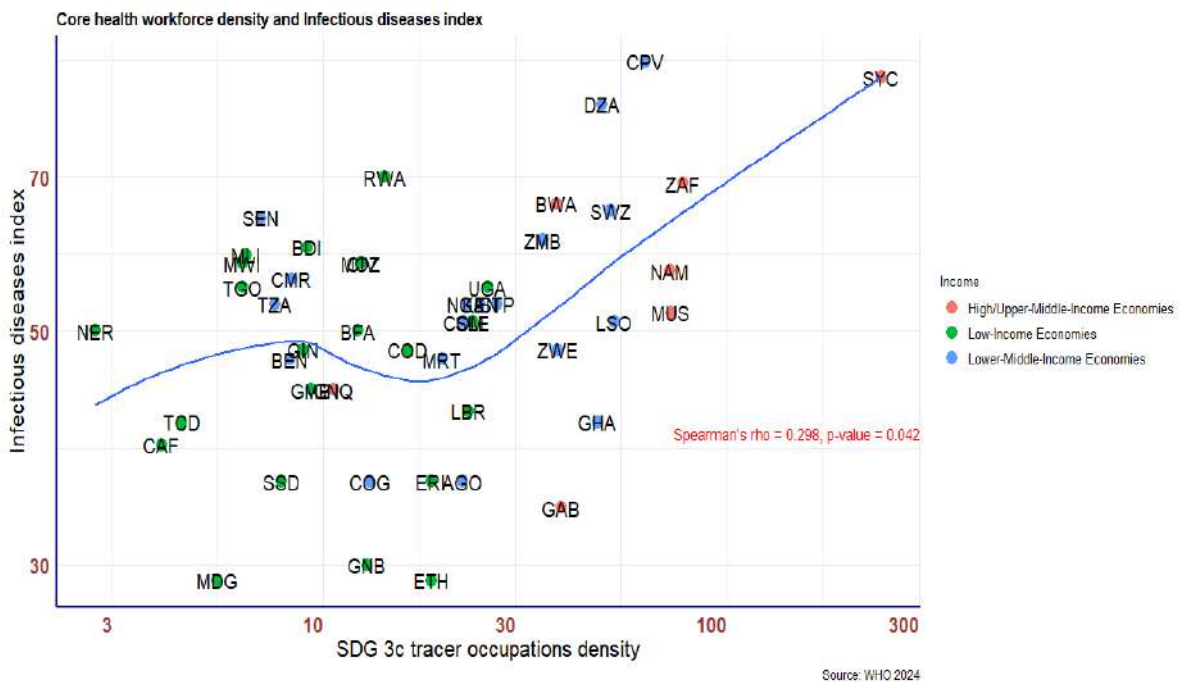
Fig. 52. The association of SDG 3.c tracer occupations and health-adjusted life expectancy (HALE)

Source: WHO 2024

"
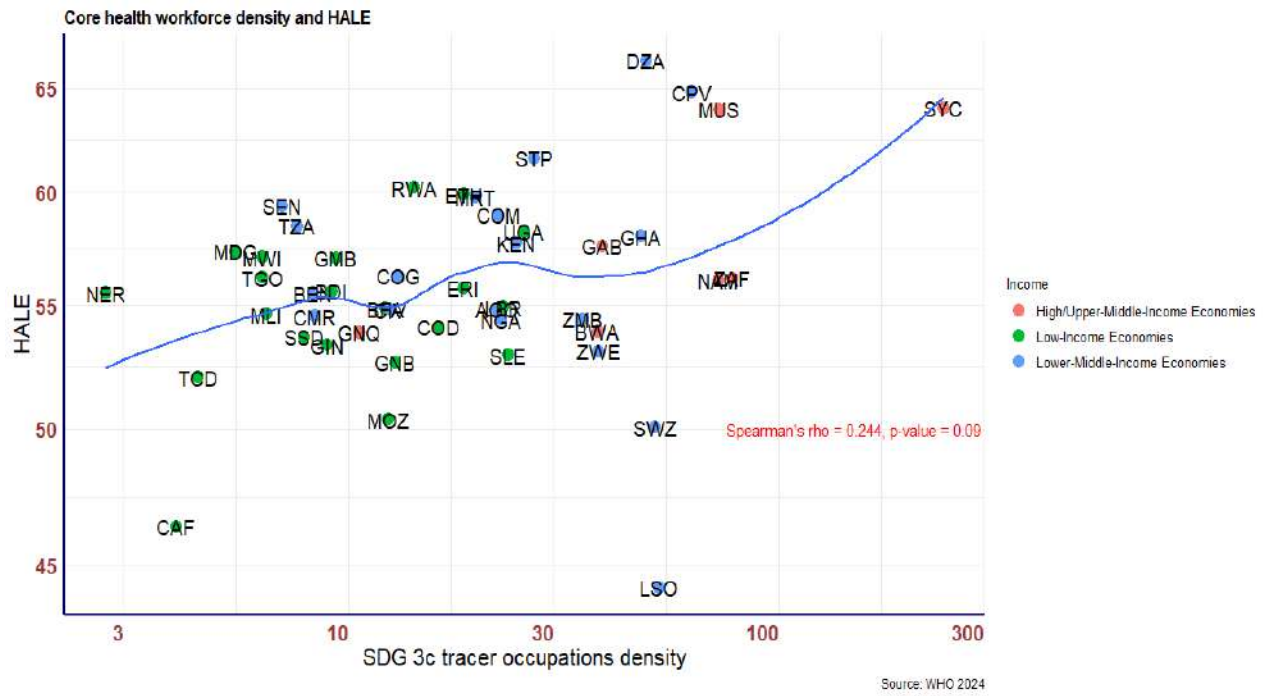
There is a strong association between current health expenditure (CHE) per capita and workforce density. Countries with high per capita expenditure also reported high densities; Therefore, more investment in health translates into significantly enhanced workforce densities for the tracer occupations.

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10 Summary and conclusions

This report has provided new insights that can be helpful in shaping policy and investment dialogues to strengthen the HWF across the African Region in the drive to achieve UHC and ensure health security. It highlights major improvements in the past decade, alongside emerging priority areas of action.

Expanded HWF size and density: A 10-year trend in the stock and density of health workers in the Region shows it has followed an upward trajectory. This was evident across the various occupations.

Young and female workforce: Almost three quarters of the HWF are female. The medical profession is becoming increasingly feminized, with the proportion of female doctors increasing from 28% in 207 to 35% in 2022. Most health workers in the African Region are below 45 years old, which is much younger compared to Europe and North America (the major destination countries of migrant African health workers).

Uneven training capacity and paradoxical unemployment: The Region has the capacity to produce at least 255 000 health workers per year (not including CHWs). Some countries have the capacity to produce at a faster rate than their capacity to absorb, creating a "surplus" situation despite their unmet need for health workers. Almost one in three of the trained HWF in the Region are unemployed. Although this was data from a sample of 10 countries, the situation is not expected to be different across the rest of the Region. Other countries with low health densities have no capacity to produce adequate numbers of health workers and have limited prospects of expanding their budgets to invest in the HWF.

Continuing brain drain is hitting hard: Migration was still a threat to the achievement of the required staffing levels, as at least one in every 10 health workers tends to emigrate to work in a country different from their country of origin. Evidence from a few countries suggests a surge in out-migration during and in the aftermath of the COVID-19 pandemic.

The projected supply and need for health workers: The stock of health workers is expected to increase by 40% by 2030. The needs-based requirement for health workers was estimated to be 9.75 million in 2022 and is expected to increase to 11.82 million by 2030. The projected stock in 2030 might cover 48% of the need and leave an aggregate shortage of 6.1 million by 2030, or 5.3 million if only doctors, nurses, midwives, pharmacists and dentists are taken into account. Assuming the current staffing dynamics persist (that is, production, deployment, retirement and out-migration) until 2030, the deficit is expected to broaden.

HWF budgeting and spending: Addressing the needs-based shortage of health workers is estimated to require about 2% of GDP over nearly a decade. Countries have been spending about 4% of their GDP on health, of which 29% is spent on workforce employment.

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HWF governance and stewardship/leadership: Countries are increasingly adopting strategies for their HWF and have established central HRH departments and units at their MoHs or departments of health. Stewardship and leadership roles must be strengthened, as must the comprehensiveness of planning and allocation of financial resources to implement the plans.

Investing in the HWF has intermediate and long-term returns: When financial resources are invested in health, this results in improved HWF stock and density, which in turn results in better health outcomes and improved quality of life.

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This report has provided new insights that can be helpful in shaping policy and investment dialogues to strengthen the HWF across the African Region in the drive to achieve UHC and ensure health security. It highlights major improvements in the past decade, alongside emerging priority areas of action.

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11 Recommendations for 2024–2030

There has been an improvement in the production and stock of the HWF in the Region over the past 10 years, which has resulted in the workforce doubling. Many countries, however, are still projected to have needs-based shortages by 2030. This report identifies four main areas of action.

1. **Expanding health workforce education, decent employment and ensuring retention so as to halve the needs-based shortage within a decade**

    Summary of evidence: There has been significant momentum towards improving the Region's workforce size and density in the past decade, with each country having an average of 27 doctors, nurses and midwives, pharmacists, and dentists per 10 000 population, which is an increase of 14% from 23 per 10 000 population in 2018.

    However, while some countries have made rapid progress and transitioned from being in the lowest 25% of countries and other countries have progressed to the top 25%, 12 countries have achieved slower progress. Comparing existing density to their output from the HWF education pipeline, four clusters are observed (as illustrated in Figure 33). Addressing the HWF shortage requires differentiated approaches, which have been clustered into four distinct groups of countries based on their existing density of health workers and their existing training and education capacity (measured as the ratio of new graduates or output from the education pipeline to the need for health workers).

    Capacity category 1: Countries with low density and low production capacity. Countries requiring intensified efforts and massive expansion in the HWF production.

    Countries in capacity category 1: Angola, Benin, Burkina Faso, Cameroon, the Central African Republic, Comoros, Congo, Côte d'Ivoire, Eritrea, Ethiopia, Gambia, Guinea, Guinea-Bissau, Liberia, Madagascar, Malawi, Mali, Mauritania, Mozambique, Niger, Nigeria, Rwanda, Senegal, South Sudan, Togo and United Republic of Tanzania.

    5. For these countries, if appropriate introduce a shorter period for their mid-level training programmes and incorporate career progression pathways commensurate with additional training.

    6. Introduce task-sharing mechanisms where appropriate for cadres to optimize service delivery until training programmes deliver outputs.

    7. Invest more in education for the HWF by building and expanding infrastructure, training and building the capacity of tutors/lecturers, and making more teaching and learning materials and equipment available.

    8. Leverage the use of digital technologies and blended learning approaches to scale up

education and training.

9.   Countries in this group with high levels of out-migration should invest in the retention of their HWF, especially in rural and PHC settings.

Capacity category 2: Countries with low density but high production capacity. These countries potentially have the capacity to address their needs-based shortfalls if the right investments are made.

Countries in capacity category 2: Burundi, Chad, the Democratic Republic of the Congo, Equatorial Guinea, Lesotho, Sierra Leone and Uganda.

1.   Invest more in the HWF to employ and retain more trained health workers.

2.   Countries should maintain or optimize their momentum of production.

3.   Leverage the use of digital technologies and blended learning approaches to enhance efficiencies in education and training investments.

4.   When countries have fiscal constraints that prohibit the employment of additional health workers, the possibility of utilizing bilateral agreements with developed countries to leverage the dividend of health worker mobility could be explored.

5.   The private sector should be stimulated to employ more trained health workers.

Capacity category 3: Counties with relatively high density but lower than average production capacity. These countries would potentially have a problem with replacing retired and migrated health workers and meeting their needs, especially for those with high out-migration. These countries must optimize their production capacity and, where appropriate, increase admissions into training institutions.

Countries in capacity category 3: Algeria, Cabo Verde, Eswatini, Gabon, Kenya, Sao Tome and Principe, South Africa and Zimbabwe.

1.   Scale up training and education capacity to adequately replace health worker outflows and match needs-based requirements.

2.   Countries with a high rate of out-migration should invest in retention and explore the use of bilateral agreements to strengthen their production capacity.

3.   Invest more in education by building and expanding infrastructure, training and building the capacity of tutors/lecturers, and making more teaching and learning materials and equipment available.

4.   Leverage the use of digital technologies and blended learning approaches to scale up education and training.

Capacity category 4: Countries with relatively high density and high production capacity. They need to maintain the momentum of production and optimize the capacity for skills mix and invest in their recruitment and retention.

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> **Countries in capacity category 4**: Botswana, Ghana, Mauritius, Namibia, Seychelles and Zambia.

5. Countries should maintain their momentum of production and ensure equitable distribution, especially in rural and underserved areas to optimize service delivery#

6. Where unemployment is rising, explore the use of bilateral agreements to explore dividends to leverage health worker mobility.

7. Workforce planning should ensure an appropriate skill-mix for efficient and optimized service delivery.

2. **Transforming HWF education to be competency-based to better address population health needs**

    Summary of evidence: The current health worker training pipeline is producing an annual output equivalent to about 10% of the existing stock. While the momentum is gathering, some countries are worse off compared to the average, and while competency-based training and education are becoming more prevalent, they is not yet universal. In 2022, countries in the African Region reported having 90% of medical and 75% of nursing education programmes accredited using national processes, but there is still a need for improvement and standardization.

    1. Develop master's training and education plans that align health sector needs with education sector training policies and plans.

    2. Adopt competency-based HWF education and training curriculums to address population health needs, and incorporate the global competency framework for UHC, regional/international prototype and/or standardized curriculum.

    3. Train all health trainers on appropriate pedagogical approaches in health science/ professions education.

    4. Establish regional and international partnerships and collaborate to enhance educational resource-sharing to maximize education, training and local capacity-building for health professions.

    5. Progressively professionalize CHWs by standardizing their training and scope of practice and integrating them into the HWF.

3. **Leveraging multisectoral action to implement the principles of the Africa HWF investment charter towards expanding and sustaining adequate investments in the HWF**

    Summary of evidence: On average, countries are prioritizing 7.3% of their national government spending on health, compared with the Abuja Declaration target of 15. Of this, an average of 42% is prioritized for HWF employment and remuneration. The ballpark cost of addressing the workforce crisis in the African Region is US$ 147.6 billion over a decade to sustain existing jobs, train more health workers and employ them. The proposed interventions below pertain to all countries in the Region.

1. Governments should lead the process of using multisectoral approaches to engage all actors across sectors to build consensus on investment priorities.

2. Leverage the implementation of NHWA to conduct HLMA and other evidence appraisals to inform prioritization for investment in workforce education, employment, and retention, including addressing issues pertaining to youth and gender.

3. Convene regular, preferably annual, workforce policy and investment dialogues to align priorities and efforts among government entities and partners to develop and monitor a HWF investment plan in line with long-term national HWF strategies and health strategies.

4. Where appropriate, develop and sign investment instruments (compacts, memoranda of understanding and bilateral agreements) that outline the contribution of different actors to identified investment priorities.

5. External bilateral and multilateral partners should consider government efforts in workforce employment as part of the overall investment plan. Investment focus should be also shifted from predominantly short-term investments to long-term ones.

6. Regularly monitor and review progress, adjust as appropriate and include peer-to-peer accountability mechanisms.

However, given the level of prioritization for health and the HWF, countries face different realities. The budget space analysis of countries highlighted some specificities and called for more tailored additional recommendations.

Prioritization of health and HWF in the African Region (Figure 34 reproduced)

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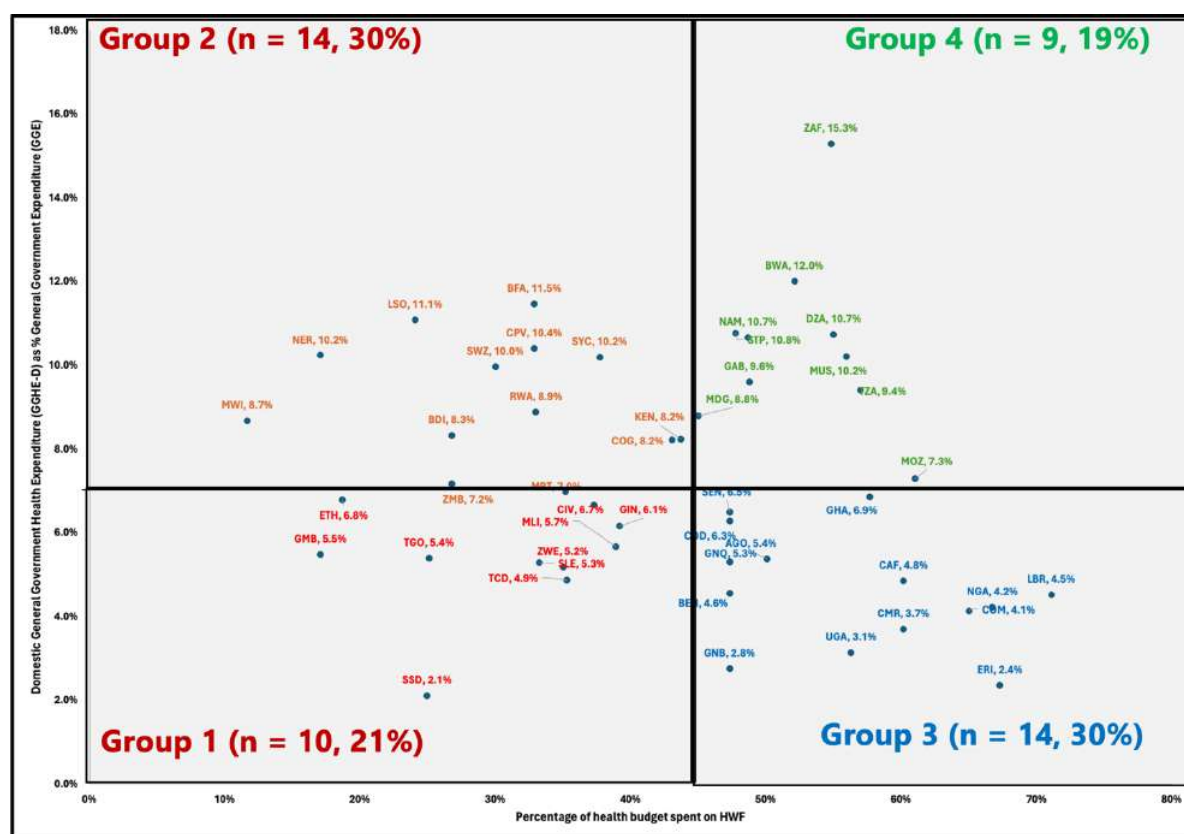
Budget space group 1 countries: These are countries that prioritized less than the regional average of government spending on health and less than the regional average of health spending on the HWF. For this group of countries, it is imperative that any investment efforts from partners integrate donor contributions at the inception of their contribution and take into consideration their long-term impact and transition.

Budget space group 2 countries: These are countries that prioritized less than the regional average of government spending on health, but more than the regional average of health spending on the HWF. For this group of countries, in addition to advocating for more investment in health generally, efforts should primarily be focused on improving efficiencies in the budget allocation for the HWF and freed-up resources should be channelled to education, retention mechanisms and equipment needed to deliver quality care.

Budget space group 3 countries: These are countries that prioritized more than the regional average of government spending on health, but less than the regional average of spending on the HWF. For this group of countries, efforts should be focused on increasing the budget allocated for HWF spending and investment. Efforts should include, among others, employment of health workers to reduce paradoxical unemployment, retention mechanisms, continuous professional development and opportunities for career development.

Budget space group 4 countries: These are countries which prioritized more than the regional average of government spending on health and more than the regional average of health spending on the HWF. For this group of countries, efforts should be focused on maintaining the budget allocation for both areas.

4. **Sustainably managing HWF migration in the African Region**

    Summary of evidence: For every 10 doctors or nurses working in the African Region, at least one other is working in a country other than their country of origin. During the COVID-19 pandemic, an acceleration of out-migration of health workers from the African Region to high-income counties was observed. Data on migration was scant and analyses were limited to receiving countries. In addition, while intention to migrate was high, it was limited to countries that reported high migration of health workers.

    1. Explore the use of a regional workforce pool to support smooth migration processes.

    2. Explore the use of mutually beneficial bilateral agreements to leverage the dividends of HWF migration.

    3. Systematically collect and share data on migration.

    4. Optimize the use of return of service arrangements to enhance retention.

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