Health Labour Market **Analysis for Zimbabwe**

Investing in the Health Workforce towards attainment of Vision 2030

2022

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Foreword

The Health Workforce continues to be one of the key building blocks for Zimbabwe's accomplishment of Universal Health Coverage (UHC), the National Development Strategy 1: 2021-2025 (NDS1), and the Second Republic's progress toward Vision 2030. However, the Public Health Service in Zimbabwe faced several difficulties recently, including severe staff shortages, a lack of other critical skills, an unequal geographic distribution of health workers, and gaps in performance, motivation, and job satisfaction.

From June to December 2021, the Health Service Board conducted a comprehensive analysis of the health labour market with technical assistance from the WHO to get a better perspective and understanding of the Health Workforce. The analysis provided a better understanding of the factors that contribute to geographical and skill-mix imbalances, poor performance, and shortages and surpluses of health workers. It also enables the establishment of effective strategies to address these problems. The COVID-19 pandemic brought to light the value of health workers to the healthcare system and the necessity of comprehending the dynamics of the health labour market, highlighting the applicability of this strategy even more.

The Zimbabwe Health Labour Market Analysis (HLMA) gathered evidence across all sectors of the market (public and private) and provides reliable information on the main dimensions of the performance of the Health Workforce. The Analysis provides the Health Sector with fact-based findings, thorough analyses, and an appreciation of the dynamics of the labour market, allowing for addressing significant policy concerns regarding the health workforce. The HLMA provides an opportunity to better understand the factors that influence health worker surpluses and shortages, skill mix and regional health labour imbalances, track system-level performance/productivity and develop effective strategies to address these issues from the Zimbabwean perspective.

The exercise has improved the understanding of the dynamics of the Zimbabwean health labour market, its key stakeholders, and how and why the market moves in a certain direction. It is my hope that the findings from this analysis will assist the health sector and other decision makers in finding key answers to some of its health workforce challenges and issues as well as in developing effective solutions.

Dr. P.L.N. Sikosana

Executive Chairman
Health Service Board
December 2022

Acknowledgements

The Ministry of Health and Child Care (MOHCC) is keen on delivering on Universal Health Coverage and other health related targets of the sustainable development agenda by 2030. It is important to staff the health system with adequate numbers of health workers who are equitably distributed with the requisite skills mix and highly motivated. As part of this commitment, the HSB in 2021 working with MOHCC undertook this comprehensive Health Labour Market Analysis (HLMA) of the Zimbabwe Health Workforce to understand the full spectrum of health workforce needs, demand and supply dynamics and mismatches. This laid an evidence-base for responsive and proactive policy and strategic interventions.

This work would not have been possible without the contribution from various organisations and individuals. We wish to express our profound gratitude to the WHO Country Office in Zimbabwe and the WHO Africa Regional Office for providing technical expertise and financial assistance throughout the development of this HLMA.

We would also like to acknowledge contribution and participation from government institutions, development partners, UNDP, WHO, UNFPA, USAID, UNICEF, World Bank, Global Fund, KOICA, private and not for profit hospitals.

Finally, we extend our gratitude to the Technical Working Group (TWG) members who worked tirelessly throughout this process during the methodology, data collection, analysis and consolidation of this comprehensive Health Labour Market Analysis (HLMA) of the Zimbabwe Health Workforce.

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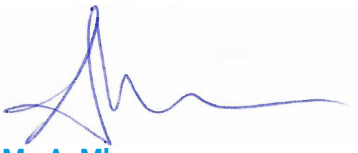

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Acronyms/List of abbreviations

CSI	Composite Services Index
GDP	Gross Domestic Product
GEI	Geographical Equity Index
HIMS	Health Information Management System
HRIS	Human Resource Information System
HIV	Human Immunodeficiency Virus
HRH	Human Resources for Health
HRM	Human Resources Management
HSB	Health Service Board
MoFED	Ministry of Finance and Economic Development
MoHCC	Ministry of Health and Child Care
MoHTEIST	Ministry of Higher and Tertiary Education, Innovation, Science and Technology Development
NHS	National Health Strategy
PSC	Public Services Commission
SSB	Salaries Service Bureau
TWG	Technical Working Group
UHC	Universal Health Coverage
WHO	World Health Organization
WHO/AFRO	World Health Organization, Regional Office for Africa
WPI	Workforce Productivity Index (WPI).
ZIMSTAT	Zimbabwe National Statistics Agency

Glossary

Accreditation (in professional education): The process of evaluating education institutions against predefined standards required for the delivery of education. The outcome of the process is the certification of the suitability of education programmes and of the competence of education institutions in the delivery of education.

Capacity building, capacity development: It is the process of developing and strengthening the skills, instincts, abilities, processes and resources that organizations and communities need to survive, adapt and thrive in a fast-changing world.

Decent work: Decent work involves opportunities for productive work and delivers afair income, security in the workplace and social protection for families, better prospects for personal development and social integration, freedom for people to express their concerns, organize and participate in the decisions that affect their lives and equality of opportunity and treatment for all women and men.

Demand (for health services): The health care expectations expressed by individuals or communities; or, the willingness and ability to seek, use, and, in some settings, pay for services. It may be subdivided into expressed demand (equated with use) and potential demand. It may also be subdivided into rational demand (demand that corresponds to need) and irrational demand (demand that does not correspond to need).

Demand (for health workers): The demand for health workers corresponds to the number of health workers that a health system can support in terms of positions or economic demand for services. In other words, it reflects the capacity and willingness to pay the purchasers of health care (for example, the Government or private sector firms), which in turn drives the demand for employing health workers in public or private hospitals, public health centres and other parts of the health system, including self-employed health workers. The demand for health workers is therefore a derived demand for health services.

Dual practice: There are several forms of dual practice. Health professionals can work in a public service provision role and another role: (a) outside: in a completely separate private environment; (b) beside: in a private ward or clinic physically associated with a public facility but run as a separate business; (c) within: where private services are offered inside a public facility but outside public service operating hours or space; or (d) integrated: where additional fees are charged for services offered alongside standard public ones, often informally, on the understanding of a faster– or higher-quality-service. Academics and policy-makers typically restrict the term dual practice to category (a), but it is clear that categories (b), (c) and (d) present alternative scenarios for health professionals to combine public and private practice and supplement public sector salaries. Policy-making in this domain should navigate the trade-offs between the objective of retaining personnel while ensuring their commitment to public sector objectives.

Education (of health workers): The process of developing knowledge, skills, attitudes and competencies related to the delivery of health services. Specialization is the process of developing advanced knowledge, skills, attitudes, and competencies related to the delivery of specific health services.

Employment status: full-time, part-time, temporary, permanent: Full-time (whole-time) is employment for or working for the amount of time considered customary or standard. Part-time is employment for or working for less than the amount of time considered customary or standard. Permanent is employment contracted for an indeterminate period. Fixed term is employment contracted for a fixed period of time. Temporary refers to short-term contracts or “casual” work, either for a definite period or for a

specific activity. Self-employment is when remuneration is directly dependent upon the profits derived from the goods and services produced by the individual.

Health labour market: The structure that allows services of health workers to be sought (demanded) and offered (supplied). The health labour market can be characterized according to geographical area (local, national or international); occupation (by occupation title or category, specialized or unspecialized); and sector (private or public, formal or informal). The dynamic between the number and the kind of jobs offered on the market and the number of health workers is central in determining the configuration of the health labour market.

Health workforce, human resources for health, health workers: All persons engaged in actions whose primary intent is to enhance health. Three categories of workers relevant to health workforce analysis can be distinguished: (a) those with health vocational education and training working in the health services industry; (b) those with training in anon-health field (or with no formal training) working in the health services industry; and (c) those with health training who are either working in anon-health-care-related industry or who are currently unemployed.

Health workforce planning: The process of estimating potential requirements for human resources for health and designing ways of fulfilling those requirements, including strategies that address the adequacy of the supply and distribution of the health workforce according to policy objectives and the consequential demand for health labour.

International Standard Classification of Occupations (ISCO): An international classification for organizing jobs into a clearly defined set of groups according to the tasks and duties undertaken in the job. It is maintained by the International Labour Organization.

Mismatch: A discrepancy or alack of correspondence between demand and supply that can result in (a) health worker shortage or surplus, (b) skills mismatch related to under education or over education, or (c) labour discrimination or bias exercised by the employer.

National Health Workforce Accounts (NHWA): A mechanism to collate and use a set of standardized indicators to generate reliable human resources for health information and evidence, with the objective of enabling planning, implementation and monitoring of workforce policies towards universal health coverage and improving comparability of health workforce data nationally and globally.

Occupation: A set of jobs whose main tasks and duties are characterized by a high degree of similarity. Out of the labour force: Individuals who are neither employed nor unemployed and who are not looking for a job.

Productivity (technical efficiency): The outputs extracted from given inputs, such as patients seen per doctor or number of procedures per provider.

Stakeholder: An individual, group or organization that has an interest in the organization and delivery of health care.

Stock: The total number of health workers potentially available in a country, including those participating in the health labour market, plus those who are qualified to do so but do not participate for some reason, such as early retirement.

Supply (of health workers): The number of health workers active in the health labour market, either in employment or not employed but willing to work.

Surplus (of health workers): The situation in which more qualified health workers are willing to work than there are jobs readily available to employ them.

Executive summary

BACKGROUND

Zimbabwe has universal health service coverage index of 55 out of a possible 100. The country is targeting to be an upper-middle-income country by 2030 implying that Zimbabwe has to attain an 80 rating for UHC service coverage index. In line with the UHC targeted progress from the current 55 to 80 index points, the Government of Zimbabwe conducted a Health Labour Market Analysis to inform its HRH policy-making and guide targeted strategic interventions. The Health Labour Market Analysis is a systematic, comprehensive and evidence-based Health Workforce planning tool used to appreciate the labour market dynamics in a country and guide decision making. This study was conducted with the understanding that the Health Labour Market like any market is dynamic and is influenced by policy decisions and actions across several sectors that include education, labour market, finance, foreign relations and the health sector itself.

This report presents a comprehensive Health Labour Market Analysis (HLMA) of the Zimbabwe Health Workforce. The main objective of the HLMA was to conduct an in-depth analysis of the relationship between supply, demand, need for Health Workforce in Zimbabwe and the necessary policy actions to address any existing or anticipated gaps. The specific objectives of the analysis were:

(1) To undertake a descriptive analysis of the dynamics of supply and demand for Health Workforce in Zimbabwe covering clinical health workers in both the public and private sectors.

(2) To estimate the normative need for Health Workforce to address the disease burden/workload in Zimbabwe vis-à-vis the outlook in supply, demand and fiscal space scenarios.

(3) To explore the nature and drivers of recent surge in out-migration of skilled Health Workforce from Zimbabwe and ascertain the necessary conditions, policies and regulatory measures towards sustainability.

(4) To conduct an exploratory analysis of the required policy actions to address supply/demand gaps required to achieve the desired need and distribution of Health Workforce in Zimbabwe.

(5) To develop policy recommendations with regards to the production, inflows/outflows, misdistribution, inefficiencies and regulations in Zimbabwe.

SCOPE AND METHODOLOGY

The analysis adopted state-of-the-art technical approaches recommended in various WHO normative, global and regional studies. Multiple complementary approaches were used to collect data and analyse the Health Workforce situation and labour market dynamics. The Zimbabwe Health Labour Market Analysis involved four core areas to derive an understanding of the past, present, and future Human Workforce circumstances, both in the public and private sectors. These involved descriptive, predictive and exploratory labour market analyses as well as a productivity study. The HLMA Technical Task Team conducted field surveys using adapted WHO tools to collect primary and secondary data from health workers in both public and private hospitals, training institutions, regulatory and health administrative bodies in Zimbabwe. The questionnaires explored the seventy-two (72) staff categories of health workers targeted in the research. A representative sample of 329 health facilities was sampled from the

1,867 health facilities in Zimbabwe. All the Provincial, Central, and District Hospitals in the selected districts were purposively included in the sample.

SUMMARY OF FINDINGS

As of September 2022, Zimbabwe had a registered stock of 74,298 for the 72 staff categories studied. This included 19,722 community health workers and 54,576 clinical and paramedical health workforce across 71 selected health worker categories. Of the total registered stock, 59.8% (n=32,645) were actively participating in the Zimbabwean health labour market (either employed or looking for job). Out of this, 25,016 (76.6%) were employed in the public sector, whilst 7,441 (22.8%) were in the private sector. Only 188 (0.5%) of the 32,645 were not in full-time employment but were engaged in either part-time or contract employment.

Existing stock and densities: Zimbabwe had about 655 specialist doctors across various public and private sectors as of December 2020. The stock of these specialists was estimated to be growing at 8.3% per annum since 2016. **The aggregate stock of specialist doctors translates into 4.35 specialist doctors per 100,000 people as of 2020.** There were 4,385 specialist nurses and midwives in Zimbabwe in 2020, a 21% decline from the overall stock of 5,573 in 2018. The supply was declining by 11.3% per annum since 2018. The pattern of decline appeared to be worse among midwives because the production from the education pipeline had dramatically slowed, and attrition had exacerbated. **In 2020 there were 3271 midwives in 2020, a reduction by 27% from 4,475 in 2018. Overall, there were 7.39 specialist nurses per 100,000 and 22 midwives per 100,000 population.**

A total of 74% of the health workers were female, of which 65% of doctors were male. However, apart from Primary Care Nurses (79% female) and Registered General Nurses (76% female), the majority of other health professional categories were predominantly male. For instance, 65% of doctors and 71% of medical specialists were males.

In 2022, Zimbabwe's training output was at 75% of its maximum theoretical capacity. About 3,334 health workers are produced per year compared to the theoretical (maximum) capacity of around 4,476 health workers per year.

The demand for Health Workforce was higher than the current supply levels, signalling supply-side constraints. Zimbabwe's established posts (indicative demand) was estimated to be 81,517 of which 64% are public sector posts (n=52,085). There were over 5,000 funded vacancies in the public sector due to lack of suitably qualified professionals to fill these posts. This translates into a vacancy rate of 9.1 - 26.5%, signalling supply-side failure (labour shortage) which was driven by excessive outmigration. Nonetheless, the funded positions represent only 41.36% of the over 133,000 health workers needed by 2030 to meet at least 80 UHC index and 99.1% disease coverage in line with the upper middle-income aspirations by 2030

Migration of Health Workforce had been a longstanding phenomenon which had now heightened the levels of attrition from the public sector. Overall, the average attrition rate for health workers was roughly 5.2% per annum, which was higher for nurses (6.6%) and dieticians (14.3%) but slightly lower for non-specialist doctors (4.7%). Consequently, the total number of health workers on Government payroll had declined by 9.2% from 50,100 in 2019 to 45,500 in 2021 due to escalated outmigration. For nurses in particular, intention to migrate had persisted over time with 3.6% (~1,079) of nurses each year

actively requesting for letters of good standing. The trend had fluctuated over time and closely mirrored periods of economic challenges and recently accentuated to pandemic triggers.

Half of Health Workforce in urban areas intended to migrate with nurses having the highest intention. The exploratory survey revealed that about 41% of the health workers had intentions to migrate abroad sometime in the future. Of these, 53% had started working on their plans to migrate abroad, with 3.8% ready to leave within the next 6months and another 7.2% having plans of emigrating within a year. At least 11% of nurses indicated their intentions to emigrate within 6months of the survey.

Zimbabwean health workers score their overall job quality moderately, considers the quality of their earnings poor, but were most satisfied with their working environment. A global Job Quality Index was computed which measure the overall satisfaction of health workers – taking into account quality of income, labour market security and working environment. The overall quality of health worker's job was rated as 42% (CI: 38–46%). Of the three dimensions, the highest quality score was on quality of working environment (70%), but lowest in the quality of earning (16%).

There was a retention gap of US$463 for health workers whose income had improved, but their expected earnings to be retained was higher as their cost of living was averagely more than their official salaries. Health workers estimated they earn an average of US$431 (median = US$450) per month compared with an US$895 expected transfer wage necessary to retain them. Thus, future retention strategies need to incrementally close a gap of US$463. On the other hand, health workers estimated that their average monthly cost of living was US$706. If health workers were to earn the average transfer wage of US$895 they would be earning a full living wage plus a potential savings of US$189.

Using an objective assessment methodology, Zimbabwean health workers had high levels of aggregate productivity, but health worker self-assessments suggested that there was room to improve. Using 16 output indicators across various health service delivery dimensions, and with data from all districts, an objective assessment of aggregate productivity of Zimbabwean health workers the aggregate productivity of health workers was considered high. For every US$100 spent on health workers they provide services equivalent to 76 outpatient consultations. Compared to $100 for 25 service outputs in Ethiopia (in 2020) and $100 for 57 service outputs in Sierra Leone (in 2019).

District-level analysis revealed that 24 districts (38%) were performing above the average, and 39 districts (62%) were performing below the national average. The objective assessment was compared with a subjective self-reported productivity assessment elicited from the exploratory survey of 2,688 health workers. In the self-reported levels of productivity, health workers perceived themselves to be up to 81% productive - leaving room for a19% improvement in productivity.

At baseline, Zimbabwe needed at least 109,645 professionals across 63 health occupations, including 25,617 community health workers, to make substantial progress towards the 80% target universal health coverage (UHC) in line with its upper middle-income aspirations. The analysis considered four factors, namely: (a) 99.1% of the disease burden of the country, (b) population size, growth and demographics, (c) package and model of essential service provision, and (d) health worker productivity (standard workload). The cumulative need for health workers will likely reach 133,128 by 2030. Based on the population's health needs, Zimbabwe needs at least 5.15 generalist doctors per 10 000 population (or 1:1942 population). The country also needs 6.93 Primary Care Nurses per 10,000 population (1:1444 population); 13.26 Registered General Nurses per 10,000 (or 1:750 population), and 3.04 midwives per 10000 (or 1:3290 population).

In 2022, Zimbabwe's health workforce stock was at 47.5% of the need representing a need-based shortage of 57, 543 health workers. Owing to high levels of attrition and increasing population health needs, the projected need-based shortage of health professionals would be 64,363 by 2030 at current training capacity, absorption and retention levels. If the status quo remains, by 2030 the supply would have covered only 48% of the population's health workforce needs.

The estimated financial space for Health Workforce (public and private sector) as at 2022 was US$387.82 million with a projected forecast of US$643.20 million by 2030, assuming that the macro-economic and policy environment remain constant. This implies the existing potential for demand of Health Workers for both sectors (public and private) given availability of supply to fill the gaps.

The estimated cost of employing projected supply of health workers at prevailing Government wages and salaries was US$293 million in 2022 and forecasted to rise to US$417,67 million by 2030. Given the above assumptions, the cost of employing to fill population health need requirements was modelled to be US$793,98 million in 2022, increasing to US$954,85 million by 2030. This translates to additional health workforce requirements of 57,543 which includes 5,895 community health workers at a cost of US$501 million.

Addressing the mismatches between need, demand and supply requires deliberate efforts to address the supply failure that is currently existent. The huge deficit between need and demand equating to 57,543 Health Workers has extensive implications on health outcomes regardless of the productivity levels that Health Workers in Zimbabwe exude. It is therefore prudent that heavy investment be directed towards Health Worker training and development to curb the supply failure hoping that the macro-economic growth projections will enable the system to increase Health Workforce demand towards the need-based projections.

Investing in the Zimbabwean health workforce had enormous returns and the health workers were comparatively highly productive. For every 1,520 trained and retained health workers (doctors, nurses and midwives) in Zimbabwe, it was significantly correlated with reductions in mortality by up to 12 maternal deaths per 100,000 live births. This averts up to 3under-5 deaths per 1,000 live births and helps to reduce HIV prevalence rate by up to 0.13%. Life expectancy at birth increased by one year. These health gains in turn boost economic productivity and catalyse economic growth, thereby contributing to the aspiration of attaining an upper middle income status.

HIGHLIGHTS OF KEY RECOMMENDATIONS

Based on the findings of the Zimbabwe comprehensive HLMA, the following recommendations are being proposed for policy and strategic actions to address the findings,

1. **Human Resources for Health Planning and Financing**

    1.1. Advocate for sustained political commitment to achieve an upper middle-income health system by 2030.

    1.2. Adopt 80 service coverage index for UHC as strategic direction for health system development towards upper middle-income health care system and progressively work towards meeting the financial space requirements to address the HRH needs, salaries and wages required to retain staff.

1.3. Develop an HRH Investment Compact aimed at progressive development of a sustainable Health Workforce supply and demand towards an upper middle income health system.

1.4. Secure and sustain Government commitment to support Community Health Workers through grant aiding.

1.5. Utilise evidence on wage expectations (reservation wage, transfer wage and economic rent) to guide policies on Government and partner-supported posts.

1.6. Initiate annual health workforce dialogue.

2. Human Resources for Health Deployment, Utilisation and Governance

2.1. Expand MoHCC staff establishment by an average of 9758 workers per year from 2023 to 2030 to meet the projected staff need of 133 128 required for 80% Universal Health Coverage and 99.1% disease burden coverage in an upper middle income economy. Due to issues of fiscal sustainability and demand affordability the establishment expansion shall be prioritised among the different cadres, 48,8% for low priority cadres, 56,3% for medium priority cadres and 66,7% for high priority cadres based on affordability levels and fiscal space. The prioritisation is based on difficulty in filling the post, attrition rates and criticality.

2.2. Improve the quality of earnings, unemployment security and security against extreme low pay to increase the health worker job quality index to favourable levels (above 70%).

3. Human Resources for Health Production, Training and Development

3.1. Establish and expand existing basic, post-basic, undergraduate and post-graduate training schools.

3.2. Mobilize equipment, material resources and retain high quality human resources for training.

3.3. Improve the skills mix for disciplines that are not being locally trained and provide targeted scholarships for critical shortage areas.

4. Human Resources for Health Migration and Retention Management

4.1. Reduce the intention to migrate from the current 41% to less than 10%.

4.2. Increase maximum production of health workers and reduce attrition by at least 50% of the 2022 levels.

4.3. Develop evidence-based ethical policies on the migration of health workers by the end of 2023 by reviewing the bonding agreement framework to reduce external migration.

4.4. Review salaries progressively to transfer wage levels by 2025.

4.5. Resuscitate a health sector employees vehicle loan guarantee fund by 2025.

4.6. Implement a Housing loan guarantee scheme to expand loan beneficiaries from the current 637 to cover all eligible cadres and use bank-supported schemes.

4.7. Advocate for Zimbabwe to be added to the health workforce support and safeguard list when it becomes eligible in 2023 and sign bilateral agreements with countries that have the highest intake of Health Workers from Zimbabwe.

5. Human Resources for Health Information, Research, Monitoring and Evaluation

5.1. Conduct a Multidimensional Productivity Index (MPI) study for the health sector to guide productivity improvement plans and salary incentives.

5.2. Develop and implement the National Health Workforce Accounts and the Zimbabwe National Health Workforce Observatory to enable triangulation and harmonisation of health workforce data and information across different sectors of the country.

5.3. Carry out periodic health labour market analysis using data generated from routine health information systems.

Section 1.
Introduction

1.1. Contextual Background

1.1.1 Geographic and Socio-Economic Information

Zimbabwe is a landlocked country located in Southern Africa, between the Zambezi and Limpopo rivers with a population of 15 178 979 people (ZIMSTAT population census 2022). It borders Zambia to the north, Mozambique to the east, South Africa to the south and Botswana to the west. Administratively the country is divided into ten provinces that are further sub-divided into 63 districts. About 68% of Zimbabweans live in the rural areas and 32% in urban areas (ZIMSTAT population census 2022). The total surface area of Zimbabwe is 390 757 square kilometres. Population density for the country is 39 people per square kilometre. Harare (2 783 people per square kilometre) has the highest population density followed by Manicaland with 56 people per square kilometre and then Mashonaland East (54 people per square kilometre). Matabeleland North (11) has the lowest number of people per square kilometre. The country has 16 official languages which are Chewa, Chibarwe, English, Kalanga, Koisan, Nambyia, Ndau, Ndebele, Shangani, Shona, Sign language, Sotho, Tonga, Tswana, Venda and Xhosa.

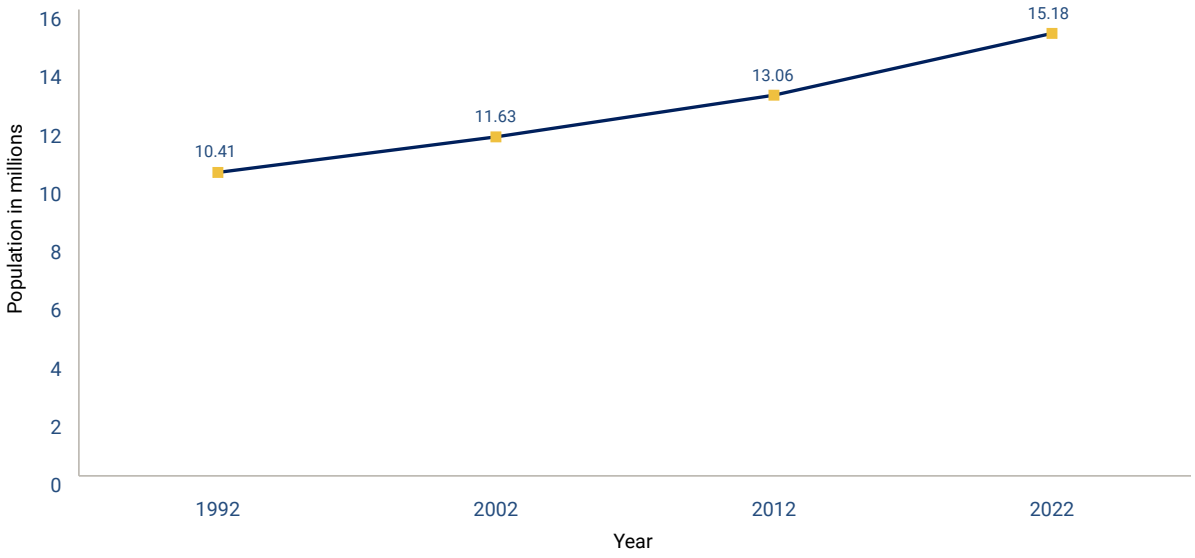
Government allocations to the health sector have been affected by limited fiscal space hence the Government has failed to meet the Abuja target of 15% of national budget to the health sector. In 2021 the health budget allocation was 10% of National Budget and increased to 12% in 2022.

1.2. Demography and Health Status

1.2.1 Population size and growth

Zimbabwe's population had been growing slowly over the past decades. Figure 1shows that the population of Zimbabwe increased by about 46% from around 10.4 million people in 1992 to about 15.2 million in 2022 (over 30 years). According to the 2022 Population and Housing Census, the population of Zimbabwe was 15 178 979 people which comprised of 48% males and 52% females. The sex ratio was 92:100 which means that there were 92 males for every 100 females. Given the 2012 population size of 13 061 329, this gives an annual population growth rate of 1.5%.

FIGURE 1: *Trend of Zimbabwe's Population Size, 1992–2022*



Source: *ZIMSTAT Population Census Reports (2022)*

1.2.2 Age Structure

The 2012 Population and Housing Census projections were used to come up with population pyramids because the 2022 Population and Housing Census figures had not yet been disaggregated by age. The age structure of a population has direct implications on health service requirements and the distribution of economic resources and is best demonstrated by a population pyramid. Figure 2shows projected population pyramids for Zimbabwe for the years 2022 and 2030 based on the 2012 Population and Housing Census figures. The pyramids indicate that Zimbabwe has a relatively young population with about 61% aged less than 25 years in 2022, however, this proportion was expected to decline to 58.5% in 2030.

FIGURE 2: *Trend of Zimbabwe's Population Structure, 2022 vs 2030*

The age cohorts 0-4, 5-12, 13-24 and 60 years and above was projected to decline in the proportional share of the Zimbabwe population between the years 2022 and 2030 while the age group 25-29 is projected to increase by 2.6% from 33.2% in 2022 to 35.8% in 2030. The cohort of children below one year is projected to increase by 1.9% by 2030. However, the proportional share for the less than 1year will decline from 3.2% to 2.7% in 2022 and 2030, respectively. Women of Childbearing Age's (15-49 years) proportional share would remain constant at 25.1%. This is shown in Table 1.

TABLE 1: *Population of Selected Age Cohorts and their Share of the Total Population*

Cohort	Population (2022)	% of Total Population (2022)	Population (2030)	% of Total Population (2030)
Less than 1year	539 354	3.2	549 977	2.7
Less than 5years	2 587 199	15.2	2 799 842	13.6
5 -12 years	3 561 027	21.0	4 194 454	20.4
13 -24 years	4 194 886	24.7	5 028 565	24.5
25 -59 years	5 638 205	33.2	7 361 415	35.8
60+ years	999 196	5.9	1 168 528	5.7
Women Aged 15-49	4 266 578	25.1	5 167 690	25.1

1.3. Health status

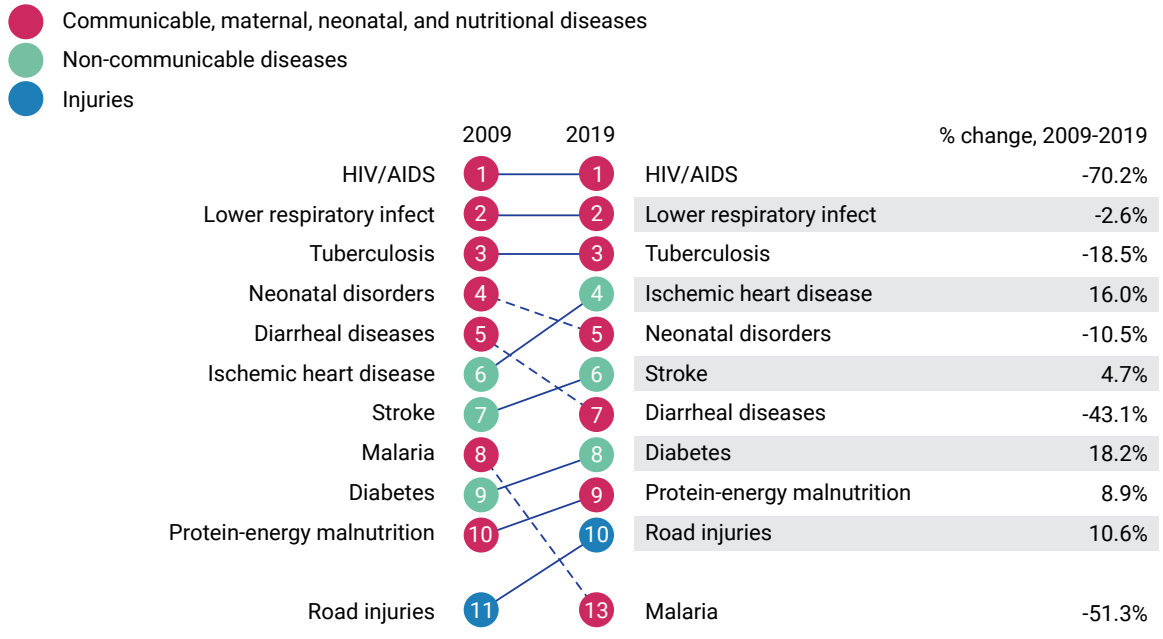
The country's health indicators have been steadily improving over the last decade. The average life expectancy of Zimbabweans at birth increased from 38 years in 2012 to 61.8 years by 2017; infant mortality rate was estimated at 47 deaths per 1000 live births in 2019 (a decline from 55 deaths per 1000 live births in 2014) and that of under-five mortality rate was 65 deaths per 1000 live births in 2019 (also a decline from 75 deaths per 1000 live births in 2014). The maternal mortality ratio dropped from 614 deaths per 100 000 live births in 2014 to 462 deaths per 100 000 live births in 2019. About 59 percent of deaths for the 15-34 years' age group were due to communicable diseases. An estimated 39 percent of the deaths were due to non-communicable diseases as shown in Table 2 and Figure 3.

TABLE 2: *Summary of Health Status Indicators*

Indicator	Estimate	Year of Estimate
Life Expectancy at Birth (Years)	60	2017
Mortality Rate, Adult (per 1000 adults)	346.9	2019
Deaths due to communicable diseases (15-34 Years)	58.9	2019
Deaths due to non-communicable diseases (% of total)	39.2	2019
Mortality from CVD, Cancer, Diabetes or CRD between exact ages 30 and 70 (%)	28.4	2019
Deaths due to traffic injury per 100 000	41.2	2019
HIV prevalence rate	11.6	2021
Maternal Mortality ratio-Maternal Deaths per 100 000 Live Births	462	2019
Infant Mortality Rate	47	2019
Under Five Mortality Rate	65	2019
Stunting Prevalence (Children under five years)	23.5	2019
Overweight/Obese Prevalence	38.2	2019
Diabetes Prevalence (% of population ages 20 to 79)	2.1	2021

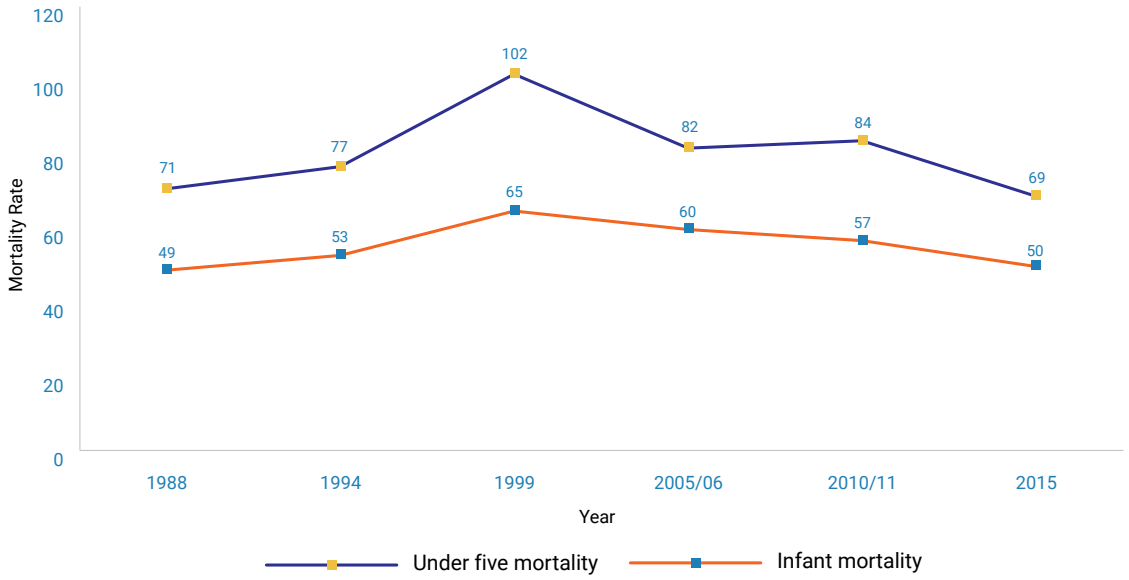
Sources: *World Bank, 2017 Inter-censal demographic survey and 2019 Multiple Indicator Cluster Survey*

FIGURE 3: *Top 10 Causes of Total Number of Deaths In 2019 & Percent Change 2009–2019, All Ages Combined*



Overall, the Under-Five Mortality Rate was higher than the infant mortality for the period 1988 to 2015 as shown in figure 4. The figure shows that between 1988 and 1999 the Under-Five Mortality Rate and the Infant Mortality Rate were increasing reaching 102 deaths per 1000 live births and 65 deaths per 1000 live births, respectively. The mortality rates began to decline in 1999, reaching 69 under-five deaths and 50 infant deaths per 1000 live births in 2015. The 2019 Multiple Indicator Survey estimated that Zimbabwe's Under Five and Infant Mortality Rates had declined to 65 deaths per 1000 live births and 47 deaths per 1000 live births, respectively.

FIGURE 4: *Trend in Infant and Under 5 Mortality, 1988–2015*



Source: *Zimbabwe Demographic and Health Surveys*

1.4. Overview of Zimbabwe's Health System

The Zimbabwe health system, which was designed in the 1980s along Primary Health Care approaches, has a multi-tier system comprising primary, secondary, tertiary and quaternary health facilities. Another layer of quinary level has recently been added.

There are about 1867 health facilities across this spectrum, most of which are government-owned public health care facilities, mission (Church-owned) health facilities, others owned by local authorities, urban and rural, and private health facilities.

According to Zimbabwe Service Availability and Readiness Assessment (SARA) conducted in 2015, there were about 101 private health facilities and 92 mission facilities. There are also six (6) central hospitals, three (3) in the southern region and three (3) in the northern region. Of the three (3) in the southern region, one (1) is a specialist Psychiatric Hospital. Each of the eight (8) rural provinces has a provincial hospital. However, the one (1) for Matabeleland North is still under construction and therefore, a church-owned hospital has been designated as such. In addition, each district has a government-owned district hospital or designated district hospital. Table 3 shows the health facilities in Zimbabwe.

TABLE 3: *Health facilities in Zimbabwe, 2022*

Levels	Public	Private & Faith Based Organizations	Total
Primary level	1,501	296	1,797
Secondary level	57	0	57
Tertiary level	7	0	7
Quaternary level	6	0	6
Total	**1,571**	**296**	**1,867**

Source: *MOHCC DHIS2 Database 2022 & PHAZ database*

1.5. HRH Governance

The public sector health workers are mainly employed under the HSB, constituted through the Health Service Act [Chap 15:16]. The MoHCC has a delegated HRH function from the Health Service Board for the day-to-day management of the health workforce. MoHCC is the designated arm of government charged with the delivery of the public health services and coordinates all the healthcare programmes for delivery at the various levels of care through defined management structures.

1.6. Health workforce context

To achieve Universal Health Coverage (UHC), the Zimbabwean government has made numerous investments in the expansion of health services, in line with the Primary Health Care (PHC) approach. The MoHCC's National Health Strategy (NHS) 2021–2025 is aligned with the National Development Strategy 1 (NDS1), premised on Vision 2030. The national vision aims to attain an upper middle-income economy. The Human Resources for Health (HRH) policy is aligned with the NHS. The new HRH Strategy will therefore be guided by the HLMA results in conformity with the national development aspirations .

1.7. Rationale/Justification of the health labour market analysis

Zimbabwe conducted a partial HLMA in 2021 which provided a detailed analysis on; workforce stock and densities, training capacity, health workforce migration, salaries and income, need versus supply of specialist health workforce and annual training requirements. The study provided feasible targets for investing in the specialist health workforce, recommendations on fiscal and financial space for health workforce, and estimated cost of meeting future health workforce supply and needs. The analysis also highlighted the accelerating exodus of Zimbabwean health workers to high-income countries in the middle of COVID-19 pandemic.

One of the recommendations from the partial HLMA was for HSB to expand the study to cover all health workers and use the evidence to revise the National HRH strategic plan, including developing an investment case for the health workforce education, employment and retention. Therefore, the Board at its 2021 Strategic Plan review meeting approved that a second phase of the HLMA be conducted in 2022.

1.8. Aim and objectives of the Zimbabwe Labour Market Analysis

The main objective of this comprehensive HLMA was to conduct an in-depth analysis of the interactions and sequences between supply, demand, need and productivity of health labour force in Zimbabwe and the necessary policy actions to address any existing or anticipated gaps. To achieve this, the following specific objectives were pursued: -

i. To undertake a descriptive analysis of the dynamics of supply and demand for Health Workforce in Zimbabwe covering clinical health workers in both the public and private sectors.

ii. To estimate the normative need for Health Workforce to address the disease burden/workload in Zimbabwe vis-à-vis the outlook in supply, demand and fiscal space scenarios.

iii. To explore the nature and drivers of recent surge in out-migration of skilled Health Workforce from Zimbabwe and ascertain the necessary conditions, policies and regulatory measures towards sustainability.

iv. To conduct an exploratory analysis of the required policy actions to address supply/demand gaps required to achieve the desired need and distribution of Health Workforce in Zimbabwe.

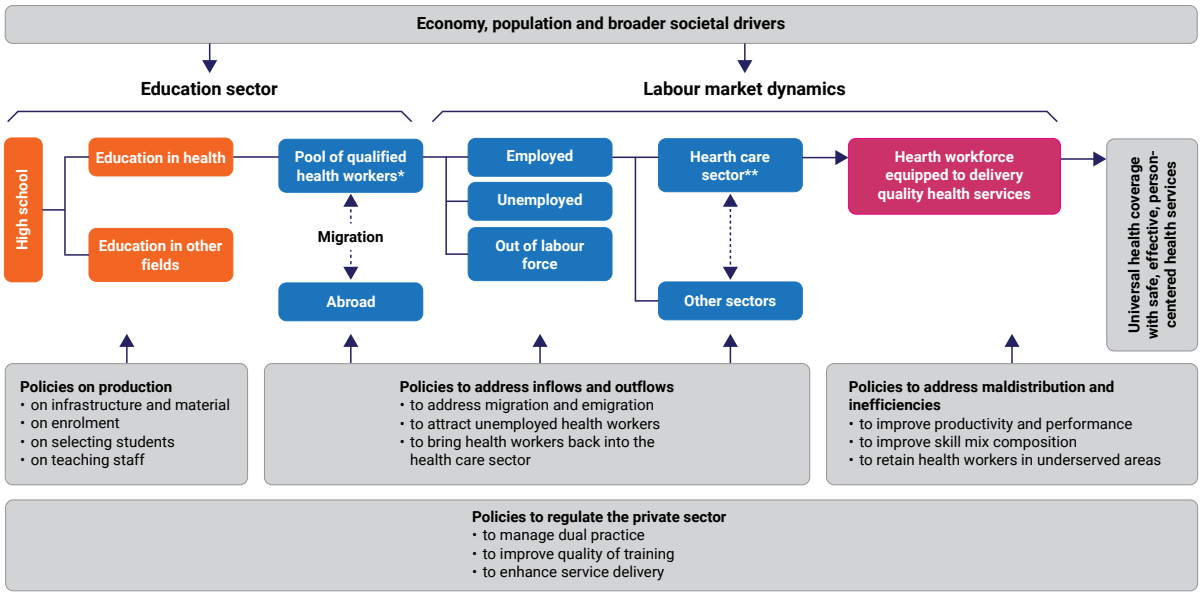
v. To develop policy recommendations with regards to the production, inflows/outflows, misdistribution, inefficiencies and regulations in Zimbabwe.

Section 2.
Implementation Process and Technical Methodology

2.1. Conceptual approach for the HLMA

The Health Labour Market Analysis provides insights into the HRH market dynamics and reveals current and potential labour market failures or mismatches for corrective policy actions. The health labour market is dynamic and influenced by policy decisions and actions across several sectors that include education, labour, finance, employment, foreign affairs (in relation to international migration) among other sectors. The HLMA framework proposed by Sousa and colleagues (2013), which has been adopted by WHO (Figure 5), is a simple guide, and was adopted for analysing the core aspects of the health labour market in Zimbabwe.

FIGURE 5: *Health labour market framework for UHC*



Source: *WHO, 2016*

A multi-method approach was used to collect and analyse data on the health labour market dynamics in Zimbabwe. These included desk review, stakeholders' discussions (inception meetings, key informant interviews and focus group discussions), triangulation and descriptive analysis of secondary data from multiple sources (mainly from Health Service Board, Ministry of Health and Child Care, Private Sector, Regulatory Authorities, and other MDAs which included Ministry of Higher and Tertiary Education, Innovation, Science and Technology Development, and Local Authorities), workforce survey and a group modelling exercise for the outlook of need, demand and supply of the health workforce. The Zimbabwean HLMA was informed by the WHO Health Labour Market Analysis Guidebook, 2022.

2.2. Overview of the HLMA process in Zimbabwe

The Government of Zimbabwe undertook a phased approach in the Health Labour Market Analysis. The first phase of the Zimbabwe HLMA 2021 was a partial exercise which analysed Specialist Doctors, Specialist Nurses, Radiographers and Pharmacists. This phase provided detailed analysis on workforce stock and densities, training capacity, health workforce migration, salaries and income, need versus supply of specialist health workforce and annual training requirements.

The findings and recommendations of the partial HLMA were adopted by the Health Service Board and Ministry of Health and Child Care in:

1. Developing the MoHCC manpower development plan for 2022.
2. Guiding the development of the revised HRH Policy of the country, and
3. Lobbying for posts and fiscal support from Treasury.

The partial HLMA was however limited in scope and it was recommended that a comprehensive HLMA be undertaken. This could facilitate a full understanding of the Zimbabwe Health labour market dynamics. As part of the preparation of the comprehensive process, the WHO capacitated selected HSB secretariat and MoHCC members with requisite expertise on conducting HLMA using WHO recommended technical approaches at a workshop conducted in Kigali, Rwanda. The internal HLMA experts led most aspects of the methodology workshop with backstopping from WHO technical experts. This exercise comprehensively studied data on demand, supply, population health needs, economic feasibility of Zimbabwe to absorb supply of health cadres and productivity.

2.2.1 Process of HLMA implementation in Zimbabwe

This section highlights the processes and approaches employed in the comprehensive phases of the HLMA which are summarised in Figure 6.

FIGURE 6: *HLMA Process*

This anticipated to be an iterative rather than a straight linear process.

Phase 1: Constitution of a Multi-Sectoral Technical Task Team and Stakeholder Mapping

The multi-sectoral Technical Task Team (TTT) was constituted to form the HLMA Technical Working Group (TWG) and was drawn from the following entities:

a) HSB and MoHCC
b) Ministry of Finance and Economic Development
c) Ministry of Higher and Tertiary Education, Innovation Science and Technology Development (MHTEISD)
d) Ministry of Public Service Labour and Social Welfare
e) WHO technical experts
f) Zimbabwe National Statistics Agency
g) Nurses Council of Zimbabwe
h) ZIMCHE

i) Health Apex Panel
j) Faculty of Medicine and Health Sciences, University of Zimbabwe
k) Private Healthcare Association of Zimbabwe
l) Zimbabwe Association of Church-related Hospitals (ZACH)
m) Development Partners (WHO, UNICEF, UNDP, GFF, World Bank, UNFPA)

Phase 2: Evidence Triangulation on the Health Workforce Situation

The evidence triangulation process included the following critical components:

a) Methodology workshop: A five-day technical workshop was conducted to orient the expanded TWG-HLMA and other key stakeholders on the recently published WHO Guidebook on HLMA. The workshop was also used to frame the main policy questions and build consensus on methodological assumptions. The platform also presented an opportunity to assess secondary data availability. A primary data collection tool and the protocol for data collection to elicit the views of health workers and managers were developed.

b) Input from clinical experts for need-based assessment of HWF requirements: A five-day workshop was held with selected clinicians and public health experts to determine the disease burden of the country, the appropriate service interventions and standards to enable estimation of future HRH needs.

c) Collection of Primary and Secondary Data: The TWG collected primary data using a data collection template and indicators agreed upon based on the formulated key policy questions. The data collection was undertaken within a period of two weeks across all Provinces. A desk review process was also conducted to collect secondary data.

d) Data cleaning and analysis workshop: A fourteen-day workshop was held by the TWG, WHO technical staff and other selected experts to conduct data analysis of the labour market (from secondary and primary data), modelling the HLM outlook and undertake strategic interpretation of the results as well as prepare for the report writing.

e) Analytical triangulation/integration and report writing: A fourteen-day session was held to integrate the findings from the different types of analyses for strategic interpretation and drafting the report. The WHO technical team supported the TWG in leading the process.

f) Validation workshop: A two-day stakeholder review and validation workshop was held to discuss the HLMA findings' accuracy and appropriateness, whereupon recommendations and policy actions with concrete timelines were finalised.

Phase 3: High-Level Policy Dialogue on Health Workforce in Zimbabwe

A multi-sector stakeholder policy dialogue was convened to deliberate on the findings and recommendations on the way forward to optimise the health labour market in Zimbabwe. The policy dialogue sought to build consensus on establishing sustainable HRH investments in education and training; employment; deployment; human resource information systems; productivity and performance management.

Phase 4: Drafting of the HRH Strategy and Investment Plan

The HLMA evidence will be used to inform the development of the MoHCC HRH Strategic Plan (2023 –2030) and the Sustainable Investment Compact for Zimbabwe. The Investment Compact is an agreement by stakeholders in HRH on the required investments option to be pursued in fulfilment of the national aspirations backed by resource commitments.

2.2.1.1 Conceptualization and planning

The HSB and MoHCC working with WHO developed the concept note and implementation plan for the comprehensive HLMA study in Zimbabwe, detailing the rationale, cost, implementation timelines and targeted stakeholders for the mapping process. A technical working group (TWG) was set up for the day-to-day implementation, including data collection, analysis and report writing. Deliberations were held with stakeholders to include their perspectives and expectations from the HLMA, which ultimately informed policy questions for the study.

2.2.1.2 HLMA methodology workshop and planning for data collection

The TWG underwent a five-day comprehensive training on HLMA methodology. This offered an opportunity to the TWG to refine the proposed policy questions and set expectations on the scope and approach, which then informed the type and nature of data required to address the identified policy questions. The TWG was divided into thematic teams to conduct a preliminary assessment of the extent of data availability and gaps. This enabled the thematic teams to ascertain the suitability of the planned analysis and identification of the assumptions that were necessary in addressing the prioritised questions. In terms of the data collection strategy, data collection tools were developed and agreed upon, and specific areas were assigned to different thematic teams for data collection. The teams were also tasked with translating policy into action. This was done by identifying policy implications and making recommendations for interventions.

Thematic team on Training and Education: The team reviewed secondary data on the production of Health Workers. The main tasks were to identify key stakeholders in health education and their roles, assess the attractiveness of health professions relative to other professions, assess production capacity, review trends in the production of Health Workers and provide an overview of production efficiency.

Thematic team on Stock and Supply: Key roles assigned to this task team included estimating supply to differentiate amongst the pool of Health Workers employed in the health sector, those working outside the health sector, the unemployed and those who have migrated; to assess the Health Worker characteristics in terms of density, gender, age distribution, skills mix, geographical distribution, and attrition and turnover rates. In addition, the team reviewed policies on salaries, assessed wages and other financial benefits relative to GDP per capita. The non-monetary benefits and related policies were also analysed.

Thematic team on Demand and Productivity: The demand task team collected data on established/approved posts (indicative demand), funded posts (effective demand), the budget allocated to fill the posts, filled posts (met demand), vacancies (unmet demand). Furthermore, the team reviewed established or approved posts that had remained vacant regardless of whether they were funded or not, the funded vacancies or labour shortages which represent the actual number of new jobs that could be created within a period of time. The team also compiled aggregate productivity for all districts in Zimbabwe utilising the Workforce Productivity Index (WPI).

Thematic team on Finance and Economic Feasibility: Key roles of this team included assessing the importance and attractiveness of the health sector in terms of employment in comparison to other sectors. The team also identified and reviewed the main funding components (public, private and external sources) and examined how funding sources influenced investments in the health workforce. Finally, the team assessed how some key macroeconomic factors impact investments in the health workforce by identifying and reviewing key constraints such as wage bill ceilings, fiscal space, budget prioritization and public spending efficiency.

2.2.1.3 Descriptive and predictive labour market analysis and modelling

Based on the data collected, a labour market modelling (need, supply, and economic space) was undertaken guided by established methods and frameworks. Findings were strategically interpreted taking the national context into account. Furthermore, an exploratory assessment of productivity analysis for sixty-three districts in Zimbabwe was undertaken using a Workforce Productivity Index (WPI).

2.2.1.3.1 Descriptive analysis of the size, composition and distribution of the health workforce

Descriptive statistics were utilised in analysing the size, composition, distribution, and trend of the health workforce in Zimbabwe. The data obtained from different sources was triangulated and compared with evidence from various reports and policy documents as well as the qualitative insights obtained from stakeholder interactions. Although very limited in scope, some inferential statistical analysis was done, whereupon a 0.05 (95%) confidence level was used for statistical significance. Due to the large number of categories of Health Workers in the classification system adopted in Zimbabwe, it was imperative to match health workforce categorization to some internationally recognized Health Worker occupational groups to enable the analysis and comparison of data. The International Standard Classification of Occupations (ISCO-08) was therefore used.

1. Analysis of current situation and past trends

Analysis were carried out to generate results for the various components of the HLMA, which are presented in tables, graphs and/or textual description, as appropriate. The size, composition, and distribution of the health workforce in Zimbabwe were analysed using descriptive statistics of the trends and interpreted with the qualitative insights obtained from stakeholders. Trend analysis was conducted to assess the health sector's contribution to the overall economic activity measured by the Gross Domestic Product. This analysis involved a graphical trend in proportional contribution of the entire health sector to the overall economic output of the country from 2010 to 2022. Trend analysis was also carried out on health sector employment as a share of overall employment in the country over the period 2010 to 2022. Comparative analysis of remunerations in different sectors in relation to the health sector was used to gauge attractiveness of the health sector.

2.2.1.3.2 Modelling the future supply and needs-based requirements for health workers

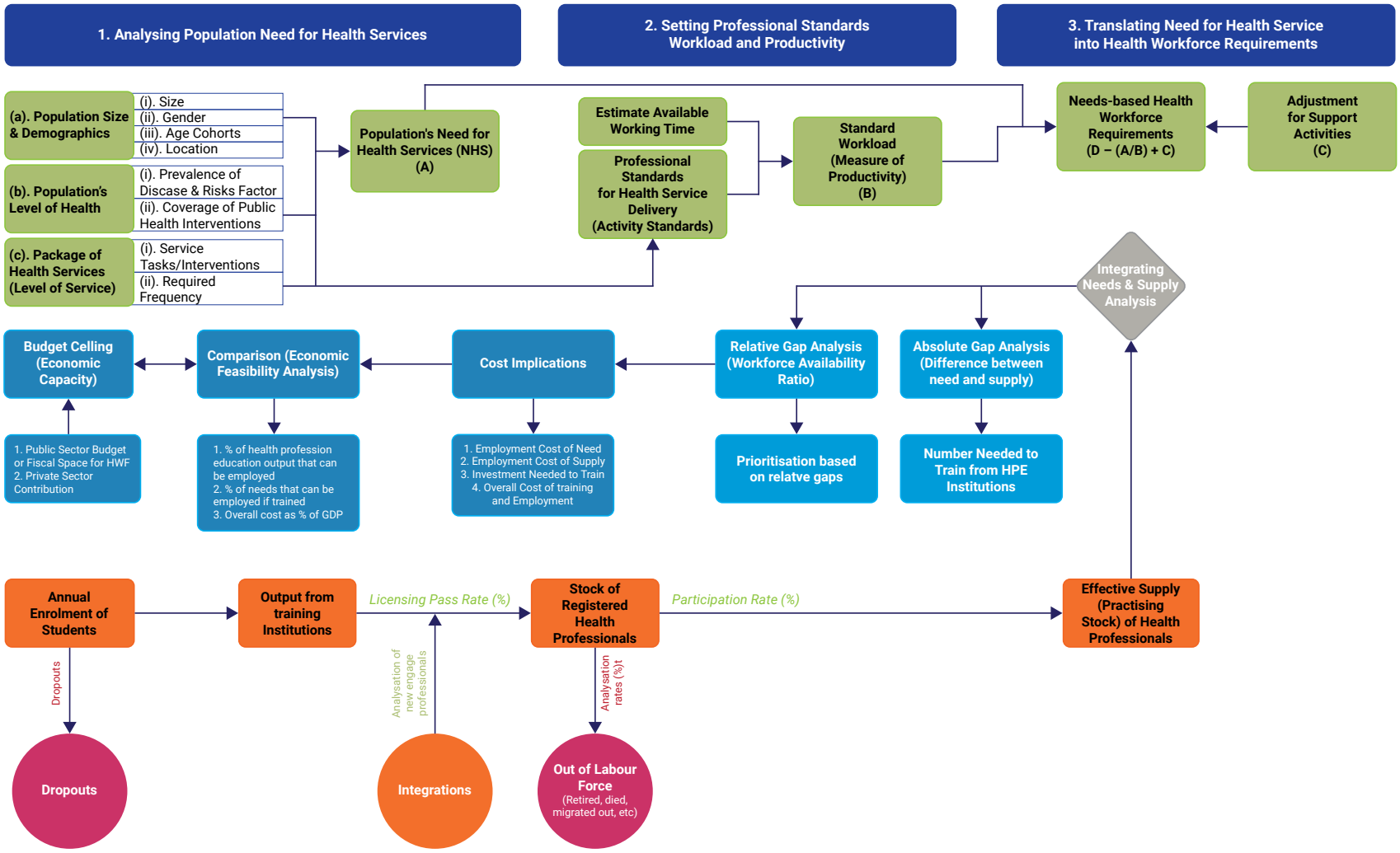
The demand and supply analysis of the labour market was conducted using existing frameworks by the World Health Organisation. Based on expressed need by stakeholder during the scoping mission, two scenarios of health workforce requirements are modelled. The first scenario uses existing staffing norms/standards and health facilities to model the need for health workers. The second scenario on the other hand is based on the need-based framework of health workforce modelling.

a) **Health workforce supply forecast:** The supply-side forecasting involved determining the inflow or entry in the current workforce and outflow or attrition from the current workforce. Whilst the inflow depends on the training capacity and immigration, the outflow/attrition, on the other hand, is influenced by retirements, emigration, deaths, resignations and dismissals.

b) **Forecasting need-based requirements for health workers using health facilities staffing norms scenario:** This scenario uses the current health facilities staffing norms to model the plausible staffing requirements and anticipated gaps when compared to the expected supply. This scenario was modelled using Health Services Development Analysis approach whereby expansion in the number and size of existing health facilities was modelled based on observed trends and population growth in Zimbabwe. The number of health facilities by type was extracted from various health sector performance reports while the staffing norms/standard for health facilities was obtained from the staff returns for the health sector. To overcome the limitation of using fixed facility staffing norms which tends to produce status quo projections, the planned upgrades and probability of increased service utilisation using the population growth rate versus the disease burden were used to adjust the annual projections. The customisation of the HLMA tool adopted aggregates the HRH need at national level and not by level of care. Thus, modelling the future developments of healthcare facilities (or expansion in service utilisation) was undertaken; the current staffing norms scenario (or structure) was applied to generate the respective HRH requirements.

c) **Forecasting economic demand for health workers:** The economic demand for health workers is reflected in a country's ability and willingness to pay for health workers. This estimates the joint capacity of the government, development partners and the private sector in purchasing health care services, with the cost of health worker wages representing a substantial proportion of this. The logic underlying this approach is that countries will not spend more than they can afford on health care, even if their health or level of health utilization is suboptimal relative to an internationally established benchmark. Figure 7 shows the framework for needs based health workforce planning.

FIGURE 7: *Framework for need-based health workforce planning*



Source: *adopted from Asamani et al.*[1]

1 James Avoka Asamani, Christmal Dela Christmals, and Gerda Marie Reitsma (2021). Modelling the supply and need for health professionals for primary health care in Ghana: Implications for health professions education and employment planning. In: PLOS ONE, 16.9, e0257957 (<https://doi.org/10.1371/journal.pone.0257957>).

1. Modelling the need-based requirements for Health Workers:

There are several methods for determining the 'needed' health workforce in a country, but the Global Strategy on Human Resources for Health recommends a need-based approach that aligns investments to the population's health needs. The health need-based or epidemiology approach was adopted with the assumption that the need for Health Workers in Zimbabwe depended on the 'need for health services' as defined by the disease burden and structure of the population alongside the health service delivery model of the country. The following technical steps were followed to determine the need for health workers.

- ***Estimating the population's 'need for health services':*** It was prioritized to quantify the 'need for health service' that covers at least 98.2% of the diseases burden and risk factors. Using data from the country's Health Information and Surveillance system, the list of diseases and risk factors that account for 99% of morbidity and mortalities were identified. A desk review was then conducted by a team of Epidemiologists and Statisticians to obtain the prevalence rates of the diseases and risk factors, as well as the targets of the coverage rates of priority public health interventions. The disease burden and the risk factors were mapped based on health facility attendance from routine health information in the Health Information and Surveillance System
- ***Translating the need for health services into needs-based staffing requirements:*** Using data from the partial WISN study which was conducted in Zimbabwe for the public health sector and augmented with experience from other countries in the SADC, a standard workload was determined for each of the health interventions identified by the clinical expert teams. A standard workload, which is like a measure of productivity, is defined as the volume of work within one health service activity that one health worker can accomplish within a year to acceptable professional standards. The estimated "need for health services" was then translated into health workforce using the standard work.

2. Forecasting budget space for the health workforce

The economic demand for health workers is reflected in a country's ability and willingness to pay for Health Workers to meet the health needs of the country's population. Thus, aggregate demand is an estimate of the joint financial capacity of the government, development partners and the private sector in purchasing health care services, of which the cost of Health Workers' wages represents a substantial proportion. The assumption underlying this approach is that countries (governments and partners) will not necessarily spend on health care more than they can afford, even if their health or level of health utilization is suboptimal relative to an internationally established metric. Therefore, demand for Health Workers can be measured using fiscal space for the wage bill as a proxy and adjusting for the private sector contribution to HWF employment. Analysis of the health sector budget was undertaken to measure the level of prioritization of the HWF within successive budgets.

3. Exploratory Survey Methodology

Using a descriptive survey design, districts and health facilities were randomly sampled in which health workers were consecutively selected. Usable responses were received from 2,688 Health Workers across 63 cadres. The survey was conducted using a standardised tool adapted from OECD, previous HLMAs and research. The 2022 Health Worker Survey, the first of its kind to be conducted in Zimbabwe, collected information on the number of Health Workers available, the jobs available in both public and private sector and identified the number of Health Workers needed to serve the population. The survey also sought information on Health Worker's wage expectations and intention to migrate. Data collection was undertaken by a multi-sectoral and multistakeholder team.

BOX 1: FISCAL AND FINANCIAL SPACE ASSUMPTIONS

- **Public Sector Fiscal Space for the year, i** =
  (GGHE as % GDP_i * Nominal GDP $Values_i$) * HRH Expenditure as % $GGHE_i$ ...(5)
- **Cumulative Financial Space for the year, i** =
  Public Sector Fiscal $Space_i$ * (1 + proportion of private sector HRH employment) ...(6)

Where:

- **i = target year**
- **GGHE = General Government Health Expenditure**
- **GDP = Gross Domestic Product**

Notes: *There are elaborate and recommended econometric equations for estimating the demand for health workers from macroeconomic indicators and health spending patterns in countries. With data constraints, these concepts guided the use of the above formulae in which it was conservatively assumed that, if the government continue to spend asimilar proportion of GDP on health and asimilar proportion of GGHE on HRH, all other things being equal, the fiscal space for HRH would be proportional to the size of the GDP. It was further assumed that the private sector would not contract and that aconservatively similar proportion of private-sector employment would continue.*

Source: *WHO, 2021*

Zimbabwe has a total of 1,867 health facilities across the ten provinces in the country. The health facilities are made of 223 hospitals and 1,644 clinics as shown in Table 4:

TABLE 4: *Health facilities in Zimbabwe, 2022*

Province	Hospitals	Clinics	Total
Bulawayo	5	56	61
Harare	14	91	105
Manicaland	44	275	319
Mashonaland East	24	208	232
Mashonaland Central	15	127	142
Mashonaland West	22	197	219
Masvingo	30	174	204
Matabeleland North	21	144	165
Matabeleland South	19	124	143
Midlands	29	248	277
Total	**223**	**1644**	**1867**

Source: *MOHCC DHIS2 Database 2022*

Using the total number of 1,867 health facilities in Zimbabwe as the accessible primary population of interest (unit of analysis) and an alpha level of 0.05, the sample size was estimated to be at least 329 using the simplified sample size formula (Yamane, 1967). See the statistical details in equation 1 below.

… equation 1.

Where: n = required sample size

N = Accessible population

e = alpha level or significance level

Thus, ≈ 329

Multi-stage sampling was used to select Districts and the 329 health facilities. Fifty percent of the districts were randomly selected and probability proportional to size was used to select the health facilities from the selected districts. All the Provincial, Central, and District Hospitals in the selected districts were purposively included in the sample. Table 5 shows a summary of the sampled sites

TABLE 5: *Summary of sampled sites*

Level	Number in the country	Sampled Size
Provinces	10	10
Districts	63	37
Facilities	**1,817**	**329**

Data Collection

The tools that were used to collect and analyse data were adopted and adapted from the WHO:-

- Health Labour Market Analysis Tool version 2.0
- Education Sector Data Collection Tool
- Health Worker Survey Tool
- Health Facility Tool
- Demand Data Collection Tool
- Macroeconomic, policy and planning Tool
- Multi-dimensional productivity index for health systems Tool
- Supply of Health Worker Tool

2.2.1.4 Report writing, validation and consensus building

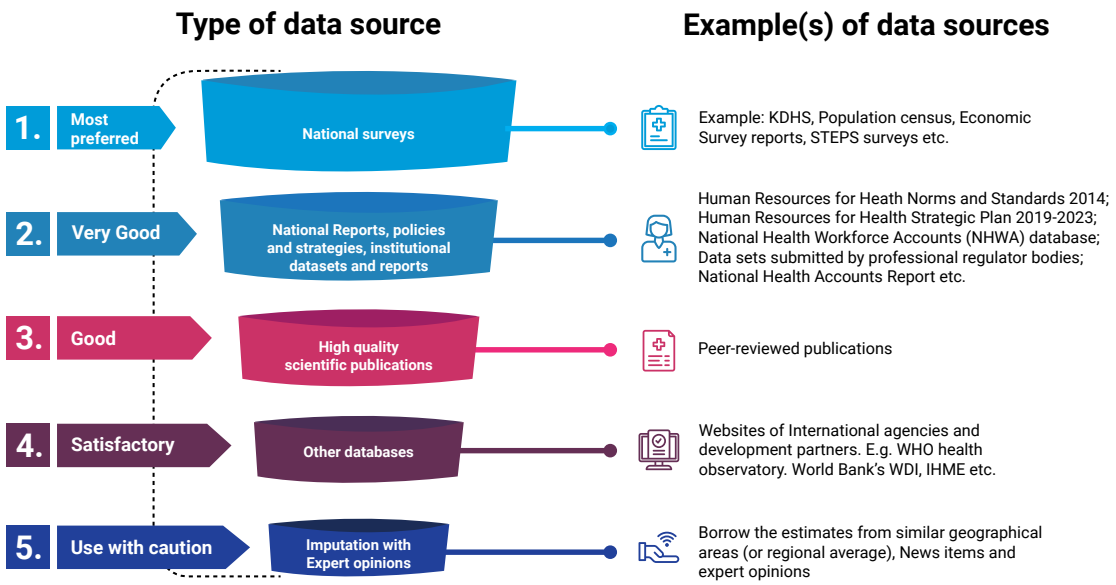
The Technical Working Group, with technical guidance from WHO experts, held a 12-day working session to develop the main points of the report and to address data gaps and inconsistencies as necessary. A zero draft report was then developed and shared for preliminary review and comment refinements. This was followed by a technical and stakeholder review and validation workshop to discuss the data and findings in terms of accuracy and appropriateness, whereupon recommendations and concrete policy actions was finalized and submitted to the HSB and MoHCC with the view of convening a multisectoral and multi-stakeholder dialogue on health workforce investment.

2.2.2 Data sources, validation and quality assurance

Different mechanisms of data validation were put in place at various stages to ensure that the data identified and used in the analysis are valid, consistent and acceptable. A predefined data collection tool (in excel template) was developed to put the data together from the documents that had been shared. The HSB/MoHCC and WHO also provided clear guidance on the type of information that needed to be collected and where to collect it.

To ensure that data from trusted sources were used, a hierarchy of data sources was adopted (see figure 8). In case of doubts about the validity of any data, especially data used in the assumptions for the projections (such as estimating health workforce needs to deliver health services), relevant stakeholders (e.g., health professionals) were consulted for their expert views.

FIGURE 8: *Hierarchy of data sources used in the analysis*



Source: *Adapted from WHO*[2]

2 Ministry of Health and Child Care, Zimbabwe (2021). Health labour market analysis for specialist health professionals in Zimbabwe.

Section 3.

The Political Economy and Macroeconomic Factors Influencing the Health Labour Market

3.1 Stakeholder mapping

The primary objective of the analysis was for the policymakers to be able to get a visual representation of all the stakeholders who can influence the Zimbabwe HRH agenda and their interactions. Using the categorisation criteria of power and influence (high power low interest, low power low interest, high power high interest and low power high interest), the incentives, relationships, distribution and contestation of power between different stakeholders were analysed by thematic areas. Under the HRH planning and financing 27 stakeholders were identified, HRH production training and development 24 stakeholders, HRH deployment utilisation and governance 38 stakeholders, HRH migration retention 51 stakeholders, HRH information, research, monitoring and evaluation 30 stakeholders.

3.2 Macroeconomic factors influencing the health labour market

In a budget statement read by the Honourable Minister for Finance and Economic Development on 24 November 2022, the economy was projected to grow by 4% during 2022, and follows an 8.5% positive growth trajectory for 2021 (ZIMSTATS September 2022). Growth in 2022 was mainly from mining (10%), construction (10.5%) and accommodation and food service sectors (56.3%). Domestic headline inflation steadily accelerated from 60.7% in January to 191% in June 2022, partly due to external factors which impacted negatively on import prices of raw materials, food, fertilizers and liquid fuels. To year end, inflation is expected to slow down, as Government continues to implement policies that address adverse inflation expectations, speculative tendencies, exchange rate manipulation as well as arbitrage opportunities

Government allocations to the health sector have consistently been on the rise towards the Abuja target of 15% of national budget to the health sector. In 2021 the health budget allocation was 10% of National Budget and increased to 12% in 2022.

Fiscal consolidation measures implemented since 2018 have resulted in the Government's fiscal position improving, with smaller deficits being recorded during the same period. Improved fiscal performance has also enabled the rebuilding of fiscal buffers that enable the country to respond to future shocks. Fiscal deficits have remained within the 3% of GDP threshold, in line with the NDS1 and the SADC Macroeconomic Convergence Target, as the country registered balanced budget (0.4% of GDP surplus) in 2019, a budget surplus of 1.7% of GDP in 2020, and a deficit of 1.7% of GDP in 2021.

Government's policy thrust will continue to be anchored on maintaining a sustainable fiscal position in order to support structural reforms required to ensure inflation and exchange rate stability whilst enabling the Government to finance public services in an affordable and sustainable budget framework. The fiscal deficit will be maintained at below 3% of GDP during 2023, with strict control on consumptive expenditures in order to provide more resources towards development expenditures such as infrastructure and social services. The medium-term fiscal framework is as indicated in table 6.

TABLE 6: *Macro-Fiscal Framework 2022–2025*

National Accounts (Real Sector)	2021	2022	2023	2024	2025
Nominal GDP (ZWL$ Million)	3 273 365.4	10 501 448.8	18 780 234.7	29 803 244.9	42 532 769.3
Real GDP Growth (%)	7.8	4.6	5.0	5.4	5.2
Inflation (Annual Average) %	98.5	166.7	100.7	50.2	33.4

National Accounts (Real Sector)	2021	2022	2023	2024	2025
Government Accounts					
Revenues (excluding Retained Revenue)	489 592.2	1 740 000.2	3 140 948.5	5 027 222.9	7 251 337.2
Revenues (excluding Retained Revenue) as %of GDP	15.0	16.6	16.7	16.9	17.0
Expenditures (Million ZWL$)	545 029.2	1 897 522.0	3 400 934.4	5 404 862.4	7 507 931.9
Expenditures (Million ZWL$) as %of GDP	16.7	18.1	18.1	18.1	17.7
Recurrent Expenditures	364 149.5	1 451 056.5	2 594 307.7	4 046 114.1	5 459 302.4
Recurrent Expenditures as %of GDP	11.1	13.8	13.8	13.6	12.8
Employment Costs including Pension	193 261.0	867 016.5	1 531 624.0	2 415 287.2	3 222 369.2
Employment Costs including Pension as %of GDP	5.9	8.3	8.2	8.1	7.6
Employment Costs including Pension as %Total Expenditure	35.5	45.7	45.0	44.7	42.9
Employment Costs including Pension as %of Revenue	39.5	49.8	48.8	48.0	44.4
Capital Expenditure &Net lending	180 879.6	446 465.5	806 626.7	1 358 748.3	2 048 629.5
Capital Expenditure &Net lending as %of GDP	5.5	4.3	4.3	4.6	4.8
Overall Balance	-55 437.0	-157 521.8	-259 985.8	-377 639.5	-256 594.7
Overall Balance as %of GDP	-1.7	-1.5	-1.4	-1.3	-0.6
Public Debt	1 863 860.0	10 381 337.6	17 366 044.5	22 566 423.3	31 842 549.2
Public Debt as %of GDP	56.9	98.9	92.5	75.7	74.9

Source: *Ministry of Finance and Economic Development - Zimbabwe, 2022*

3.3 Funding for Health

The commitment of government to increasing domestic funding for health is strategically placed as one of the outcomes for the health and wellbeing sector in the National Development Strategy 1. The Abuja declaration on at least 15% of government budget allocation to the health sector has seen a progressive increase in the government financing of the health sector. Funding requirements estimate closing a gap in domestic funding from the current USD39 per capita towards USD86 per capita as a the minimum threshold for the National Health strategy implementation. At optimal level to the National Health Strategy would require USD104 per capita The table 7shows the trend in government financing of the health sector.

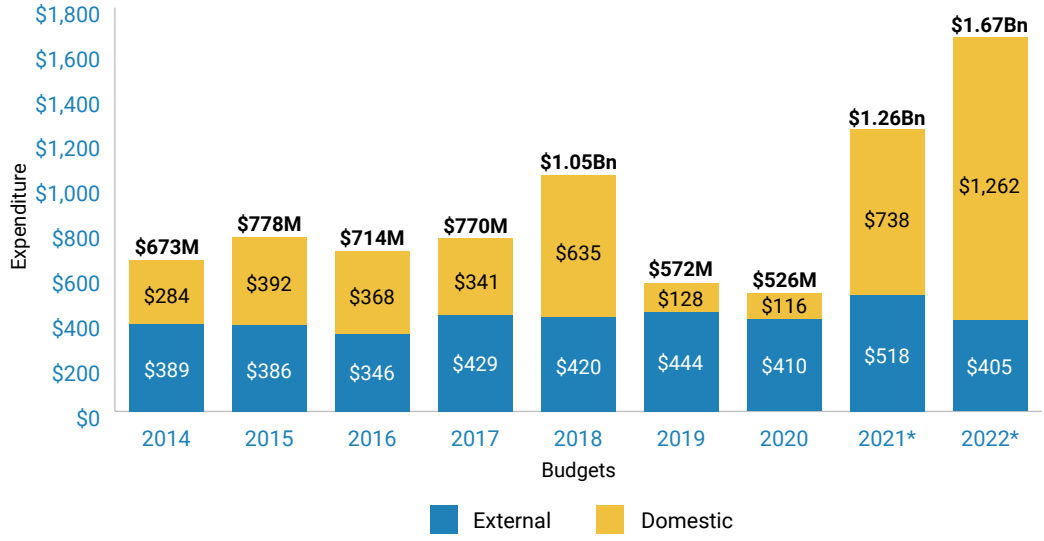
TABLE 7: *Budget allocations to Health Sector*

	2019	2020	2021	2022	2023
Abuja target (Health Budget/ Total Gvt Budget	10.7%	9.32%	12.87%	12.16%	9.93%
Per Capita govt allocation	USD4.80	USD27.29	USD42.29	USD71.66	USD37.22

Source: *Budget Estimates of Expenditure, 2019–2022.*

Since 2014, health financing has comprised a mix of domestic and external resources. The decline in national health spending between 2018 and 2020 was mainly due to a challenging macroeconomic environment. This environment was characterised by a depreciation of the domestic currency and the increasing gap between the parallel market and official exchange rates, thereby fuelling inflation and resulting in the tightening of fiscal conditions. In 2020, increased political will resulted in the health sector benefiting from increased budget support as the Government of Zimbabwe (GoZ) intensified efforts to fight the scourge of the COVID-19 pandemic. Consequently, total funding increased from US$526 million in 2020 to US$1.3 billion and US$1.7 billion in 2021 and 2022 respectively. Domestic financing increased from US$116 million in 2020 to US$738 million and US$1.26 billion in 2021 and 2022, respectively. External funding initially increased from US$410 million in 2020 to US$518 million in 2021 but decreased to US$405 million in 2022.

FIGURE 9: *2014–2022 Domestic vs External Funding for Health*



Source: *Ministry of Health and Child Care (2022) - Resource Mapping Report*

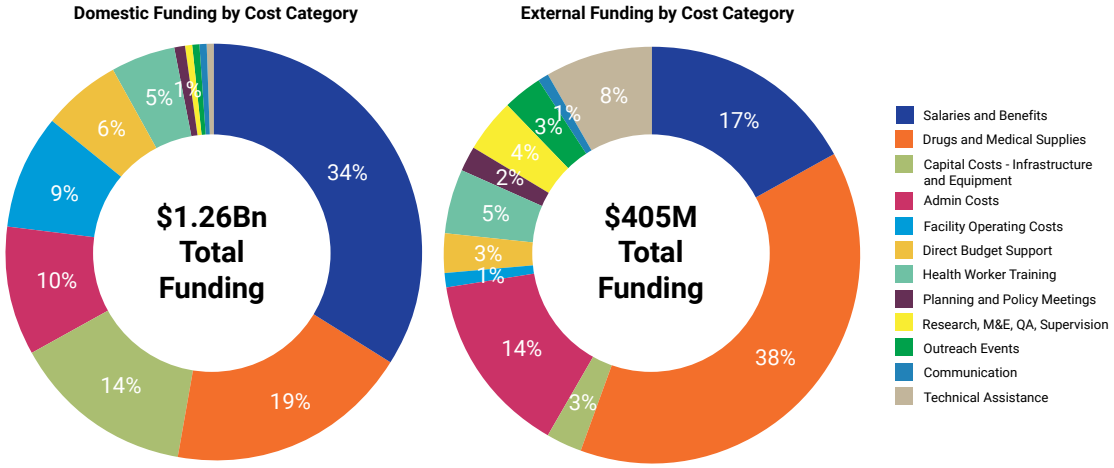
An analysis of domestic funding by cost category shows that most of the financing in 2022 was allocated to salaries and benefits (US$435 million), a US$65 million increase from the 2021 figure of US$370 million. This increase in funding was made to address some of the HRH challenges the MOHCC has faced, which included but were not limited to the brain drain of existing Heath Care Workers to more attractive labour markets and low morale among existing staff. To retain workers, the Government implemented measures to increase disposable income for Health Care Workers.

Another significant investment area in 2022 for domestic funding was for drugs and medical supplies, which increased from US$72 million in 2021 to US$234 million in 2022. While a significant portion of this increase was funding the procurement of COVID-19 vaccines, part of this drive was to increase local production and reduce the import bill. For example, as part of the efforts to curb the COVID-19 pandemic, local universities were involved in producing cloth masks and sanitisers. Infrastructure also saw significant investments in 2022, and this was mainly for the upgrading and the construction of healthcare facilities. Other vital cost category areas for domestic sources of funding included direct budget support for MOHCC programs (US$80 million) and health worker training (US$65 million).

For external funding sources, most funding in 2022 was allocated to medicines and medical supplies (US$154 million), this was a US$29 million decrease from the 2021 figure of US$183 million. Other significant cost drivers for external funding sources included salaries and benefits (US$70 million) and

administration costs (US$58 million). Human Resources for Health remained the biggest cost category for health expenditure A summary of the 2022 funding by cost category is shown in Figure 10:

FIGURE 10: *Funding by Cost Category*



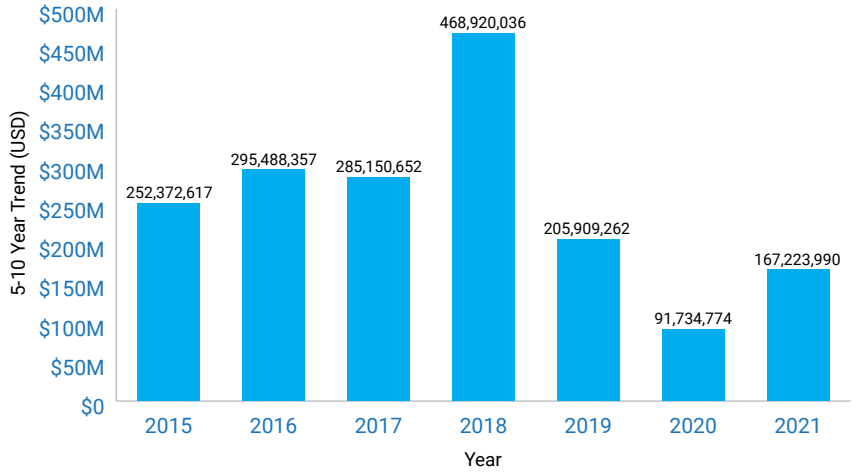
Source: *Ministry of Health Resource Mapping Report (2022)*

3.4 Health Workforce Funding (Salaries and Benefits)

HRH challenges required a sustainable long-term solution rather than an ad hoc and piece-meal fix. Retention of critical staff has remained a challenge given the limited fiscal space to address the needs of the health staff. The Investment Case for the National Health Strategy 2021-2025 proposes more focused attention on providing appropriate inputs at the proper levels of care, including for medicines, supplies, infrastructure, equipment and most importantly, HRH.

To this end, the Government has made the highest salary contribution in 2022, representing 34% of its budget allocation. Other benefits to HRH include non-monetary benefits, such as loans, a duty-free facility for importing personal vehicles, and the establishment of canteens and dormitory facilities. A housing project for the MOHCC staff spearheaded by The Ministry of National Housing and Social Amenities has also been introduced to boost employee morale. Such measures are expected to improve the living quality of HRH and move their remunerations above the poverty datum line.

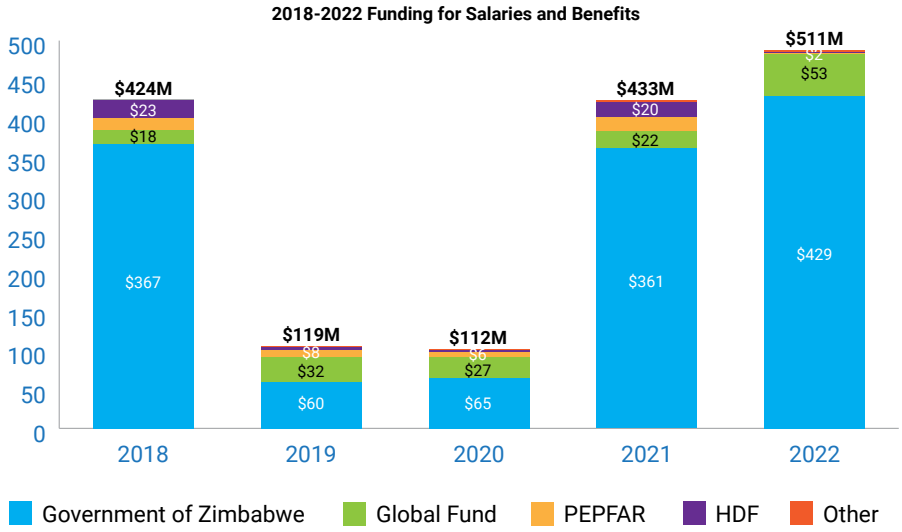
FIGURE 11: *Public health sector wage bill in Zimbabwe*



Source: *MoHCC-National Health Accounts (2015-2021) and Ministry of Finance and Economic Development (2015-2021).*

Partners also contribute towards salaries and allowances through various support mechanisms. Figure 12 highlights funding structure for HRH.

FIGURE 12: *Trend of Spending on Salaries and Benefits of Health Workers in Zimbabwe*



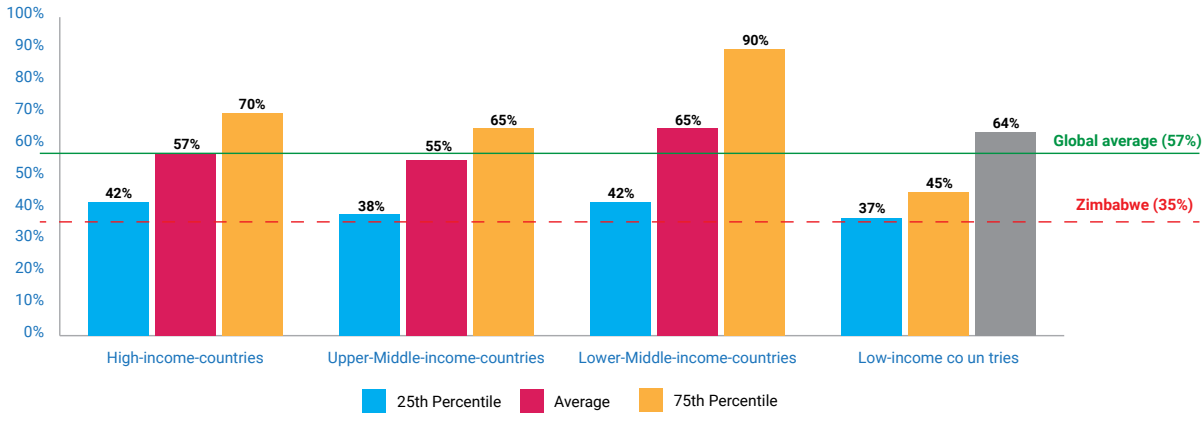
Note: *In 2018, the exchange rate of $ZWL was 1:1 with $US. However, that changed drastically from 2019 when the $ZWL rapidly lost value against the $US. Hence, although no HRH budget cuts were made in 2019 and 2020, the reduction is attributed to the lost value of the $ZWL.*

Prior to 2018 the fixed exchange rate system resulted in a distortion on the real value placed on the local currency which resulted in a highly inflationary environment as the gap between the official exchange rate and parallel market was too wide. The onset of the floating exchange rate in 2019 showed a slump in the real value of wages and hence an erosion of wage perceptions as the purchasing power parity was eroded. This triggered increased health worker attrition as wage expectations were now below market levels.

The lifting of the recruitment freeze (suspension) in April 2020 by Government saw a relative rise in the public sector wage bill through filling of formally frozen vacancies and creation of limited additional posts. There was a slight increase in demand due to added posts in response to the COVID-19 pandemic.

Zimbabwe`s prioritisation of Health Workforce has always been within the global ranges until 2020 which brought the share of Health Workforce to about 35% of the overall health expenditure which is 10% below even the average in low-income countries. However, compared to average regional spending on HRH ($24 per capita), Zimbabwe fares far below at $9 per capita on HRH spending.

FIGURE 13: *Comparisons on HRH Spending*



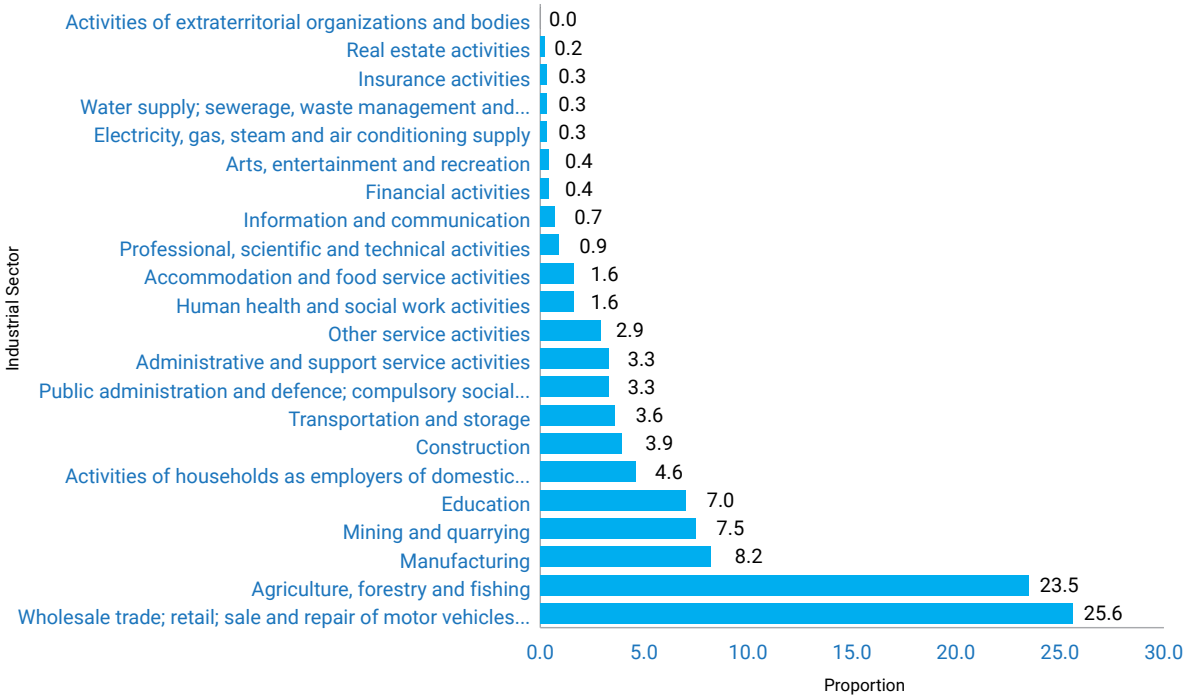
3.5 Process for setting and reviewing of public sector remuneration

In the Public Health Service, remuneration review is usually preceded by negotiation in the Health Service Bipartite Negotiating Panel (HSBNP). The HSBNP is a negotiation forum created in terms of the HSBNP Regulations (SI 111 of 2006). The Statutory Instrument provides guidelines for settling any negotiation disputes including when and how the parties may resort to arbitration, for example, in cases of deadlock. It is the HSBNP which primarily makes public health sector remuneration unique from the rest of Government service. Conditions of service for the rest of Government employees are negotiated for in a separate National Joint Negotiating Panel, which was created in terms of a separate Statutory Instrument.

3.6 Attractiveness and importance of health sector employment compared with other sectors

The delivery of health care services relies on an appropriate and sustainable health human resource base. The attractiveness of the Health Labour Market will ultimately affect the ability of the health sector to recruit and retain health workforce. Recruiting and retaining health professionals remains a high priority for health system planners. Different employment sectors may vary in their appeal to prospective workers. According to the 2022 First Quarter Labour Force Survey, the health sector contributed 1.6% of the employed persons above 15 years of age of the total industry. This was a decrease from the 2019 Labour Force and Child Labour Survey Results of 1.98%. Figure 14 shows the proportion of employed population by industry in 2022.

FIGURE 14: *Proportion (%) of Employed Population 15 Years and Above by Industry, 2022 First Quarter QLF*



Source: *ZimStats, 2022*

The Average income for the health sector employees according to the 2022 First Quarter Labour Force Survey was US$234, which was lower when compared to what Cadres in the education and defence industries were earning. It is important to note, however, that this estimate encompasses all persons

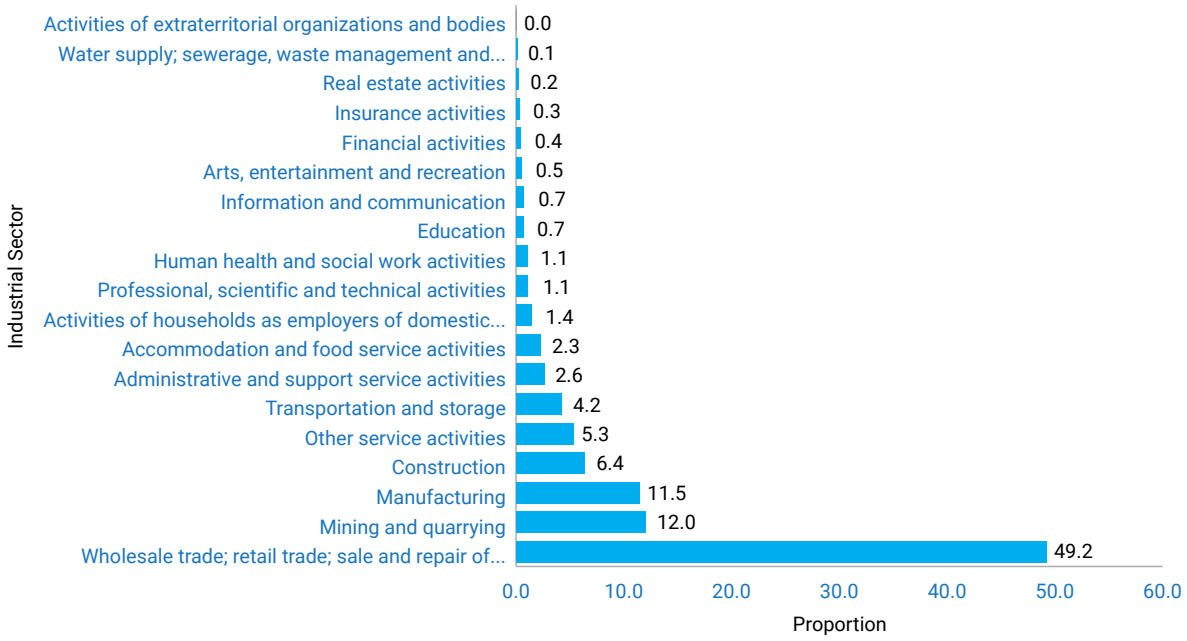
working in the health industry which would usually be lower when compared to the public sector. Also, the average income by sector as shown in figure 15 suggest that the average income in the health industry is quite lower compared to that of, the education and other service sectors.

FIGURE 15: *Proportion of Employed Population 15 Years and Above by Average Income and Industry.*

Source: *ZimStat, 2022 – Quarterly Labour Force Surveys*

Informal workers in the health sector comprised of 1.1% of all informal sector employees which translates in an estimated 30,800 informal employees in the health sector. These include unregistered home-based carers, traditional birth attendants and faith-based practitioners as shown in figure 16.

FIGURE 16: *Proportion (%) of Employed Population 15 Years and Above in the Informal Sector by Industry, 2022 First Quarter QLFS*



Source: *ZimStat, 2022 – Quarterly Labour Force Surveys*

3.7 Health sector's contribution to GDP

On average the health sector contributed between 1% and 2.4% of GDP for the period 2009 to 2018. There is, however, an increasing trend in the contribution of the health sector to GDP from 0.81% in 2009 to 2.27% in 2017 and a marginal drop to 2.22% in 2018. The sector also contributes indirectly through downstream multiplier effects on other sectors.

TABLE 8: *Health Sector Contribution to GDP*

Description	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Human health and social work activities (in million US$)	69	130	206	279	314	348	395	418	455	492
Human health Sector Contribution percentage GDP (%)	0.81	1.22	1.64	1.83	1.83	1.97	2.20	2.24	2.27	2.22
Gross Domestic Product at Basic Prices (Million US$)	8511	10708	12551	15244	17151	17655	17919	18671	20014	22158
GDP per capita in US$	790	976	1132	1310	1428	1428	1432	1441	1511	1629

Source: *National Income Statistics*

Section 4.

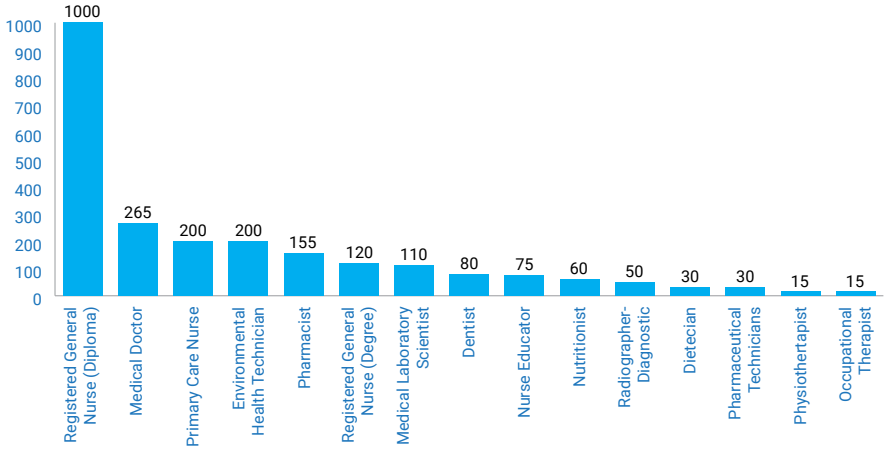
Descriptive Labour Market Situation

4.1 Health workforce education and production capacity

Pre-service training of health professionals in the Zimbabwe health sector is undertaken under the Ministry of Health and Child Care (MOHCC) and Ministry of Higher and Tertiary Education, Innovation, Science and Technology Development (MHTEISTD). In-service and post basic education is predominantly undertaken by MOHCC, while postgraduate training is under MHTEISTD. The MOHCC pre-service training programmes produce health professionals in the following categories - nursing, pharmacy, medical laboratory, environmental health, radiography, dental, biomedical engineering, rehabilitation, food and nutrition services. To complement the MOHCC training efforts, MHTEISD through Polytechnical colleges also offers pre-service training for some disciplines. Private sector players, also offer pre-service training at a marginal scale.

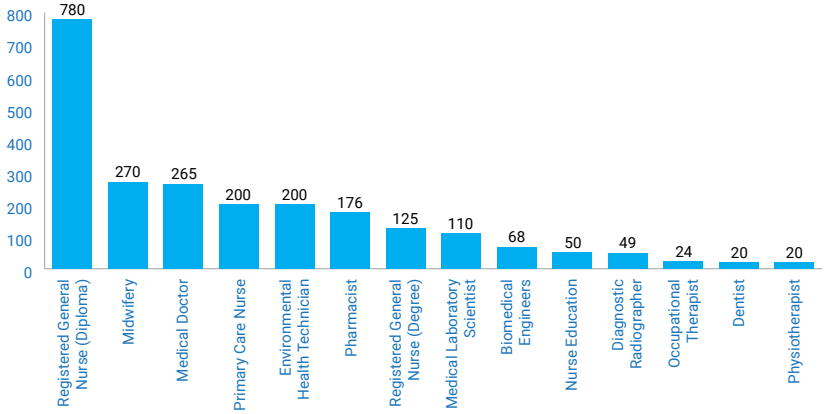
Pre-service health workforce education and production capacity is highest for Registered General Nurses with 1000 training slots per annum, followed by Medical Doctors with 265 slots. Occupational therapists and Physiotherapists have the lowest training slots of 15 per annum. Details are illustrated in Figure 17.

FIGURE 17: *Production capacity (Available training slots)*



The available data shows an aggregate annual student enrolment figure for the various cadres nationally. Registered General Nurses had the highest enrolment of 780, followed by Midwifery and Medical Doctors with 270 and 265 average enrolments per annum respectively. Dentists and Physiotherapists had the lowest enrolments of 20 per annum and there is only one training institution which is University of Zimbabwe.

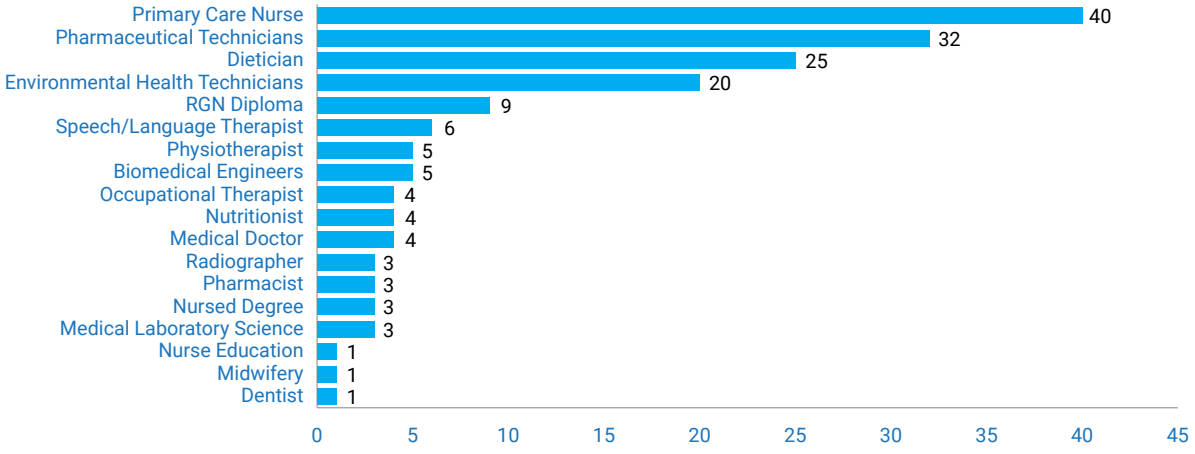
FIGURE 18: *Distribution of average annual student enrolments (2015–2022)*



4.2 Attractiveness and volume of applications to health professions programmes

The analysis estimated a ratio of attractiveness of various health professions education programmes. This was estimated as a ratio of annual applicants to the available slots (the theoretical capacity). As shown in Figure 19, Primary Care Nurses had the highest level of attractiveness with an average of 40 applicants competing for each available training slot. Pharmaceutical Technicians had a ratio of 1:32, and the Dietitians had a ratio of 1:25. Although these ratios demonstrate high level of attractiveness for the health professions programmes, it could also be indicative of a low training capacity for critical programmes with high demand.

FIGURE 19: *Ratio of Applicants to Available Slots (Attractiveness) of Programmes Health Education Market*



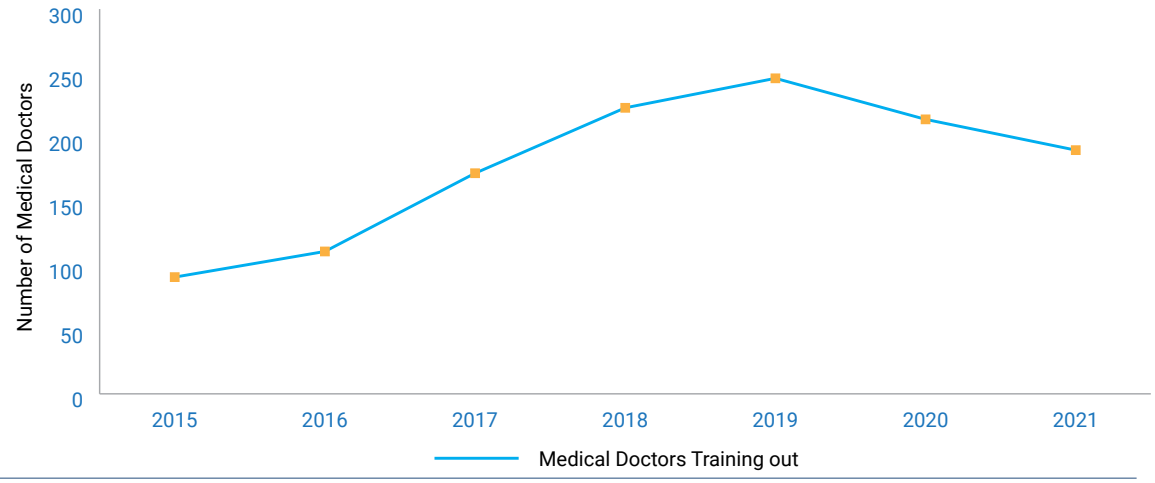
Source: *Data provided for HLMA by MOHCC and Universities (UZ, BUSE, AU, ZOU, Solusi, HIT)*

4.3 Trends in the production output of the health professions education

4.3.1 Training Output for Doctors

As illustrated in Figure 20, the training output of medical doctors increased by around 170% from 91 in 2015 to 246 in 2019. This is attributable to the opening of additional medical schools such as NUST, MSU and the expansion of the intake at UZ. However, there was a decline in the training output for the period 2020-2021.

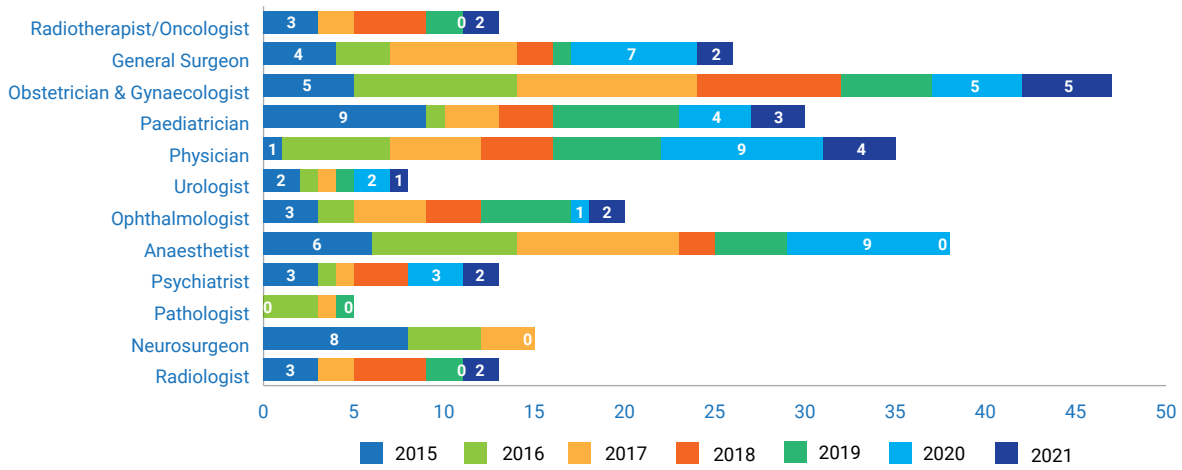
FIGURE 20: *Number of Medical Doctors per annum from 2015 to 2021*



Source: *Records from University of Zimbabwe (UZ), National University of Science and Technology (NUST)and Midlands State university (MSU)*

Figure 21 shows the output trend for specialist doctors from 2015 to 2021 which has been constantly low due to limited training capacity.

FIGURE 21: *Training output of the locally trained Specialist Medical Doctors: 2015-2021*



Source: *MOHCC and MDPCZ*

During the period 2016 to 2021, Master's in Public Health degree constituted the highest number of members studying abroad, followed by Diagnostic Radiology and Paediatric Surgery. In the same period, a total of 113 Doctors trained in various specialty areas outside the country as shown in Table 9.

TABLE 9: *Output of Specialist doctors training outside the country, 2016–2021*

	Programme	2016	2017	2018	2019	2020	2021	Total
1	Masters in Public Health	5	7	3	0	0	1	16
2	Mmed Diagnostic Radiology	0	0	2	2	0	6	10
3	Mmed Paediatric Surgery	3	5	0	0	1	0	9
4	Mmed Cardiothoracic Surgery	0	3	0	2	0	1	6
5	Mmed Internal Medicine	0	0	3	2	0	0	5
6	Mmed Orthopaedics	3	1	0	0	1	1	6
7	Mmed Radiology	0	5	0	0	0	0	5
8	Mmed Haematology	1	1	0	2	0	0	4
9	Mmed Opthalmology	2	0	2	0	0	0	4
10	Fellowship in Clinical Haematology	0	0	1	1	0	1	3
11	Mmed Nuclear Medicine	1	2	0	0	0	0	3
12	Mmed Dermatology	0	0	2	0	1	1	4
13	Mmed Anaesthesia	0	1	0	1	0	0	2
14	Mmed Ear Nose and Throat	0	1	1	0	0	0	2
15	Mmed Neurology	1	0	1	0	0	0	2
16	Mmed Obstetrics and Gynaecology	2	0	0	0	0	0	2
17	Vitreoretinal Fellowship	0	0	0	1	0	1	2
18	Mmed Surgery	0	0	1	0	0	1	2
19	Fellowship in Nephrology	0	0	1	0	1	1	3
20	Fellowship Vascular and Endovascular Surgery	0	0	0	1	0	0	1
21	Masters in Medical Image	0	1	0	0	0	0	1
22	Masters in Pharmacology	1	0	0	0	0	0	1

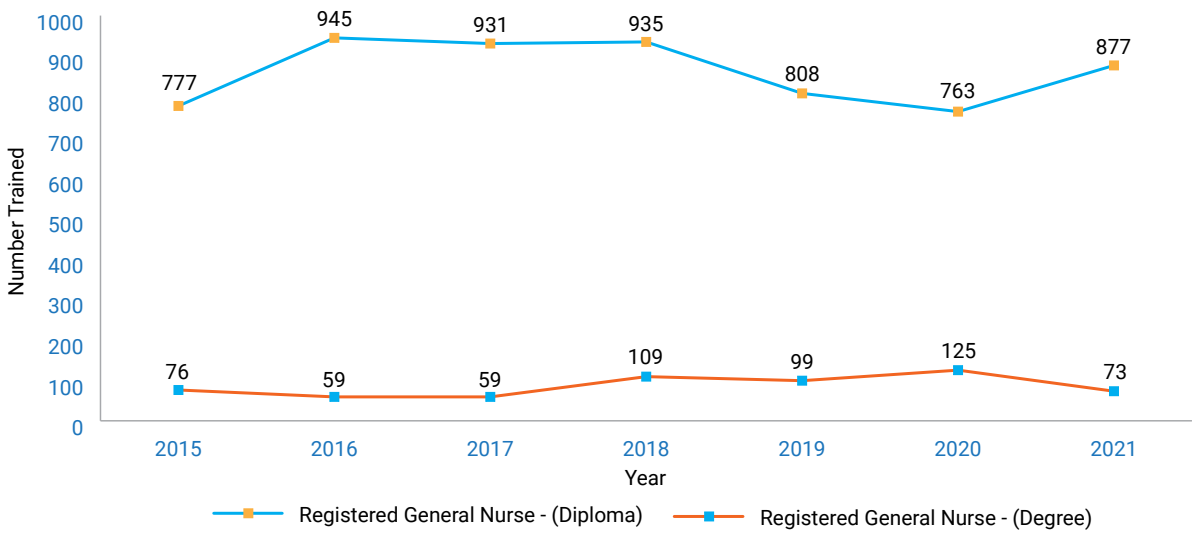
	Programme	2016	2017	2018	2019	2020	2021	Total
23	Mmed Aesthetic Plastic and Re-constructive Surgery	0	0	0	1	0	0	1
24	Mmed Clinical Dematology	0	1	0	0	0	0	1
25	Mmed Histopathology	0	1	0	0	0	0	1
26	Mmed Neonatology	1	0	0	0	0	0	1
27	Mmed Neurosurgical Technics	0	1	0	0	0	0	1
28	Mmed Paediatric Oncology	0	0	0	1	0	0	1
29	Mmed Radio Diagnostics	0	0	0	0	0	1	1
30	Masters in Medical Physics	0	0	0	0	0	1	1
31	Fellowship in Paediatric Urology	0	0	0	0	0	1	1
32	Fellowship in Otology Surgery	0	0	0	0	0	1	1
33	Fellowship in Cardiology	0	0	0	0	0	1	1
34	Fellowship in Sport Medicine	0	0	0	0	1	1	2
35	Mmed Paediatric Orthopaediatics	0	0	0	0	1	1	2
36	Masters in Global Health	0	0	0	0	1	1	2
37	Masters in Health Development	0	0	0	0	0	1	1
38	Masters in Plastic Surgery	0	0	1	0	0	1	2
39	Mmed Urology	0	1	0	0	0	1	2
	Grand Total	**20**	**31**	**18**	**14**	**7**	**25**	**115**

Source: *HSB MDL Records.*

4.3.2 Training of Nurses and Midwives

In Zimbabwe there are two entry points into the Registered General Nurse training namely direct entry into University (degree) and MoHCC training institutions (diploma). The training output for RGNs increased by 20% from 777 in 2015 to 935 in 2018 and marginally declined by 6.2% to 877 in 2019 and 2020. This decline was caused by limited employment opportunities at the time resulting from constrained fiscal space to absorb, which led to a reduction in training intakes and enrolments throughout the country. The training level for degree programmes remained relatively constant since 2016. Figure 22 compares training outputs for nurses trained at diploma versus the degree level.

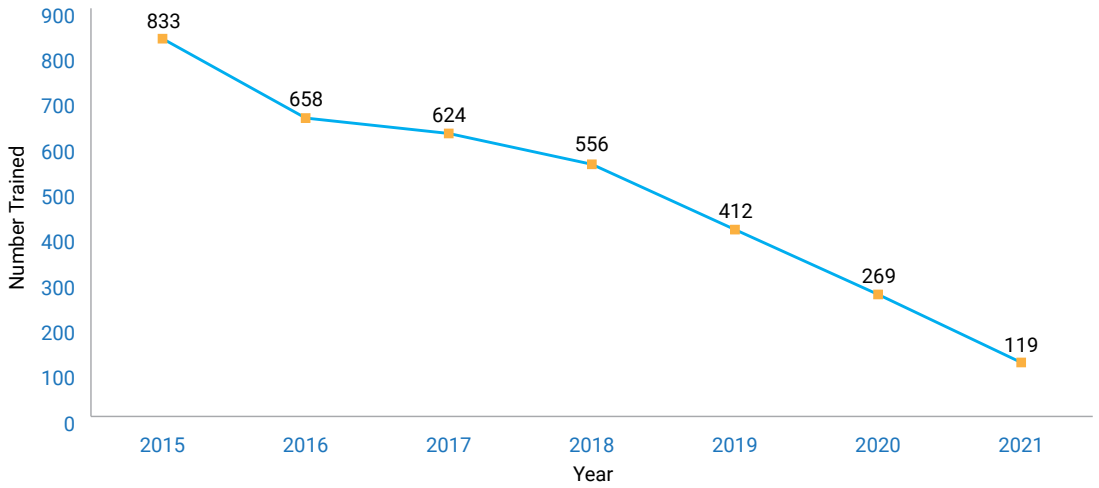
FIGURE 22: *Training output of Registered General Nurses (Degree and Diploma holders) 2015–2022*



Source: *MOHCC, Nurses Council of Zimbabwe, Africa University, University of Zimbabwe*

Figure 23 depicts 86% sharp decline in the training output of midwives from 833 in 2015 to only 119 in 2021. The decline was more pronounced from 2019 to 2021, a 71% decline. The decline from 2015 to 2019 was mainly caused by the shortage of nurse tutors, which saw the intakes being reviewed from three to one per annum. Furthermore, in 2019, the duration of training was increased from one to two years, which adversely impacted the interest of nurses to train as midwives.

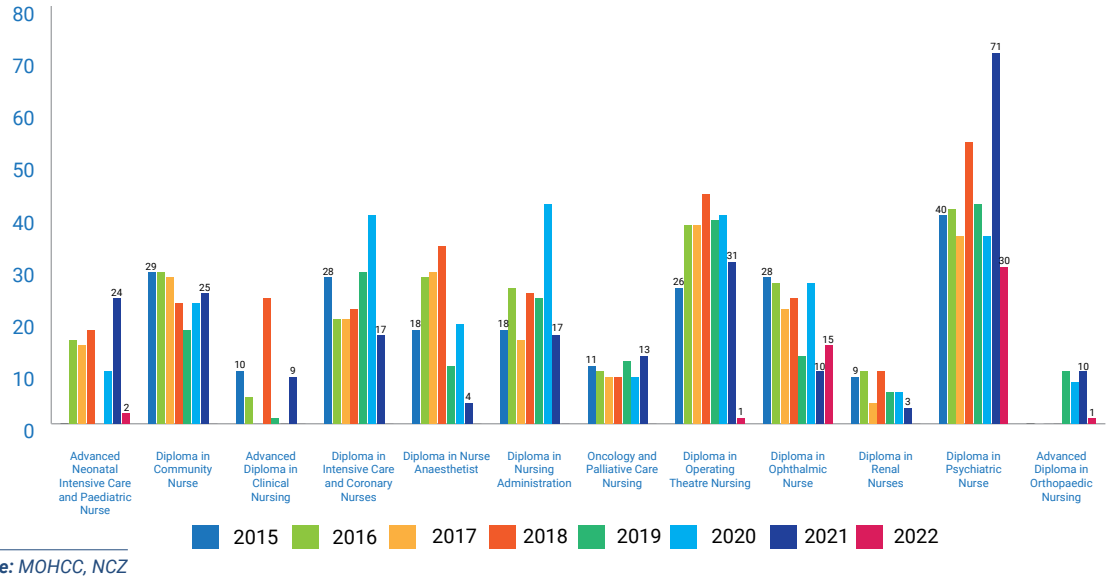
FIGURE 23: *Training Output of Midwives 2015–2021*



Source: *MOHCC, NCZ records*

The training of specialist nurses, except for midwives remained relatively constant over the period 2015 to 2021. The highest training output was recorded in Operating Theatre Nursing, Intensive and Coronary Care Nursing, and Community Nursing as shown in Figure 24. The low training outputs in Renal and Nurse Anaesthetist is attributed to the existence of only one training school at Parirenyatwa Group of Hospitals.

FIGURE 24: *Training Output of Specialist Nurses from 2015 to 2021*

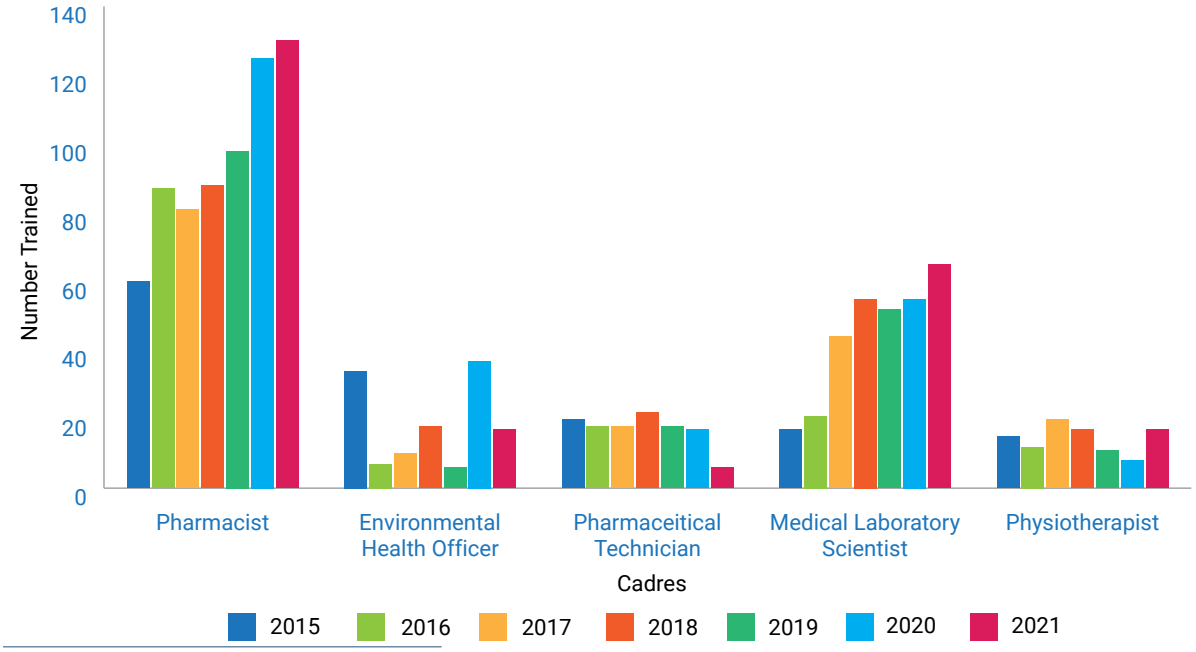


Source: *MOHCC, NCZ*

4.3.3 Training of Pharmacists, Medical Laboratory Scientists, and other Allied Workers

There has been a steady increase in the training output of Pharmacists and Medical Laboratory Scientists over the period 2015 to 2021. This is attributed to other higher education institutions such as HIT and AU offering similar programmes. However, the training output for Environmental Health Officers, Pharmacy Technicians and Physiotherapists has been fluctuating over the same period as shown in Figure 25.

FIGURE 25: *Training Output of other Health Workers Category for the period 2015–2021*

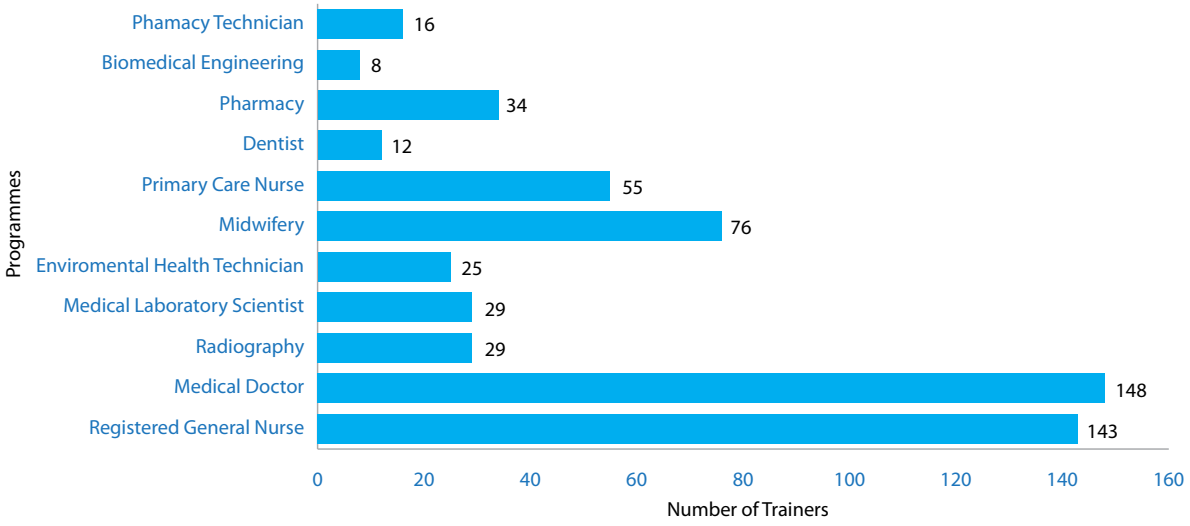


Source: *Data provided for HLMA by UZ, Solusi, HIT, AU*

4.4 Number of faculty (trainers or tutors)

Overall, Medical Doctors training programme had the highest number of trainers of 148, followed by Registered General Nursing with 143 and Midwifery has 76 tutors. Bio-medical Engineering and Dental programmes had the lowest number of trainers at 8and 12 respectively. The Medical Doctors programme had the highest number of trainers because the theory course (5 years) is long and intense with several studying courses that require different experts to teach. The General Nurse training programme had 27 schools with a total of 143 tutors, which translated into 5tutors per school. These 143 nursing tutors are grossly inadequate to cover general nursing, primary care nursing and post basic training programmes.

FIGURE 26: *Number of Trainers (faculty) per Programme*



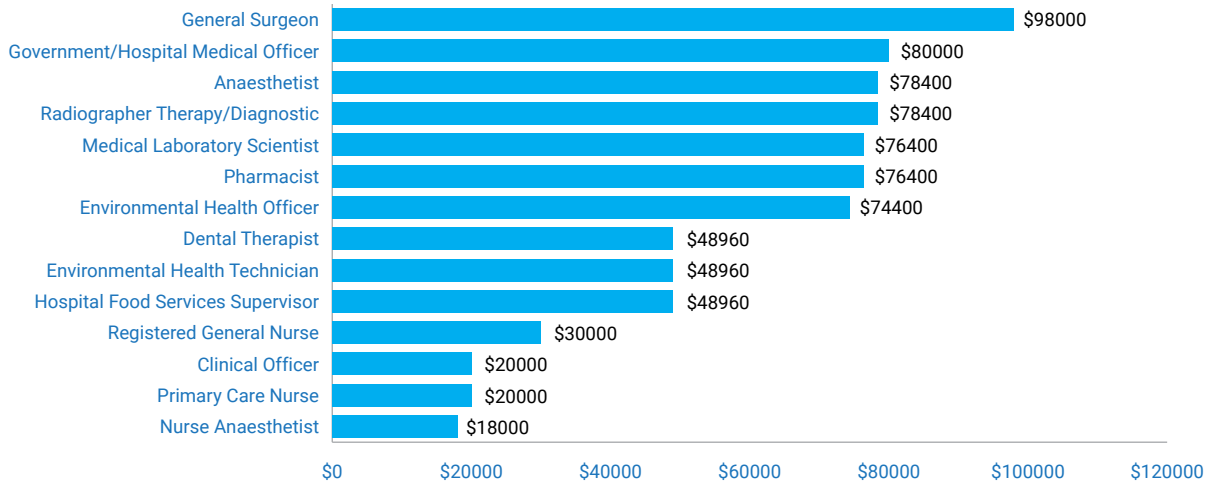
Source: *MoHCC, UZ, NUST, AU, Solusi, HIT, MSU*

The dropout rate was 8% for Clinical Officers and General Medical Officers and 20% for Operating Theatre Nurses and Registered General Nurse.

4.5 Cost of training of Health Workers in Zimbabwe

The cost of training component includes tuition fees, salaries and allowances for students, books, library fees, infrastructure maintenance cost, internet, ICT equipment, food and transport expenses. The cost of training Specialist Doctors was approximately US$80,000.00 per cadre for the duration of the training period. The cost of training for all nursing programmes under the MoHCC was approximately US$30,000.00 and US$18,000.00 for the post basic training for the duration of the training period. The training cost for pre-service and post basic programmes is borne by MoHCC, and for students at universities and colleges the costs are met by Government and students.

FIGURE 27: *Cost of Training (USD)*



Source: *Estimations by the MTT based on data provided by MoHCC*

BOX 2: ZIMBABWE IS PRODUCING AT 75% OF ITS TRAINING CAPACITY

- Zimbabwe is producing an average of 3,334 Health Workers per year, but the theoretical (maximum) capacity is around 4,476 Health Workers per year.
- The average production is at 75% of the theoretical capacity. The average production of nurses is about 700–800 per year and at least 200–250 doctors per year, 90–110 pharmacists and 27–31 per year for laboratory scientists.
- The health professions programmes are largely attractive as there are an average of 89 applicants competing for every available seat for admission.
- With 397,185 applicants for admission in the previous academic year, just over 1% (n=4,134) of the prospective health professions students were offered places. An estimated 19.4% of students drop out of the training. Of those that finish around 90% obtain their professional qualifications and licenses to practice. These, however, vary by occupation.

4.6 Current stock and supply trends of Health Workers

BOX 3: HOW WAS STOCK AND SUPPLY DEFINED IN THIS STUDY?

- Stock relates to the total number of Health Workers who are qualified or registered and eligible to potentially work in Zimbabwe. This includes those employed, unemployed but willing to take up employment, and those out of the labour force, i.e., those although qualified as Health Workers are not available or willing to work in their respective health professions.
- In contrast, the supply of Health Workers is those willing to work in their professional fields given the current levels of wages/income. These include those employed (in public and private health sectors) and those unemployed but currently looking for jobs.

4.6.1 Current Stock and Supply

The overall stock of Health Workers for Zimbabwe was estimated to be about 74,579 across 72 major Health Worker categories in 2022. Management, Administration and Support Staff who constitute 33% of the health workforce were not part of this analysis. Of the total stock, 70.2% (n=52,371) were actively participating in the Zimbabwean health labour market in both private and public sector. Out of this, 44,738 (85.4%) (including Community Health Workers) were employed in the public sector, whilst 7,441 (14.6%) were in the private sector. Amongst those employed in the public sector, 19,776 (44.1%) were Community Health Workers. Table 10 provides details of the estimated stock and supply of Health Workers in 2022.

Of the total stock, excluding Community Health Workers 32,645 (59.8%) were actively participating in the Zimbabwean health labour market. Out of this, 25,016 (76.6%) were employed in the public sector, whilst 7,441 (22.8%) were in the private sector. Only 188 (0.5%) of the 32,645 were not in full-time employment but were engaged in either part-time or contract employment.

Health Worker unemployment in 2022 was relatively low at approximately 2% compared to the national rate of unemployment of 19%.

TABLE 10: *Estimated Stock and Effective Supply of Health Workers*

Occupation Title used in the Country	Equivalent ISCO-08 Classification	Stock of qualified health workers, (P)	Number Employed in Public Sector (EnPb)	Employed in Private Sectors (EnPr)	Number Unemployed (U)	Health Labour Market Participation Rate [(EnPb+EnPr+U)/P]	Estimated Unemployment Rate [U/P]	Effective Supply (S)
Clinical Psychologist	2634 - Psychologists	39	10	29		100%	0%	39
Anaesthetist	2212 - Specialist medical practitioners	73	33	8		56%	0%	41
Audiologist	2266 - Audiologists and speech therapists	22	0	9	13	367%	59%	22
Cardiothoracic Surgeon	2212 - Specialist medical practitioners	5	3	2		100%	0%	5
Clinical Officer	2221 - Nursing professionals	69	47			68%	0%	47
Community Nurse	2221 - Nursing professionals	490	61			12%	0%	61
Dental Surgery Assistant	3251 - Dental assistants and therapists	95	85	10		100%	0%	95
Dental Technician	3251 - Dental assistants and therapists	24	12	12		100%	0%	24
Dental Therapist	3251 - Dental assistants and therapists	194	81	46		65%	0%	127
Dermatologist	2212 - Specialist medical practitioners	4	2	2		100%	0%	4
Dietitian	2265 - Dieticians and nutritionists	14	4	10		100%	0%	14
Dispensary Assistant	3213 - Pharmaceutical technicians and assistants	126	126			100%	0%	126
ENT Surgeon	2212 - Specialist medical practitioners	14	12	2		100%	0%	14
Environmental Health Officer	2263 - Environmental and occupational health and hygiene professionals	690	167	28	13	30%	2%	208
Environmental Health Technician	2263 - Environmental and occupational health and hygiene professionals	1,994	1,568	80	40	85%	2%	1,688
General Surgeon	2212 - Specialist medical practitioners	55	37	5		76%	0%	42
Government Dental Officer	2261 - Dentists	201	94	8		51%	0%	102
Government/Hospital Medical Officer (All General Practitioners)	2211 - Generalist medical practitioners	2,027	949	81		51%	0%	1,030
Haematologist	2212 - Specialist medical practitioners	6	4			67%	0%	4
Health Promotion Officer	2269 - Health professionals not elsewhere classified	88	61	8		78%	0%	69

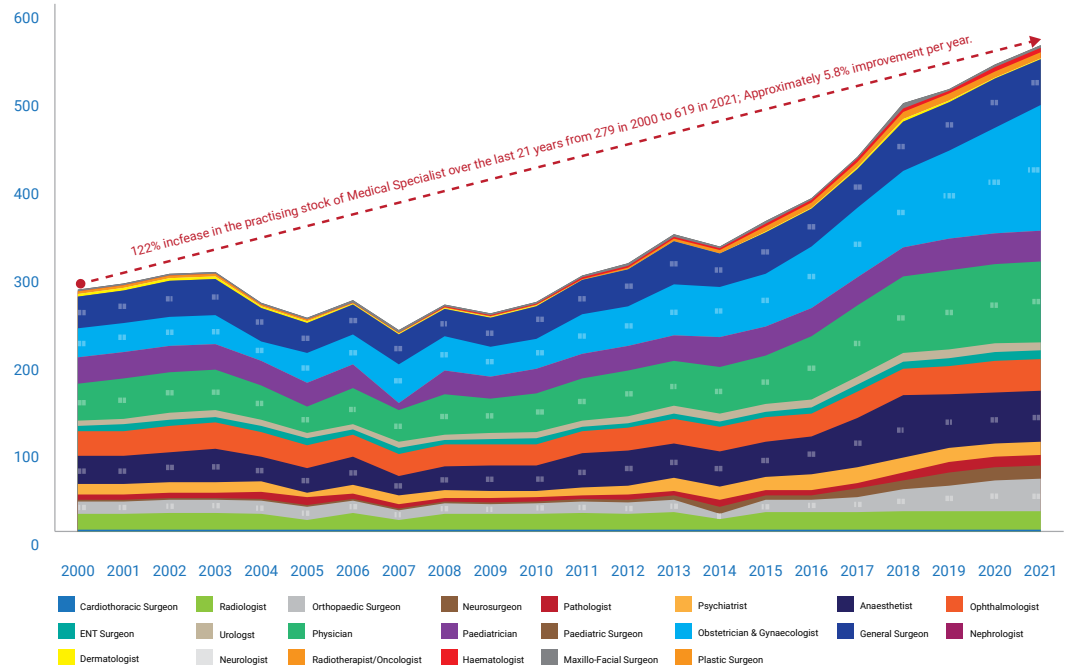
Occupation Title used in the Country	Equivalent ISCO-08 Classification	Stock of qualified health workers, (P)	Number Employed in Public Sector (EnPb)	Employed in Private Sectors (EnPr)	Number Unemployed (U)	Health Labour Market Participation Rate [(EnPb+EnPr +U)/P]	Estimated Unemployment Rate [U/P]	Effective Supply (S)
Health Information Officer	3252 - Medical records and health information technicians	265	265			100%	0%	
Hospital Equipment Technician	2149 - Engineering professionals not elsewhere classified	63	48	15		100%	0%	63
Hospital Food Services Supervisor	2265 - Dieticians and nutritionists	189	188			99%	0%	188
Intensive Care Nurse	2221 - Nursing professionals	311	45	12		18%	0%	57
Maxillo-Facial Surgeon	2212 - Specialist medical practitioners	6	0	6		100%	0%	6
Medical Laboratory Assistant	3212 - Medical and pathology laboratory technicians	7	7			100%	0%	7
Medical Laboratory Scientist,	3212 - Medical and pathology laboratory technicians	757	247	116		48%	0%	363
Medical Laboratory Technician/								
State Certified Medical Laboratory Technician	3212 - Medical and pathology laboratory technicians	795	249	54	35	43%	4%	338
Medical Physicist		14	6			43%	0%	6
Medical Social Worker		84	15		67	98%	80%	82
Mental Health Nurse	2221 - Nursing professionals	667	247	27		41%	0%	274
Midwife	2222 - Midwifery professionals	7,348	2,796	294		42%	0%	3,090
Nephrologist	2212 - Specialist medical practitioners	6	5			83%	0%	5
Neurologist	2212 - Specialist medical practitioners	4	2			50%	0%	2
Neurosurgeon	2212 - Specialist medical practitioners	19	4	1		26%	0%	5
Nurse Aide	5321 - Health care assistants	6,247	4,434	1,658		98%	0%	6,092
Nurse Anaesthetist	2221 - Nursing professionals	189	74	73		78%	0%	147
Nutritionist	2265 - Dieticians and nutritionists	77	68			88%	0%	68
Obstetrician & Gynaecologist	2212 - Specialist medical practitioners	143	42			29%	0%	42

Occupation Title used in the Country	Equivalent ISCO-08 Classification	Stock of qualified health workers, (P)	Number Employed in Public Sector (EnPb)	Employed in Private Sectors (EnPr)	Number Unem-ployed (U)	Health Labour Market Partic-ipation Rate [(EnPb+EnPr +U)/P]	Estimated Unemploy-ment Rate [U/P]	Effective Supply (S)
Occupational Therapist	2269 - Health professionals not elsewhere classified	226	63	5	6	33%	3%	74
Operating Theatre Nurse	2221 - Nursing professionals	485	85	19		21%	0%	104
Ophthalmic Nurse	2221 - Nursing professionals	243	55	58		47%	0%	113
Ophthalmologist	2212 - Specialist medical practitioners	45	7	4		24%	0%	11
Orthopaedic Assistant	3255 - Physiotherapy technicians and assistants	23	20	2		96%	0%	22
Orthopaedic Boot Maker	3255 - Physiotherapy technicians and assistants	1	1			100%	0%	1
Orthopaedic Nurse	2221 - Nursing professionals	28	24	1		89%	0%	25
Orthopaedic Surgeon	2212 - Specialist medical practitioners	41	5	4		22%	0%	9
Orthopaedic Technician	3214 - Medical and dental prosthetic technicians	15	1			7%	0%	1
Orthopaedic Technologist	3214 - Medical and dental prosthetic technicians	6	6	0		100%	0%	6
Paediatric Nurse	2221 - Nursing professionals	153	76	6		54%	0%	82
Paediatric Surgeon	2212 - Specialist medical practitioners	8	7	1		100%	0%	8
Paediatrician	2212 - Specialist medical practitioners	55	30	5		64%	0%	35
Pathologist	2212 - Specialist medical practitioners	15	11	1		80%	0%	12
Pharmacist	2262 - Pharmacists	1,902	83	708		42%	0%	791
Pharmacy Technician	3213 - Pharmaceutical technicians and assis-tants	588	203	385		100%	0%	588
Physician	2212 - Specialist medical practitioners	92	35	8		47%	0%	43
Physiotherapist	2264 - Physiotherapists	400	63	7	18	22%	5%	88
Plastic Surgeon	2212 - Specialist medical practitioners	4	2			50%	0%	2
Primary Care Nurse	"3221 -	4,379	2,589	175		63%	0%	2,764
Psychiatrist	2212 - Specialist medical practitioners	23	5	3		35%	0%	8
Radiographer Diagnostics	3211 - Medical imaging and therapeutic equip-ment technicians	320	161	56		68%	0%	217
Radiographer Therapy	3211 - Medical imaging and therapeutic equip-ment technicians	56	27	12		70%	0%	39

Occupation Title used in the Country	Equivalent ISCO-08 Classification	Stock of qualified health workers, (P)	Number Employed in Public Sector (EnPb)	Employed in Private Sectors (EnPr)	Number Unem-ployed (U)	Health Labour Market Partic-ipation Rate [(EnPb+EnPr +U)/P]	Estimated Unemploy-ment Rate [U/P]	Effective Supply (S)
Radiologist	2212 - Specialist medical practitioners	27	2	2		15%	0%	4
Radiotherapist/Oncologist	2212 - Specialist medical practitioners	15	7	2		60%	0%	9
Registered General Nurse / State Certified Nurse	2221 - Nursing professionals	21,653	9,035	3,345		57%	0%	12,380
Rehabilitation Technician	3255 - Physiotherapy technicians and assistants	557	286	13		54%	0%	299
Renal Nurse	2221 - Nursing professionals	48	27	21		100%	0%	48
Speech Therapist	2266 - Audiologists and speech therapists	12	0			0%	0%	0
Urologist	2212 - Specialist medical practitioners	16	2	2		25%	0%	4
Community Health Worker	3253 – Community Health Workers	19,722	19,722			100%	0%	19,722
Overall		**74579**	**44738**	**7441**	**192**		**2%**	**52,106**

There has been an overall increasing trajectory of medical specialists over the last 21 years. Across the specialist cadres, an overall increase of 122% was recorded over two decades with an average annualised increment of 5.8%. The medical specialist with the highest average annual increment was Neurosurgeons by 28.6%, followed by Obstetrician & Gynaecologist at 25.3%, Orthopaedic Surgeons by 17.3%, Urologists by 15.9% and Psychiatrists by 15.7%. See Figure 28 for detailed trends of the stock of practicing medical specialists between 2000 and 2021. However, the rate of increase was still inadequate to meet the need for health services.

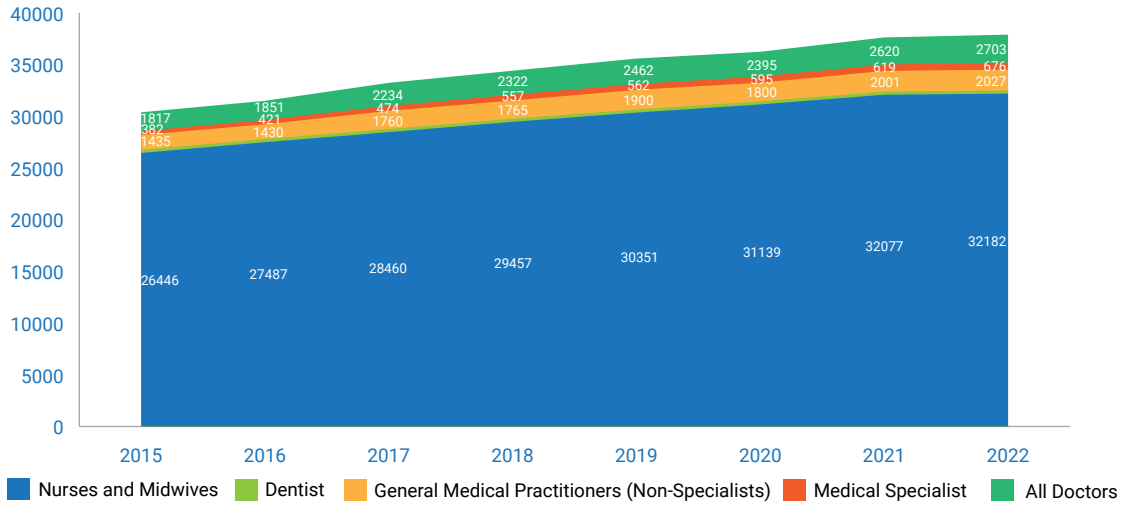
FIGURE 28: *Trends in the Practising Stock of Medical Specialist, 2000–2021*



Source: *Medical and Dental Council of Zimbabwe dataset provided for the HLMA*

Zimbabwe has shown increasing stock of Doctors, Dentists, Nurses and midwives over the last 8 years. It is however notable that the year-to-year increase has been marginal. The four cadres contributed a total of 35,561 health care workers with nurses and midwives contributing 90.5% while Doctors and Dentists contributing 9.5%.

FIGURE 29: *Trends in the Active Stock of Doctors, Dentist, Nurses and Midwives 2015–2021*



Source: *MoHCC*

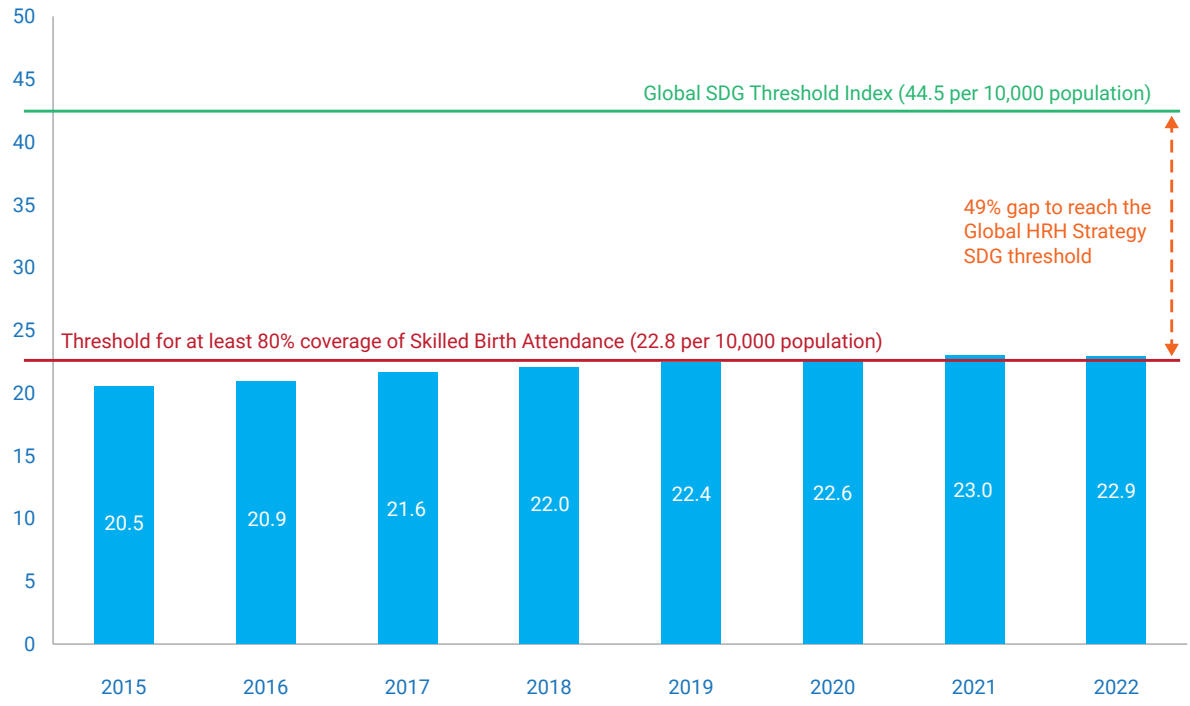
4.6.2 Trends in the density of health workforce in Zimbabwe, 2015–2022

The overall density of all doctors, nurses, and midwives was 22.86 per 10,000 population in 2022. This translates into 51.37% of the threshold of 44.50 per 10,000 population established in the Global Strategy for health workforce, 2030. If all the health workers included in the analysis are taken into account, it constituted a density of 48.68 per 10,000, which is 36.30% of the threshold of 134.2 estimated by WHO AFRO as necessary to attain at least 70% of UHC Service Index Coverage when all cadres are accounted for.

As shown in Figure 30, the density of doctors, nurses and midwives has increased marginally from 20.5 to 22.9 per 10,000 population over the last 8years representing 11.7% increase. In comparison with international HRH thresholds, by 2021, Zimbabwe also met the lower limit of the threshold that corresponds to 80% coverage of skilled birth attendance – a key target during the MDG era. In the context of the SDGs, Zimbabwe in 2022 had 51% of the 44.5 doctors, nurses and midwives per 10 000 population SDG threshold indicator, falling short of the 2030 target by 49%. However, at the prevailing rate of increase, this benchmark will not be achieved by 2030.

Global Strategy on Human Resources for Health: Workforce 2030 called on countries to match the supply of health workers to population needs, now and in the future by adopting needs-based approaches for planning health workforce investments. Hence, a country-specific need analysis was considered necessary to account for the disease burden and population demographic evolutions.

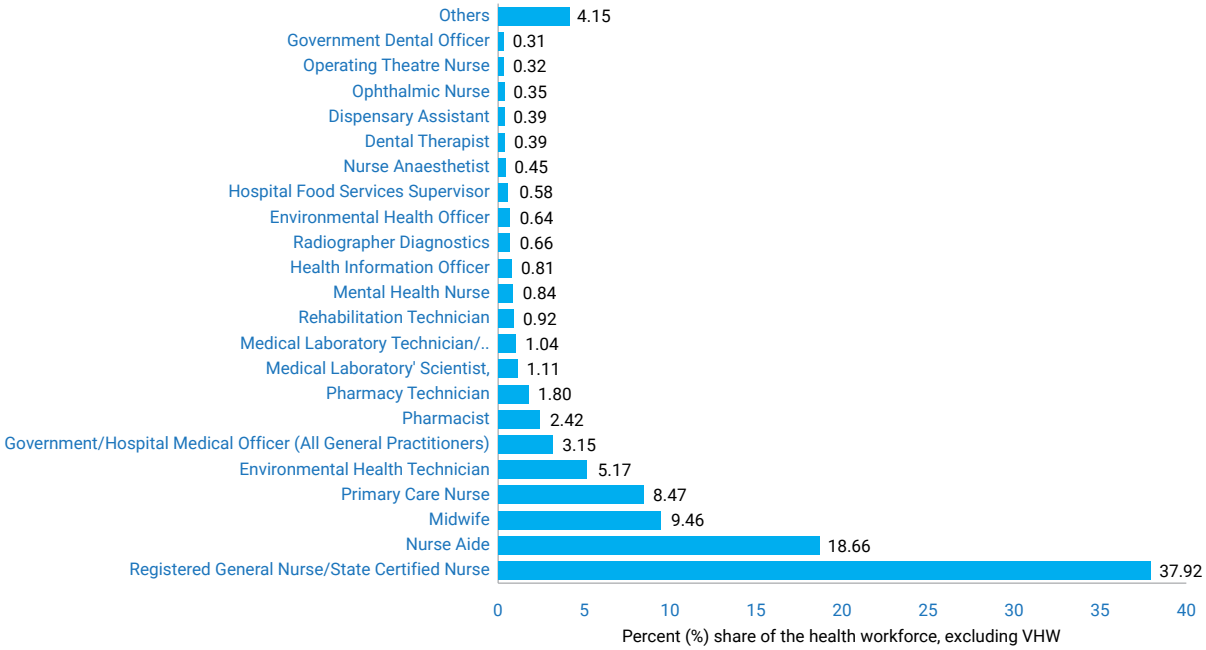
FIGURE 30: *Trends in the Density of Doctors, Nurses and Midwives per 10,000 Population, 2015–2022*



4.6.3 Distribution of health workforce by category

Figure 31 shows the distribution of the health workforce by category, which shows that when Community Health Workers are excluded, the Nursing and Midwifery workforce (inclusive of professional and associate professionals) constitutes the majority (74%) of the health workforce, followed by Environmental Health Tehnicians at 5.17% and Medical Doctors at 3.15%.

FIGURE 31: *Composition of the health professionals, 2022*



Source: *HSB and MoHCC*

4.6.4 Health workforce distribution by sector of employment

The overall distribution of health workforce was 85.4% in the public sector and 14.6% in the private sector. The public sector had more Registered General Nurses at 73% against 27% in the private sector. A total of 90% of Midwives were found in the public sector, against 10% who were found in the private sector.

The majority of Pharmacy Technicians (65%) were in the private sector compared to 35% in the public sector. Medical Laboratory Technicians working in the public sector constituted 82%, whereas 18% were in the private sector.

There were other categories of employees who were only found in the private sector, such as Audiologists. Other employment categories were only found in the Public Sector, such as Orthopaedic Technician, Medical Social Worker, Medical Laboratory Assistant and Health Information Officer.

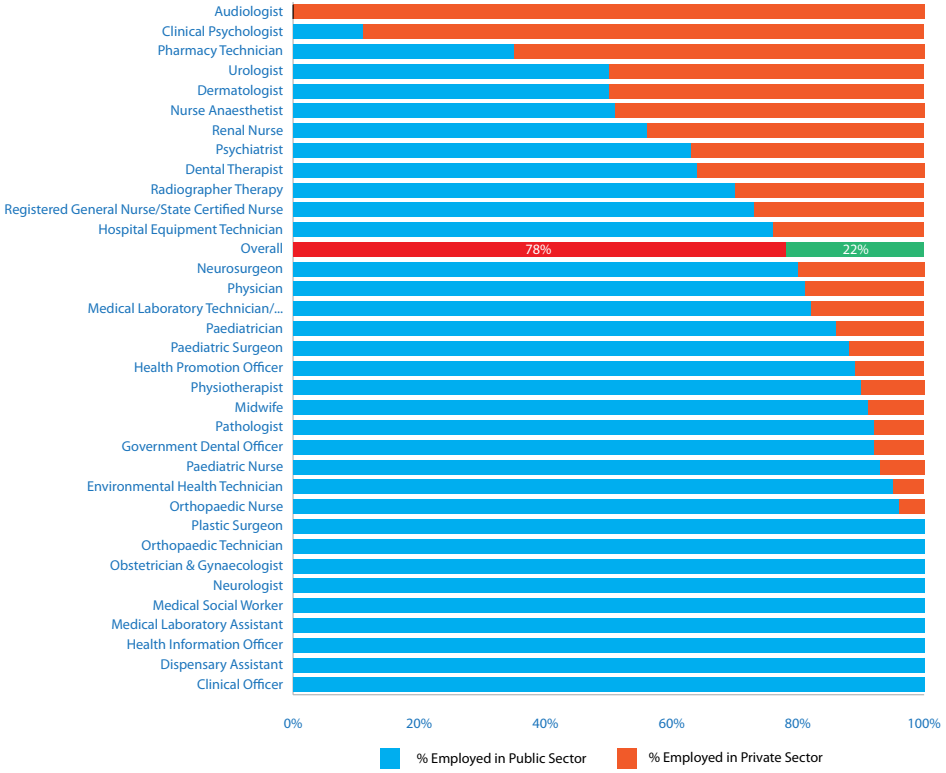
It should be noted that data on certain work categories could not be obtained during the data collection stage, for example, the number Dispensary Assistants, Obstetrician and Gynaecologists and Medical Laboratory Assistants employed in the private sector. Furthermore, some private sector data which was not readily available was found through extrapolation as shown in Figure 32 (see the next page).

4.7 Characteristics of the current stock of the health workforce

4.7.1 Age distribution of health workers

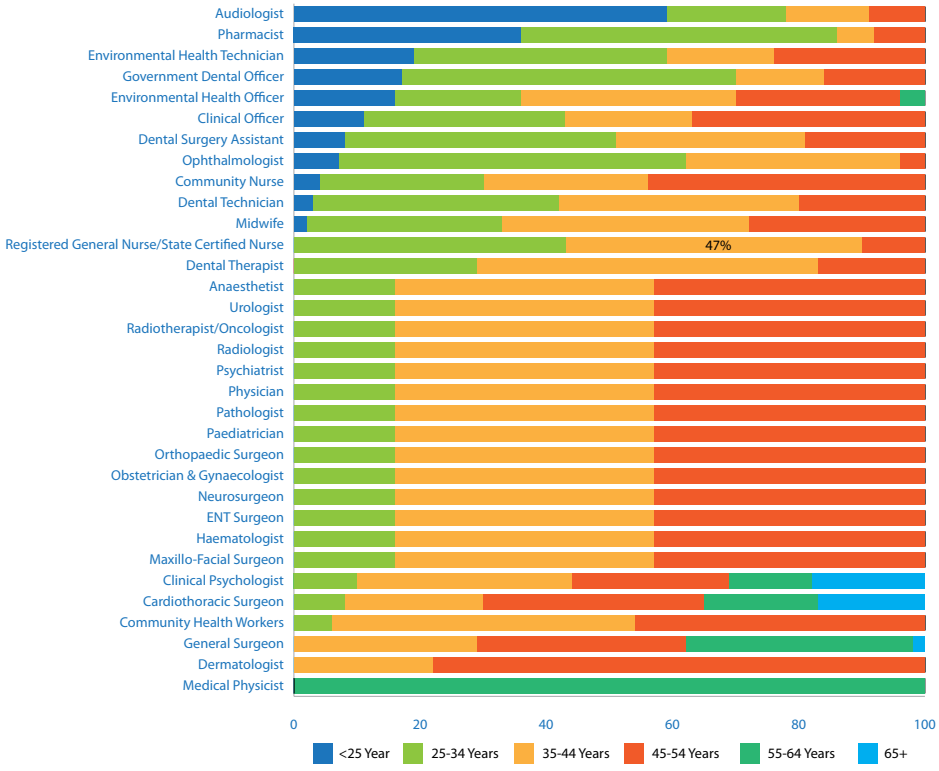
The average age of the health workers was below 40 years. About 42% of RGNs were between the ages of 25 and 34, whereas 47% were between the ages 35 and 44, whilst 11% were above 44 years. Amongst Pharmacists, 35% were below the age of 25, whereas 50% were between the ages of 25 and 34, and those above 35 years constituted 15%.

FIGURE 32: *Health workforce distribution by sector of employment*



It is worth noting that out of the four (4) Cardiothoracic Surgeons in the country, one (1) had already attained the age of 65 while another one was nearing the retirement age. See Figure 33 for details of the age distribution of the various cadres.

FIGURE 33: *Age distribution of health workers*

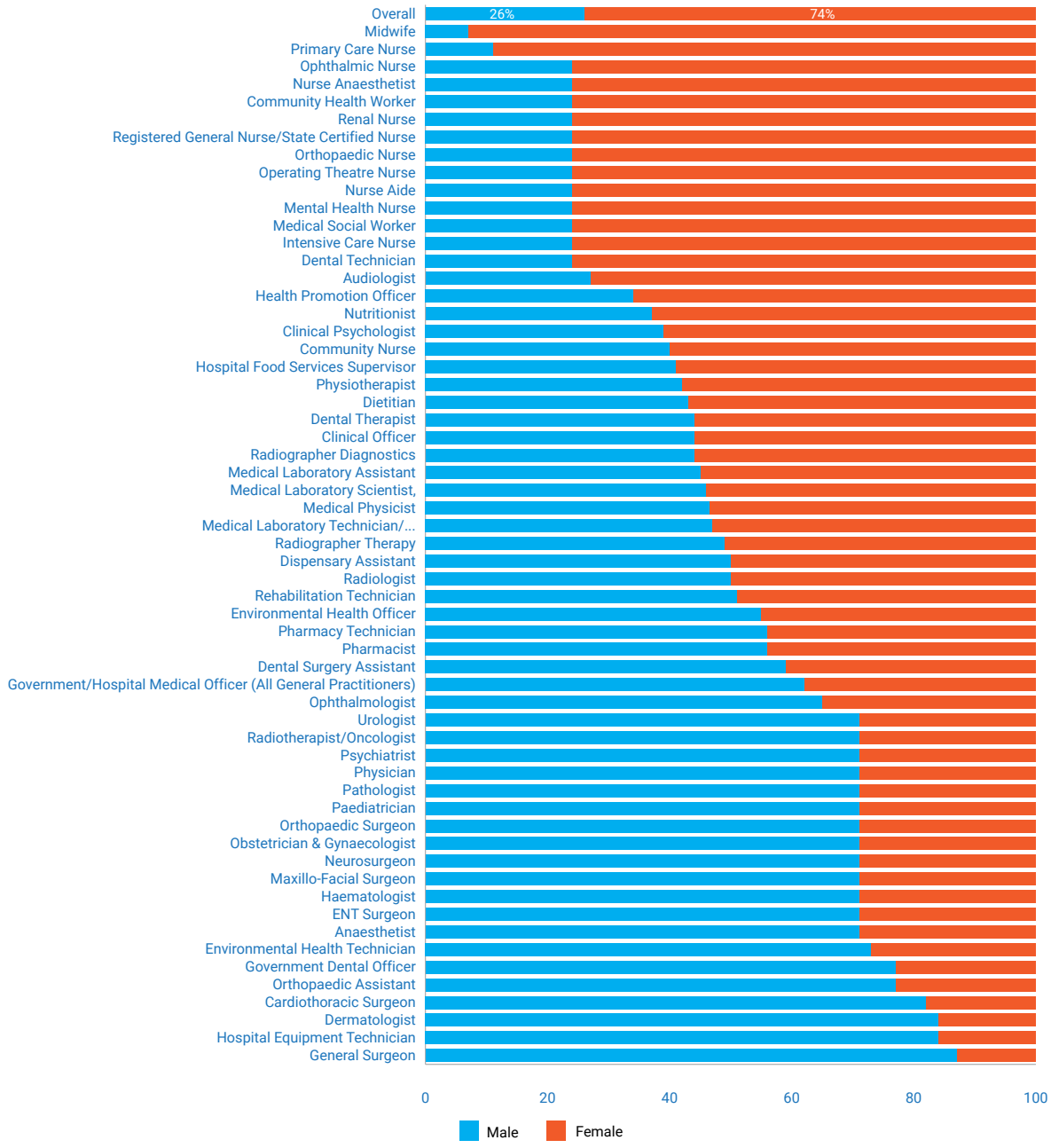


Source: *SSB Health grades database 2022*

4.7.2 Gender distribution of health workers

As shown in Figure 34, about 74% of the Zimbabwean health workers were female, which compares favourably with the global average of 70%. The Nursing profession and Community Health Workers had the highest proportion (~76%) being female. For doctors, about 38% were female compared with the Africa region average of 28% and the global average of 37%. However, the medical specialities were predominantly male, between 71% and 82%.

FIGURE 34: *Gender composition of the health workforce*



Source: *SSB Health grades database 2022*

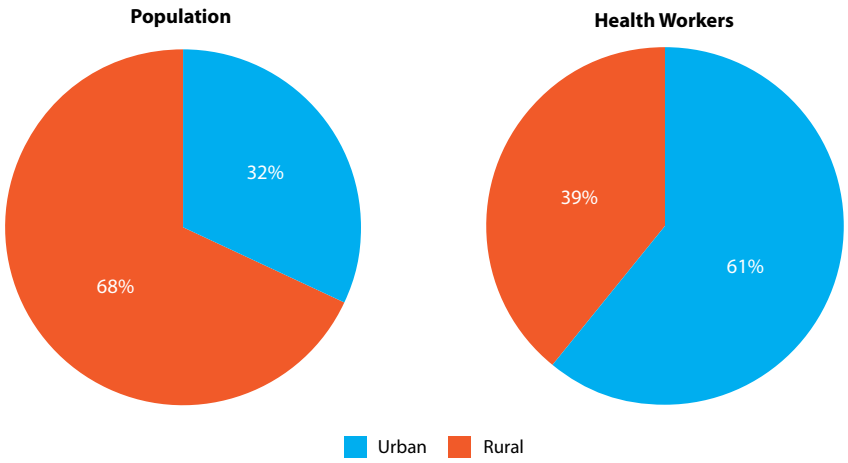
4.7.3 Geographic distribution of Health Workers: equity implications

4.7.3.1 Rural-Urban Distribution of current health workers

About 32% of the population resided in urban areas, wherein 61% of the health workers were stationed. On the other hand, 68% of the rural based population was being served by 39% of the health workers

(see Figure 35). Overall, about 29,511 of Health Workers work in the rural areas of which 19,776 (67%) are community health workers.

FIGURE 35: *Rural-Urban Distribution: Population vs Health Workers*



4.7.3.2 Equity analysis of current distribution of health workers by district: Health worker distribution compared to population distribution

The inequitable distribution of health workers in Zimbabwe is attributed to varied socio-economic circumstances and ecological dynamics across the country. This Section presents an analysis of the geographical distribution of the health workforce by districts, highlighting the equity implications. Geographical location plays an important role in determining equity ratios for different categories. Analysis of the geographical distribution of the health workers is presented in Maps that follow. The HRH Geographical Index, which is an approach used in a number of African countries to explore the equity implications of regional distribution of the existing health workforce. The approach uses the district's percentage share of national population as a denominator and their respective percentage share of the public service health workforce as a numerator. The HRH Geographical Equity Index (GEI) was calculated for each district/province. A perfectly distributed workforce will ideally yield an HRH GEI yield of 1, thus a GEI above 1in a particular district reflected health workers distribution skewed in its favour and the opposite is true. A district with the highest GEI compared to the district with the lowest GEI showed the magnitude of inequality between the best staffed and the worst staffed district.

The highest GEI for Government/Hospital Medical Officers was in cities and towns, with Bulawayo having the highest ratio of 3.12. Bulawayo's high GEI was attributable to its comparatively low population. In contrast, Harare, with a higher population, had a GMO/HMO GEI of 2.66. Gokwe North, asocially and geographically distanced area, had the lowest GEI of 0.11.

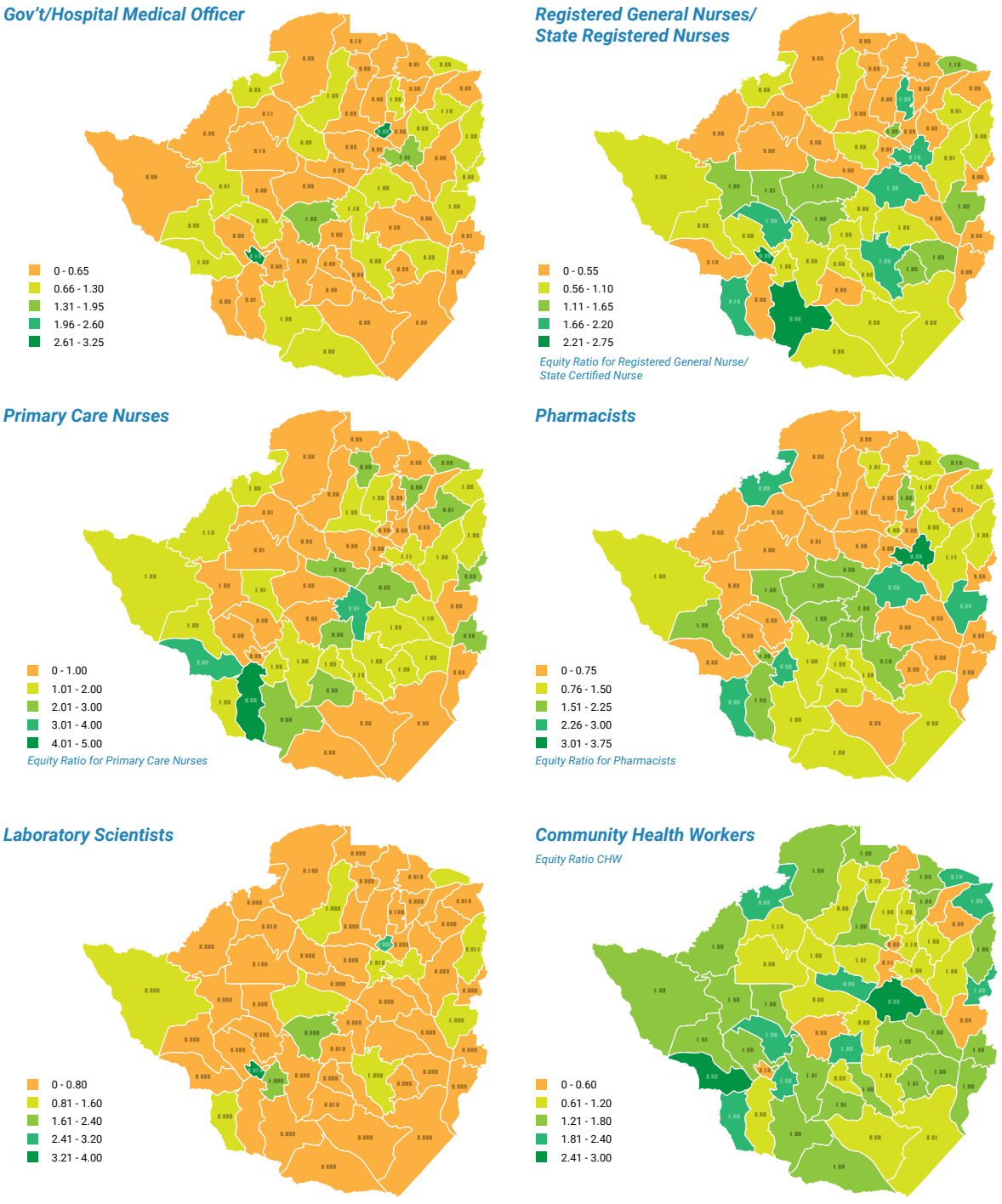
The highest GEI for Community/Community Health Workers was in rural areas, with Bulilima District having the highest GEI of 2.99, followed by Chikomba District (2.92) and Kariba District (2.39). In contrast, Harare had the lowest GEI of 0.09, slightly higher than Chitungwiza which had 0.10, and Bulawayo, which 0.17.

Mangwe had the highest Community Nurse GEI of 3.63, whilst Harare, Bulawayo and Chitungwiza had no community nurses (as per operational policy). The highest Pharmacist GEI was in Marondera which 3.56 followed by Chikomba with 2.83 and Mangwe with 2.67. The lowest GEIs were in Mwenezi, Lupane, Umguza, Bulilima, Binga, Zaka, Chipinge, Chimanimani, Buhera, Gutu, Mutasa, Mbire which all had 0.00. Most of the districts with the lowest GEI for Pharmacists were in Matabeleland, Manicaland and Masvingo provinces.

The highest GEI for Registered General Nurses was in Bulawayo District which had a GEI of 2.60. Bulawayo's high GEI was attributable to its comparatively low population. Bulawayo was followed by Gwanda (2.29), Marondera (2.18) and Mangwe (2.16). The lowest GEI were in Bulilima (0.14), as well as Mudzi (0.20).

For the PCN the highest ratio was in Matobo (4.94) followed by Chirumanzu (3.91). Bulawayo, Harare and Chitungwiza had low GEI of PCNs because this cadre is mainly concentrated in rural areas. The few PCNs available in towns were working for local authorities and the private sector as shown in Figure 36.

FIGURE 36: *Equity heatmaps for distribution of selected public sector health workers in Zimbabwe, 2022*



Source: *Analysed using data from HSB and MoHCC*

4.8 Health Worker Attrition and Out-migration

Current levels of attrition

As of December 2021, the overall attrition rate in the public health sector stood at 8%. However, the attrition rate for clinical staff categories stood at 11%. Major areas of clinical staff attrition included Radiographers (68%), Paediatric Nurses (40%), Orthopaedic Nurses and Clinical Psychologists (33% each). Table 11 presents 2021 attrition levels for selected staff categories.

TABLE 11: *Staff Attrition selected staff categories 2021*

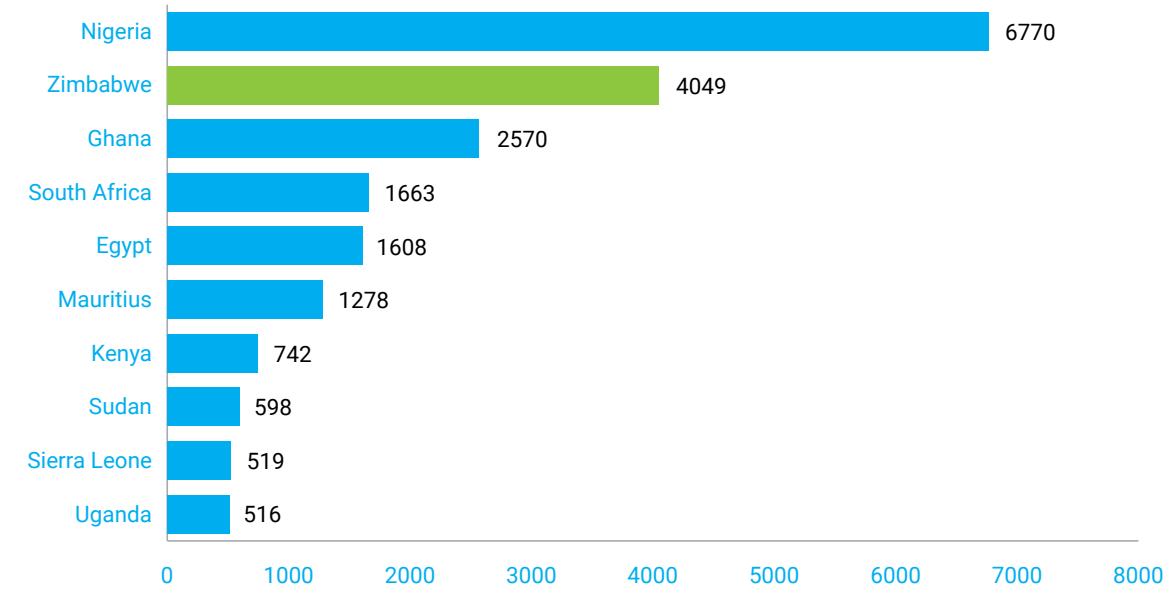
Staff Category	In post Jan 2021	In post December 2021	Appoint-ments	Termina-tions	Vacancy	Attrition rate
Nurse Anaesthetist	121	111	10	20	86	17%
Intensive Care Nurse	68	60	9	17	226	27%
Midwife	3040	2979	187	248	505	8%
Opthalmalmic Nurse	144	142	12	14	74	10%
Oncology Nurse	57	56	2	3	136	5%
Renal Nurse	46	42	4	8	89	18%
Paediatric Nurse	122	108	32	46	456	40%
Theatre Nurse	243	243	7	7	174	3%
Orthopaedic Nurse	52	50	12	14	102	27%
Mental Health Nurse	374	343	14	45	187	13%
Principal Tutor School of Nursing	11	10	1	2	1	19%
Nurse Tutor/Senior/Principal	175	173	2	4	83	2%
Government Medical Officer	319	312	28	35	90	11%
Radiographer Senior/Principal/Diagnos-tic/ Ultra sound	35	24	9	20	50	68%
Radiographer Tutor/Principal	1	1	0	0	2	0%
Medical Laboratory Scientist/Technolo-gist (Snr/Principal)	118	90	12	40	72	38%
Specialist Doctor	60	57	9	12	18	21%
Therapist	72	64	7	15	17	22%
Therapist tutor	9	9	2	2	2	22%
Clinical Psychologist	3	3	1	1	7	33%
Dietician	4	4	1	1	4	25%
Grand Total	**5074**	**4881**	**361**	**554**	**2381**	**11%**

Source: *HSB and MoHCC*

Migration of Health Workers

The available evidence shows that out-migration of Health Workers accelerated in 2021, with the popular destinations being Ireland, the United States of America, Australia and the United Kingdom. For example, the English NHS in 2019 had 4,049 Zimbabwean doctors, nurses and clinical support staff, the second highest from Africa, only after Nigeria as shown in Figure 37. This figure is relatively higher considering that the country had 21,372 doctors and nurses serving the public health sector in 2020. One in every five doctors and nurses trained in Zimbabwe (approximately 20%) was working in the English NHS. This has been the trend for many years.

FIGURE 37: *Number of health workers in the English NHS from Africa, 2019*



Source: *UK Parliamentary Briefing Number 7783; https://researchbriefings.parliament.uk/ResearchBriefing/Summary/CBP-7783*

TABLE 12: *Ranking of source countries for all health workers in UK NHS*

Rank	Country	All Health Workers in NHS	Position on the Global Contribution - All health workers
1	Nigeria	6770	6
2	Zimbabwe	4049	10
3	Ghana	2570	12
4	South Africa	1663	19
5	Egypt	1608	21
6	Mauritius	1278	26
7	Kenya	742	31
8	Sudan	598	37
9	Sierra Leone	519	39
10	Uganda	516	40

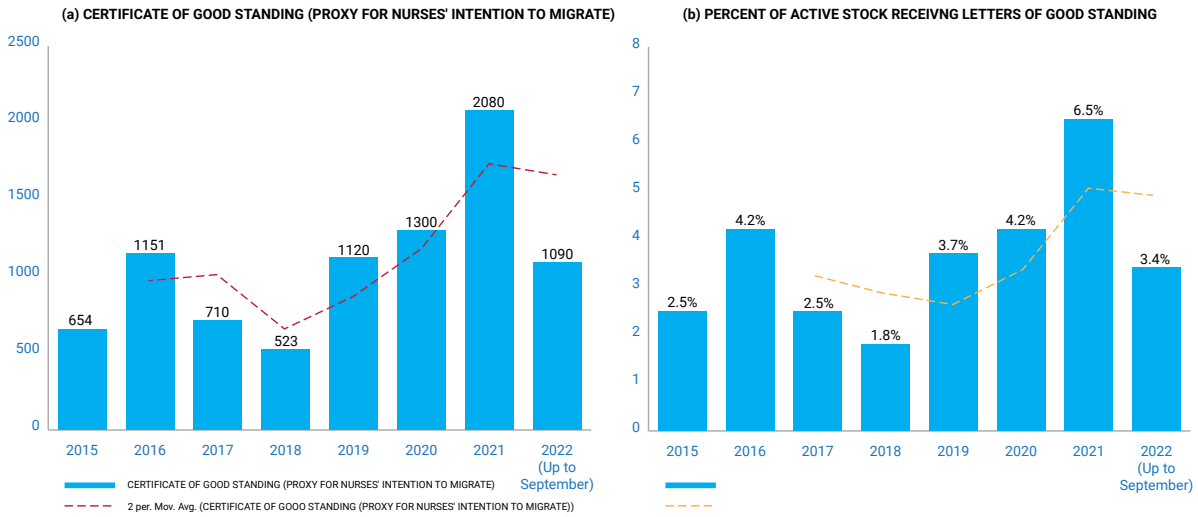
Source: *Asamani and Nabyonga-Orem (2019): https://www.internationalhealthpolicies.org/blogs/will-the-2019-uk-election-impact-on-the-health-workforce-in-africa-feels-like-a-rhetorical-question/*

Data from HSB showed that for 2021 atotal of 2,235 Health Workers, primarily nurses (1,647) and doctors (188), terminated their services and potentially emigrated. The observed attrition rate by mid-year of 2021 surpassed each of the full years from 2017 to 2020.

Request for attestation of good standing from regulatory bodies as a proxy of intention to migrate:

Intention to migrate has persisted over time with 1,079 (~3.6%) of nurses each year actively requesting for letters of good standing. The trend has mirrored periods of economic challenges and recently accentuated to pandemic triggers. This had, however, declined from 6.5% in 2021 to 3.4% as at September 2022 as shown in Figure 38. This could be attributed to the administrative measures that have been implemented by the Government.

FIGURE 38: *Trends in issuances of letters of good standing to nurses as a proxy for intention to migrate(2015–2022)*



Source: *MOHCC, Health Labour Market Analysis for Specialists Health Professionals in Zimbabwe (Harare: Ministry of Health and Child Care, Zimbabwe, 2021).*

4.9 Income and Income Relativities

4.9.1 Current level of income of Health Workers

The salary packages quoted in the HLMA study were calculated using the September 2022 exchange rate of (1USD:560 RTGS). The packages comprised gross salaries and weighted earnings. To appreciate the internal and external relativity of the income of Health Workers, the income of aGeneral Practitioner and Government Senior Lawyer was used as reference cadres for comparison.

The results revealed avery wide pay relativity gap among the 70 categories of Health Workers studied (as shown in Table 13). For example, one among the least paid Health Worker (excluding Community Health Worker), Nurse Aide earns 53% of the level of income of amedical doctors, while others (for example, medical specialists) earn about 75% more than General Practitioners in the public sector. The salaries of health professionals were compared with that of alawyer as aproxy which show that medical officers and medical specialists in the public health sector earn 24% and 116% respectively above what asenior lawyer in the civil service earns. It therefore can be noted that the income levels of the Medical Specialist and General practitioners are still attractive locally to influence cadres to pursue medical studies. However, they are very low to slow down external migration.

A Registered General Nurse was earning 73% of what a government Medical Officer was earning. It was further noted that the income of dentists and general medical practitioners in the public sector was almost similar and estimated at US$12,660 per year. The results showed that 58% of the professionals were receiving amedian annual basic salary of US$960 and total annual allowances amounting to US$6,996. The allowances constituted 86% of the member's total earnings which showed aprioritisation of allowance payments over the basic salary. The majority of the Health Sector allowances were non-taxable and also not pensionable. More so it was noted that 13% of the professionals were receiving aremuneration package which was above the median of US$960. These included the reference cadre (Hospital Medical Officer), Government Medical Officer, Government Dental Officer and Medical Specialists.

It was essential to compare the earnings of workers with the gross domestic product per capita of the country which better reflects the extent to which aggregate productivity of the country is translated into individual reward for their productivity. Internationally, the average wage index (workers' wages as amultiple of GDP per capita) has been shown to be 4.4 for doctors, 3.6 for nurses and 2.1 for other Health Workers. This is, however, markedly higher in low-income countries where it is 7.8 for doctors, 6.4 for nurses and 3.7 for other Health Workers. In the context of Zimbabwe, the wage index for the medical doctor is about 9.71 times (971%) that of the GDP per capita. Nurses' wage index is 7.13 times (713%) GDP per capita whereas Laboratory Scientist is 7.24 (724%), 7.19 (719%) for Radiographer and 17.00 (1700%) for Medical Specialist. While this is by no means conclusive, it possibly points to high relative wages of health workers when compared with the global average and for countries within the same income bracket as Zimbabwe. It is also worth noting that the Community Health Worker was not on mainstream establishment and receives monthly allowance from Partners through the Health Development Fund and Global Fund.

TABLE 13: *Health Worker Income and Income Relativities*

Occupation Title used in the Country	Total Public Sector Income	Total Private Sector Income	Overall Annual Income per worker (LCU)	Total Income per worker (USD)-Current Official Income	Health Sector Internal Income Relativity - GMO as Reference	Wage Index (Income as multiple of GDP per capita)	External Income Relativity - Top Lawyer as reference
Clinical Psychologist	9,547		9,547	9,547	0.76	7.36	0.94
Anaesthetist	22,050		22,050	22,050	1.75	17.00	2.16
Audiologist	8,760		8,760	8,760	0.70	6.75	0.86
Cardiothoracic Surgeon	22,050		22,050	22,050	1.75	17.00	2.16
Clinical Officer	8,844		8,844	8,844	0.70	6.82	0.87
Community Nurse	8,844		10,338	10,338	0.82	7.97	1.01
Dental Surgery Assistant	7,080		7,080	7,080	0.56	5.46	0.69
Dental Technician	7,868	4,005	5,937	5,937	0.47	4.58	0.58
Dental Therapist	7,977	6,432	7,205	7,205	0.57	5.55	0.71
Dermatologist	22,050		22,050	22,050	1.75	17.00	2.16
Dietitian	9,180		9,180	9,180	0.73	7.08	0.90
Dispensary Assistant	7,080		7,080	7,080	0.56	5.46	0.69
ENT Surgeon	22,050		22,050	22,050	1.75	17.00	2.16
Environmental Health Officer	7,536		7,536	7,536	0.60	5.81	0.74
Environmental Health Technician	7,284		7,284	7,284	0.58	5.61	0.71
General Surgeon	22,050		22,050	22,050	1.75	17.00	2.16
Government Dental Officer	12,660		12,660	12,660	1.00	9.76	1.24
Government/Hospital Medical Officer (All General Practitioners)	12,604		12,604	12,604	1.00	9.71	1.24
Haematologist	22,050		22,050	22,050	1.75	17.00	2.16
Health Promotion Officer	7,536		7,536	7,536	0.60	5.81	0.74
Health Information Officer	529		6,348	6,348	0.5	4.89	0.62
Hospital Equipment Technician	8,812	9,276	9,044	9,044	0.72	6.97	0.89
Hospital Food Services Supervisor	7,933		7,933	7,933	0.63	6.11	0.78
Intensive Care Nurse	8,844	11,832	10,338	10,338	0.82	7.97	1.01
Maxillo-Facial Surgeon	22,050		22,050	22,050	1.75	17.00	2.16

Occupation Title used in the Country	Total Public Sector Income	Total Private Sector Income	Overall Annual Income per worker (LCU)	Total Income per worker (USD)-Current Official Income	Health Sector Internal Income Relativity - GMO as Reference	Wage Index (Income as multiple of GDP per capita)	External Income Relativity - Top Lawyer as reference
Medical Laboratory Assistant	7,080		7,080	7,080	0.56	5.46	0.69
Medical Laboratory Scientist,	11,053	12,000	11,527	11,527	0.91	8.88	1.13
Medical Laboratory Technician/State Certified Medical Laboratory Technician	8,497	9,432	8,965	8,965	0.71	6.91	0.88
Medical Physicist	9,516		9,516	9,516	0.75	7.33	0.93
Medical Social Worker	7,956		7,956	7,956	0.63	6.13	0.78
Mental Health Nurse	8,844	11,832	10,338	10,338	0.82	7.97	1.01
Midwife	8,844	11,832	10,338	10,338	0.82	7.97	1.01
Nephrologist	22,050		22,050	22,050	1.75	17.00	2.16
Neurologist	22,050		22,050	22,050	1.75	17.00	2.16
Neurosurgeon	22,050		22,050	22,050	1.75	17.00	2.16
Nurse Aide	7,080	6,405	6,743	6,743	0.53	5.20	0.66
Nurse Anaesthetist	8,844	11,832	10,338	10,338	0.82	7.97	1.01
Nutritionist	7,425		7,425	7,425	0.59	5.72	0.73
Obstetrician & Gynaecologist	22,050		22,050	22,050	1.75	17.00	2.16
Occupational Therapist	9,925		9,925	9,925	0.79	7.65	0.97
Operating Theatre Nurse	8,844	11,832	10,338	10,338	0.82	7.97	1.01
Ophthalmic Nurse	8,844	11,832	10,338	10,338	0.82	7.97	1.01
Ophthalmologist	22,050		22,050	22,050	1.75	17.00	2.16
Orthopaedic Assistant	7,080		7,080	7,080	0.56	5.46	0.69
Orthopaedic Boot Maker	7,080		7,080	7,080	0.56	5.46	0.69
Orthopaedic Nurse	8,844	11,832	10,338	10,338	0.82	7.97	1.01
Orthopaedic Surgeon	22,050		22,050	22,050	1.75	17.00	2.16
Orthopaedic Technician	7,824		7,824	7,824	0.62	6.03	0.77
Orthopaedic Technologist	8,052		8,052	8,052	0.64	6.21	0.79
Paediatric Nurse	8,844	11,832	10,338	10,338	0.82	7.97	1.01
Paediatric Surgeon	22,050		22,050	22,050	1.75	17.00	2.16

Occupation Title used in the Country	Total Public Sector Income	Total Private Sector Income	Overall Annual Income per worker (LCU)	Total Income per worker (USD)-Current Official Income	Health Sector Internal Income Relativity - GMO as Reference	Wage Index (Income as multiple of GDP per capita)	External Income Relativity - Top Lawyer as reference
Paediatrician	22,050		22,050	22,050	1.75	17.00	2.16
Pathologist	22,050		22,050	22,050	1.75	17.00	2.16
Pharmacist	8,402	13,380	10,891	10,891	0.86	8.39	1.07
Pharmacy Technician	9,436		9,436	9,436	0.75	7.27	0.93
Physician	15,936		15,936	15,936	1.26	12.28	1.56
Physiotherapist	9,883		9,883	9,883	0.78	7.62	0.97
Plastic Surgeon	22,050		22,050	22,050	1.75	17.00	2.16
Primary Care Nurse	8,074		8,074	8,074	0.64	6.22	0.79
Psychiatrist	15,936		15,936	15,936	1.26	12.28	1.56
Radiographer Diagnostics	9,395		9,395	9,395	0.75	7.24	0.92
Radiographer Therapy	9,331		9,331	9,331	0.74	7.19	0.91
Radiologist	22,050		22,050	22,050	1.75	17.00	2.16
Radiotherapist/Oncologist	22,050		22,050	22,050	1.75	17.00	2.16
Registered General Nurse/State Certified Nurse	8,292	10,211	9,252	9,252	0.73	7.13	0.91
Rehabilitation Technician	7,824		7,824	7,824	0.62	6.03	0.77
Renal Nurse	8,844		8,844	8,844	0.70	6.82	0.87
Speech Therapist	8,760		8,760	8,760	0.70	6.75	0.86
Urologist	22,050		22,050	22,050	1.75	17.00	2.16
Community Health Worker	180		180	180	0.01	0.14	0.02
Overall					**1.00**	**9.75**	**1.24**

Source: *HSB Salary Key Scale (2022).*

4.9.2 Comparison of private vs public sector health worker wages

The Health Sector in Zimbabwe is financed by a mixture of funding sources with the major ones being government, private sector and the development partners. The information gathered indicates that although the government employs the bulk of the Health Workers, its wages were relatively lower than those offered in the private sector. This is explained by the high salaries paid per professional category by the private sector as shown in Table 14. The Health Workforce in the public sector receives a mixture of salary components made up of basic salary, generic allowance (transport, housing, and entertainment allowance), health specific allowances and partner funded allowances. It was also noted that the private sector remuneration framework comprises basic salary, allowances including school fees and fuel (senior managers), groceries, cost of living, retention, risk and medical aid cover.

The analysis focused on remuneration for thirty-five comparable cadres comprising of private and public Health Workers. Generally, the health workers in the private sector have a relatively higher remuneration than their counterparts in the public sector as shown in table 14. The average annual salary for a Hospital Medical Officer in the private sector is higher than that for the same in the public sector by a ratio of 1.06. It was also noted that nurses in the private sector earn more than those employed in the public sector by a ratio of 1.23. On the other hand the analysis indicated that a Nurse Aide in the public sector earned 9% (0.91) more than their counterparts in the private sector. Considering that the private sector salary packages in the health sector are relatively higher than the public sector, its essential that remuneration packages in the public sector be improved to manage internal migration.

TABLE 14: *Comparison of public and private sector health worker wages*

Cadre	Private (USD) -[a]	Public (USD) -[b]	Ratio of Private to Public Sector Income [a/b]
Medical Laboratory Scientist	1,000	921	1.09
Medical Laboratory Technician/State Certified Medical Laboratory Technician	786	708	1.11
Medical Laboratory Assistant	584	520	1.12
Medical Social Worker	786	663	1.19
Health Promotion Officer	786	628	1.25
Nutritionist	851	619	1.37
Dietitian	851	765	1.11
Hospital Food Services Supervisor	757	661	1.15
Government Dental Officer	1,115	1,055	1.06
Dental Therapist	959	665	1.44
Rehabilitation Technician	786	708	1.11
Occupational Therapist	986	827	1.19
Speech Therapist	986	827	1.19
Physiotherapist	986	824	1.20
Audiologist	986	827	1.19
Orthopaedic Technician	786	652	1.21
Orthopaedic Technologist	986	671	1.47
Government/Hospital Medical Officer	1,115	1,050	1.06
Intensive Care Nurse	986	737	1.34
Operating Theatre Nurse	986	737	1.34
Nurse Anaesthetist	986	737	1.34
Renal Nurse	986	737	1.34

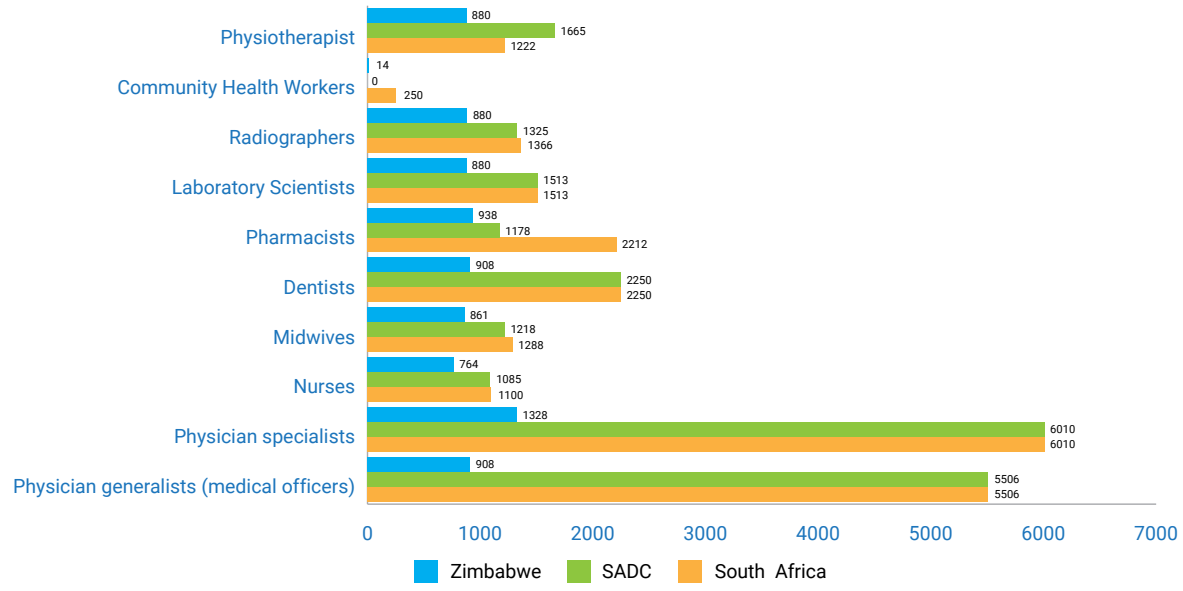
Cadre	Private (USD) -[a]	Public (USD) -[b]	Ratio of Private to Public Sector Income [a/b]
Midwife	986	737	1.34
Oncology Nurse	986	737	1.34
Ophthalmic Nurse	986	737	1.34
Mental Health Nurse	986	737	1.34
Paediatric Nurse	986	737	1.34
Orthopaedic Nurse	986	737	1.34
Registered General Nurse /State Certified Nurse	851	691	1.23
Nurse Aide	534	590	0.91
Radiographer Therapy	1,115	783	1.42
Radiographer Diagnostics	1,115	783	1.42
Pharmacist	1,115	710	1.57
Pharmacy Technician	836	694	1.20
Hospital Equipment Technician	773	734	1.05

Source: *MOHCC/HSB Payroll data (Sept. 2022) and NEC/PHAZ Survey (2022)*

4.9.3 Income comparison with other countries

Zimbabwe has been affected by brain drain as a result of migration of its labour force to countries with higher wages. In the region, pull countries for many Health Workers were South Africa, Namibia and Botswana. Outside Africa, favourite destinations were the United States of America, the United Kingdom and Australia. As shown in Figure 39 medical officers earn far much less than their counterparts in South Africa and the SADC region.

FIGURE 39: *Comparison of wages in Zimbabwe with other countries in Africa*



Source: *HSB Salary Comparative Schedule 2022*

The difference in wages across countries may determine cross-country Health Worker emigration/immigration. Table 15 presents a comparison of the average monthly income of health workers in Zimbabwe against earning levels in upper middle-income economies in Africa (Botswana, Namibia and South Africa), and high-income economies (United Kingdom, Australia and United States of America). Overall, the average monthly income of all clinical cadres in Zimbabwe were generally lower than those they were compared to.

TABLE 15: *Comparison of wages in Zimbabwe with other countries in Africa*

Country	Zimbabwe (converted to USD)	Monthly health service income – Botswana (converted to USD)	Monthly health service income – Namibia (converted to USD)	Monthly health service income – South Africa (converted to USD)	Monthly health service income – United Kingdom (converted to USD)	Monthly health service income – Australia (converted to USD)	Monthly health service income – USA
Physician generalists (medical officers)	908	3361	2131	5506	4681	9500	18690
Physician specialists	1328	3361	3193	6010	7391	9875	30666
Nurses	764	2494	4150	1100	2391	4633	6905
Midwives	861	2494	4150	1288	2430	4608	9768
Dentists	908	3361	3193	2250	7000	6990	19833
Pharmacists	938	2819	2730	2212	5083	5027	12095
Laboratory Scientists	880	2819	2730	1513	2875	4500	5675
Radiographers	880			1366	2920	5294	5485
Community Health Workers	15	557	20	250	2800	4375	3334
Physiotherapist	880		1814	1222	2825	4985	6667

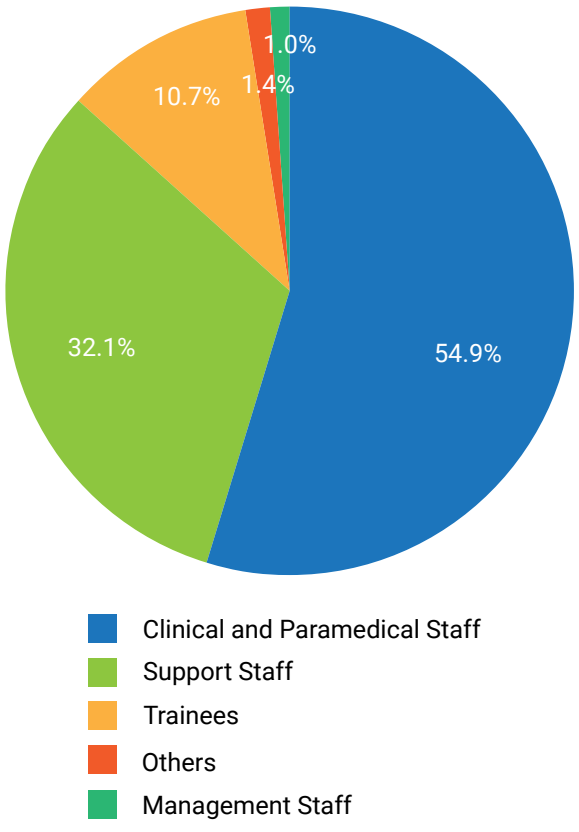
Source: *www.payscale.com accessed on 5 October 2022*

4.10 Analysis of the Level of Demand for Health Workers

4.10.1 Analysis of Public Sector Payroll of Health Workers

As of September 2022, there was a total of 45,536 health workers on the Government of Zimbabwe payroll. Of this number, the clinical and paraclinical staff were 24,990 (55%) – all of which are included in all the aspects of the HLMA. Management, Support staff and Trainees were 20,546 (45%) of the total workforce on the GOZ payroll – all of whom are not included in the HLMA. Management staff (n=441) constituted 1% of public sector employees on GoZ payroll similar to 0.9% African average. However, the support staff of 15,253 represented 33.5% of public sector employees on GoZ payroll as compared to 12.9% African average. The bulk of the Health Workers were classified as general hands (e.g. groundmen, field orderly, laboratory hand etc), comprising 16.1% of the total workforce on GoZ payroll. Health trainees being paid by Government were 4,852 or 10.66% of public sector employees on GoZ payroll. The breakdown of the public sector payroll is shown in Figure 40.

FIGURE 40: *Analysis of Public Sector Payroll of Health Workers*



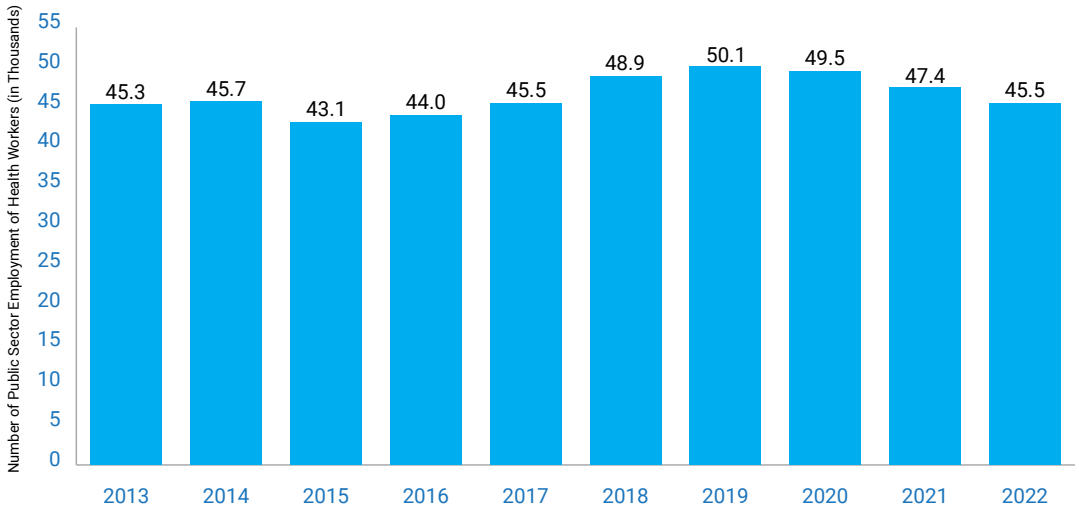
Source: *SSB September 2022 Health Sector Paysheet*

4.10.2 Analysis of Public Sector Payroll of Health Workers

A trend analysis of the Public Health Sector payroll (all MDAs included) suggests a situation of labour shortage characterised by a reduction of at least 4,600 since 2019 despite increased recruitments. By August 2022 for example, 575 Health Workers had been recruited but the number on GoZ payroll was 4% reduced compared to December 2021.

If the new recruitments are not included, the total reduction from the payroll is about 2,475 reductions to the payroll (i.e. 5.2% compared to 2021). In 2021, about 1,111 were appointed but the payroll still reduced by 4.43% from 49,500 in 2020 to 47,500 in 2021. As at September 2022, the total employment levels in 2022 showed a regression to the 2013 levels, despite lobbying efforts for increased establishment which headed positive responses over the years. This scenario suggests stock and supply constraints that require study.

FIGURE 41: *Total Employment in Public Health Sector*



Source: *Ministry of Finance data, various years.*

4.10.3 Health Workforce Establishment and Vacancy Analysis

The demand situation in Zimbabwe was determined using HSB, MoHCC and the private sector secondary data sources. The Zimbabwe HRH Country profile report (2018) was used as the reference document. To elicit data, the following documents were reviewed: MoHCC DET, HSB Recruitment Database, WISN study results, Faculty of Medicine, University of Zimbabwe (Authorised establishments). Health Sector demand data for both public and private was classified into indicative demand which is the sum of established or approved posts and effective demand which indicates the sum of funded posts. Furthermore, demand was classified into met demand (filled posts) and unmet demand (vacancies). Private sector data was not readily available and extrapolations were done using the Zimbabwe HRH Country profile report (2018).

The Health Sector (public and private) had a total 55,065 established posts (indicative demand) out of the 72 staff categories studied. Because of the lifting of the recruitment freeze in the public sector most of the established posts were funded translating to a100% effective demand. The met demand was 50,057 (90.9%) and unmet demand 5,008 (9.1%). The unmet demand was a result of the high vacancy rates in the Medical Specialist Category, Nurse Specialists, Laboratory Scientists, Radiographers, Medical Doctors, Pharmacists and Hospital Equipment Technicians, see Table 16.

It was observed that there were high vacancy rates for Specialist Doctors, with some specialities as high as 84%. Government/Hospital Medical Officer also had a vacancy rate of around 32%. Specialist nurses also had varying vacancy rates ranging between 40–80% save for midwives with a vacancy rate of 17%. Medical Laboratory Scientists had a vacancy rate of 33%. Speech Therapists had a 100% vacancy rate, whereas there was 0% vacancy rate for categories such as Medical Physicist and Orthopaedic Bootmaker.

The Community Health Workers constituted 35,8% (19,722) of the studied Health Sector demand situation. The cadres had no formalised staff establishment and received nominal allowances from development partners. Table 16 illustrates more of the details.

TABLE 16: *Public sector employment of health worker, 2022*

	Occupation Title used in the Country	Total Established Post (Indicative Demand) (b)	Total Funded Post (Effective Demand) (c)	Number of Funded Post Filled (d)	Number of Funded Post Vacant (e)	Staff Availability Ratio (SAR) (d/b)	VACANCY RATE (%)
1	Clinical Psychologist	39	39	39	0	100,0%	0,0%
2	Anaesthetist	64	64	41	23	64,1%	35,9%
3	Audiologist	10	10	9	1	90,0%	10,0%
4	Cardiothoracic Surgeon	12	12	5	7	41,7%	58,3%
5	Clinical Officer	56	56	47	9	83,9%	16,1%
6	Community Nurse	61	61	61	0	100,0%	0,0%
7	Dental Surgery Assistant	104	104	95	9	91,3%	8,7%
8	Dental Technician	24	24	24	0	100,0%	0,0%
9	Dental Therapist	194	194	127	67	65,5%	34,5%
10	Dermatologist	6	6	4	2	66,7%	33,3%
11	Dietitian	18	18	14	4	77,8%	22,2%
12	Dispensary Assistant	413	413	411	2	99,5%	0,5%
13	ENT Surgeon	16	16	14	2	87,5%	12,5%
14	Environmental Health Officer	201	201	195	6	97,0%	3,0%
15	Environmental Health Technician	1695	1695	1648	47	97,2%	2,8%
16	General Surgeon	45	45	42	3	93,3%	6,7%
17	Government Dental Officer	106	106	98	8	92,5%	7,5%
18	Government/Hospital Medical Officer (All General Practitioners)	1524	1524	1030	494	67,6%	32,4%
19	Haematologist	12	12	5	7	41,7%	58,3%
20	Health Promotion Officer	72	72	69	3	95,8%	4,2%
21	Health Information Officer	291	291	265	26	91,1%	8,9%
22	Hospital Equipment Technician	114	114	63	51	55,3%	44,7%
23	Hospital Food Services Supervisor	192	192	188	4	97,9%	2,1%
24	Intensive Care Nurse	284	284	128	156	45,1%	54,9%
25	Maxillo-Facial Surgeon	13	13	7	6	53,8%	46,2%
26	Medical Laboratory Assistant	10	10	9	1	90,0%	10,0%
27	Medical Laboratory Scientist,	537	537	362	175	67,4%	32,6%
28	Medical Laboratory Technician/ State Certified Medical Laboratory Technician	334	334	303	31	90,7%	9,3%
29	Medical Physicist	6	6	6	0	100,0%	0,0%
30	Medical Social Worker	19	19	15	4	78,9%	21,1%
31	Mental Health Nurse	594	594	274	320	46,1%	53,9%
32	Midwife	3730	3730	3090	640	82,8%	17,2%

	Occupation Title used in the Country	Total Established Post (Indicative Demand) (b)	Total Funded Post (Effective Demand) (c)	Number of Funded Post Filled (d)	Number of Funded Post Vacant (e)	Staff Availability Ratio (SAR) (d/b)	VACANCY RATE (%)
33	Nephrologist	7	7	5	2	71,4%	28,6%
34	Neurologist	3	3	2	1	66,7%	33,3%
35	Neurosurgeon	9	9	5	4	55,6%	44,4%
36	Nurse Aide	6488	6488	6092	396	93,9%	6,1%
37	Nurse Anaesthetist	291	291	147	144	50,5%	49,5%
38	Nutritionist	68	68	67	1	98,5%	1,5%
39	Obstetrician & Gynaecologist	143	143	123	20	86,0%	14,0%
40	Occupational Therapist	70	70	68	2	97,1%	2,9%
41	Operating Theatre Nurse	414	414	104	310	25,1%	74,9%
42	Ophthalmic Nurse	233	233	113	120	48,5%	51,5%
43	Ophthalmologist	24	24	11	13	45,8%	54,2%
44	Orthopaedic Assistant	23	23	22	1	95,7%	4,3%
45	Orthopaedic Boot Maker	2	2	2	0	100,0%	0,0%
46	Orthopaedic Nurse	67	67	41	26	61,2%	38,8%
47	Orthopaedic Surgeon	30	30	25	5	83,3%	16,7%
48	Orthopaedic Technician	2	2	1	1	50,0%	50,0%
49	Orthopaedic Technologist	15	15	6	9	40,0%	60,0%
50	Paediatric Nurse	584	584	82	502	14,0%	86,0%
51	Paediatric Surgeon	9	9	8	1	88,9%	11,1%
52	Paediatrician	38	38	35	3	92,1%	7,9%
53	Pathologist	14	14	6	8	42,9%	57,1%
54	Pharmacist	833	833	791	42	95,0%	5,0%
55	Pharmacy Technician	654	654	588	66	89,9%	10,1%
56	Physician	49	49	43	6	87,8%	12,2%
57	Physiotherapist	112	112	69	43	61,6%	38,4%
58	Plastic Surgeon	6	6	3	3	50,0%	50,0%
59	Primary Care Nurse	3643	3643	3521	122	96,7%	3,3%
60	Psychiatrist	17	17	12	5	70,6%	29,4%
61	Radiographer Diagnostics	218	218	217	1	99,5%	0,5%
62	Radiographer Therapy	48	48	39	9	81,3%	18,8%
63	Radiologist	11	11	4	7	36,4%	63,6%
64	Radiotherapist/Oncologist	11	11	9	2	81,8%	18,2%
65	Registered General Nurse / State Certified Nurse	9967	9967	9035	932	90,6%	9,4%
66	Rehabilitation Technician	300	300	299	1	99,7%	0,3%
67	Renal Nurse	128	128	48	80	37,5%	62,5%
68	Speech Therapist	4	4	0	4	0,0%	100,0%
69	Urologist	12	12	4	8	33,3%	66,7%
70	Community Health Worker	19722	19722	19722	0	100,0%	0,0%
		55 065	**55 065**	**50 057**	**5 008**	**90,9%**	**9,1%**

4.10.4 Relationship between Demand and Need

Zimbabwe's Universal Health Service Coverage index was measured to be at 55 in 2022. At this level and the disease burden the Zimbabwe Health Workforce Need was calculated to be 109,645. The prevailing health sector demand was estimated to be 55,065 health workers. The gap between the two was 54,580 health workers, representing a 99.1% deficit to effectively manage the disease burden.

Section 5.

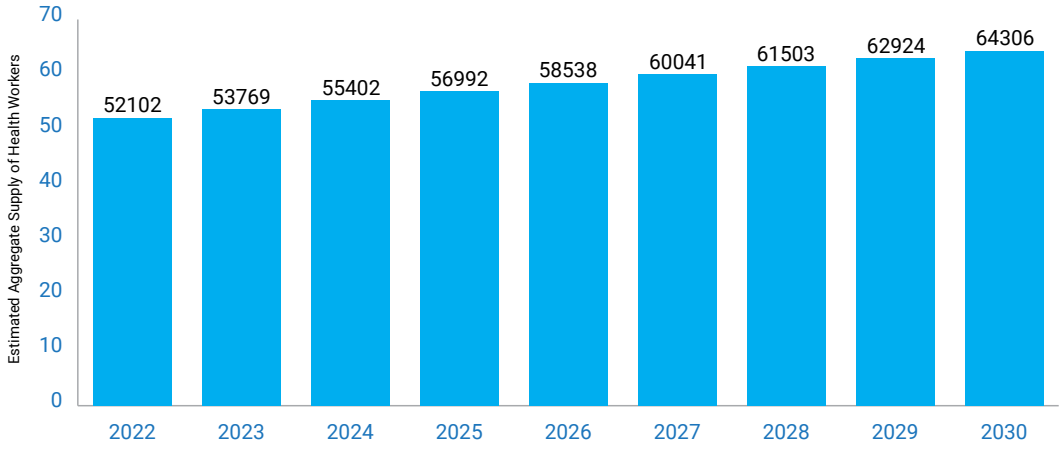
Predictive Labour Market Analysis

5.1 Projected Supply of Health Workforce

This chapter introduces the projected aggregate supply of health workers from 2022 to 2030.The supply of health workers was analysed under various scenarios and assumptions. Furthermore, the analysis provided for projected need-based requirements versus projected supply gap for the period 2022 to 2030.

The estimated aggregate supply of health workers stood at 52,102 in 2022 and it was projected that it would be at 64,306 in 2030 assuming maximum production from health worker training institutions and constant attrition levels. Therefore, over the eight-year period (2022 to 2030) the additional supply of health workers would be 12,204 representing 23.4% increase as illustrated in Figure 42.

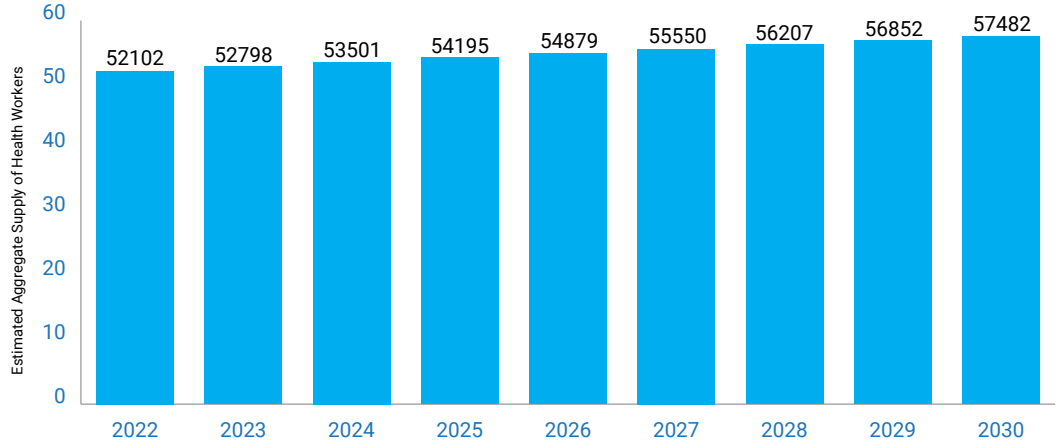
FIGURE 42: *Aggregate supply (current scenario of attrition and assuming maximum production from training), 2022–2030*



Source: *HLMA Data Analysis Tool*

The estimated average supply of health workers in 2022, taking into consideration the current attrition rate and average production from training was at 52,102. It was projected that the estimated average supply of health workers would increase to 57,482 by 2030. This demonstrates an additional supply of 5,308 health workers, representing a 10.3% increase over a period of eight years as shown in Figure 43.

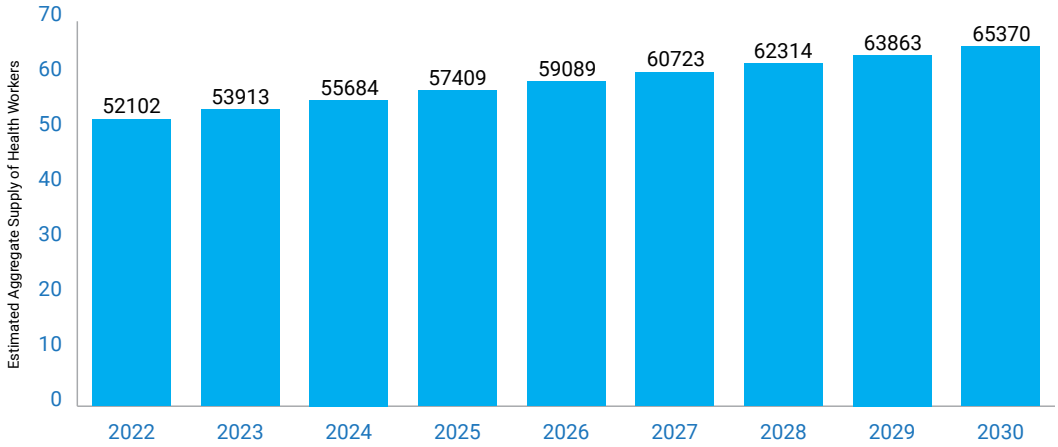
FIGURE 43: *Aggregate supply (current scenario of attrition and assuming average production from training), 2022–2030*



Source: *HLMA Data Analysis Tool*

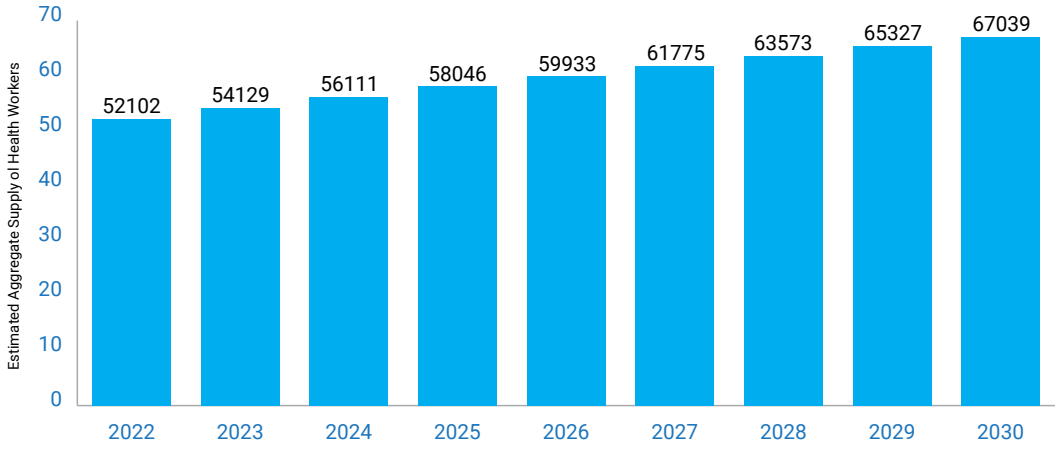
Assuming that attrition would be reduced by 10% at maximum production of training, the aggregate supply of health workers would increase from 52,102 in 2022 to 65,370 in 2030. This would represent an additional supply of 13,268 (25.4%) over eight years as shown in Figure 44.

FIGURE 44: *Aggregate supply (Reducing attrition by 10% and assuming maximum production from training), 2022–2030*



Assuming that attrition levels are reduced by 25% whilst maintaining maximum production from training, the aggregate supply which stood at 52,102 in 2022 would be 67,039 by 2030 representing an increase of 14,937 (28.6%) health workers as shown in Figure 45.

FIGURE 45: *Aggregate supply (Reducing attrition by 25% and assuming maximum production from training), 2022–2030*



Assuming that attrition level is reduced by 50% whilst maintaining maximum production from training the aggregate supply would increase from 52,102 in 2022 to 70,738 in 2030 representing an increase of 18,636 (35.7%) health workers as shown in Figure 46.

FIGURE 46: *Aggregate supply (Reducing attrition by 50% and assuming maximum production from training), 2022–2030*

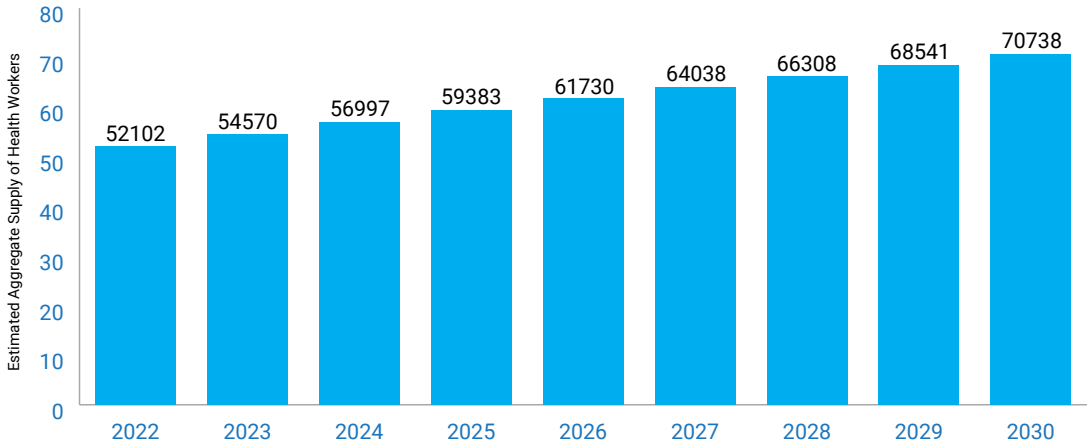


TABLE 17: *Estimated Supply (Based on a Scenario of Maximum Training Capacity) and Current Stock and Flow, 2022–2030*

Occupation Title used in the Country	Estimated Aggregate Supply								
	2022	2023	2024	2025	2026	2027	2028	2029	2030
Clinical Psychologist	39	78	114	149	182	213	243	271	298
Anaesthetist	41	47	53	59	64	70	74	79	83
Audiologist	6	6	5	5	5	5	4	4	4
Cardiothoracic Surgeon	5	5	4	4	4	4	4	3	3
Clinical Officer	47	52	57	62	67	71	75	79	82
Community Nurse	61	86	109	131	152	172	191	209	226
Dental Surgery Assistant	95	92	89	86	84	81	78	76	73
Dental Technician	24	35	46	56	65	75	83	92	100
Dental Therapist	127	139	150	161	170	179	187	195	202
Dermatologist	4	4	4	3	3	3	3	3	3
Dietitian	14	12	10	9	8	6	6	5	4
Dispensary Assistant	126	111	98	86	76	67	59	52	46
ENT Surgeon	14	13	13	12	11	11	10	10	9
Environmental Health Officer	208	242	276	310	343	376	409	441	473
Environmental Health Technician	1,688	1,886	2,082	2,278	2,472	2,665	2,857	3,048	3,237
General Surgeon	42	46	51	55	58	62	65	68	71
Government Dental Officer	102	113	124	135	146	156	165	175	184
Government/Hospital Medical Officer (All General Practitioners)	1,030	1,191	1,344	1,490	1,629	1,762	1,888	2,009	2,123
Haematologist	4	4	4	3	3	3	3	3	3
Health Promotion Officer	69	82	95	108	119	130	141	151	161
Hospital Equipment Technician	63	60	57	54	52	49	47	45	43
Hospital Food Services Supervisor	188	217	245	272	298	324	349	373	397
Intensive Care Nurse	57	90	121	151	179	205	230	253	276
Maxillo-Facial Surgeon	6	6	5	5	5	5	4	4	4
Medical Laboratory Assistant	7	7	6	6	6	5	5	5	5
Medical Laboratory Scientist,	363	378	392	405	418	430	442	452	463

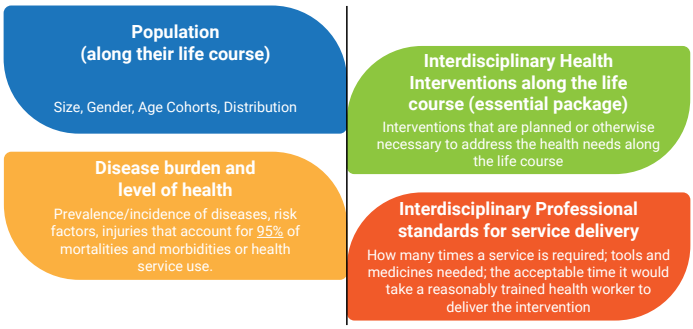
Occupation Title used in the Country	Estimated Aggregate Supply								
	2022	2023	2024	2025	2026	2027	2028	2029	2030
Medical Laboratory Technician/ State Certified Medical Laboratory Technician	338	415	490	564	637	709	779	848	917
Medical Physicist	6	6	5	5	5	5	4	4	4
Medical Social Worker	82	299	509	711	906	1,093	1,274	1,449	1,618
Mental Health Nurse	274	297	318	337	355	372	387	401	414
Midwife	3,090	3,785	4,457	5,106	5,733	6,339	6,924	7,489	8,036
Nephrologist	5	9	12	16	19	22	25	27	30
Neurologist	2	4	6	7	9	10	12	13	14
Neurosurgeon	5	18	30	41	52	62	72	81	90
Nurse Aide	6,092	5,963	5,837	5,714	5,593	5,475	5,359	5,246	5,135
Nurse Anaesthetist	147	163	178	191	203	214	223	231	239
Nutritionist	68	89	109	129	148	167	185	203	220
Obstetrician & Gynaecologist	42	51	59	68	76	84	92	99	107
Occupational Therapist	74	92	109	126	143	159	175	190	205
Operating Theatre Nurse	104	124	143	162	179	195	211	225	239
Ophthalmic Nurse	113	133	153	171	188	204	219	233	247
Ophthalmologist	11	15	19	23	27	31	34	37	41
Orthopaedic Assistant	22	20	18	17	15	14	13	12	11
Orthopaedic Boot Maker	1	1	1	1	1	1	1	1	1
Orthopaedic Nurse	25	23	21	21	20	20	20	20	20
Orthopaedic Surgeon	9	11	12	13	15	16	17	18	20
Orthopaedic Technician	1	1	1	0	0	0	0	0	0
Orthopaedic Technologist	6	3	2	1	0	0	0	0	0
Paediatric Nurse	82	74	68	64	61	59	58	57	56
Paediatric Surgeon	8	8	7	7	6	6	6	6	5
Paediatrician	35	41	46	52	57	62	66	71	75
Pathologist	12	3	3	3	3	3	3	3	3
Pharmacist	791	894	995	1,093	1,190	1,284	1,377	1,467	1,556

Occupation Title used in the Country	Estimated Aggregate Supply								
	2022	2023	2024	2025	2026	2027	2028	2029	2030
Pharmacy Technician	588	589	590	592	593	594	595	595	596
Physician	43	51	59	67	74	82	89	96	103
Physiotherapist	88	108	128	147	164	181	197	213	228
Plastic Surgeon	2	2	2	2	2	2	1	1	1
Primary Care Nurse	2,764	2,901	3,036	3,167	3,297	3,423	3,547	3,669	3,788
Psychiatrist	8	11	13	15	18	20	22	24	25
Radiographer Diagnostics	217	230	243	256	268	280	291	302	312
Radiographer Therapy	39	35	31	28	25	22	20	18	16
Radiologist	4	8	11	15	18	21	24	27	29
Radiotherapist/Oncologist	9	12	16	19	22	25	27	30	32
Registered General Nurse/State Certified Nurse	12,380	12,166	11,966	11,780	11,605	11,443	11,291	11,149	11,016
Rehabilitation Technician	299	319	340	360	379	399	418	438	457
Renal Nurse	48	58	67	74	80	85	90	93	96
Speech Therapist	12	11	11	10	10	9	9	8	8
Urologist	4	5	5	6	7	7	8	8	9
Community Health Worker*	19,722	19,721	19,720	19,719	19,718	19,717	19,716	19,715	19,714
Zimbabwe	**52,102**	**53,769**	**55,402**	**56,992**	**58,538**	**60,041**	**61,503**	**62,924**	**64,306**

5.2 Projected need for health workers based on the population's need for health services

The need analysis considered four factors, namely: (a) 99.1% of the disease burden of the country, (b) population size, growth and demographics, (c) package and model of essential service provision, and (d) health worker productivity (standard workload). At baseline year 2022, Zimbabwe needed 109,645 professionals across studied health occupations, including 25,617 community health workers, to make substantial progress towards the universal health coverage index target of 80 in line with its upper middle-income aspirations.

FIGURE 47: *Parameters used for analysing the need for health workers*



Download an excel tool for analysis from: https://doi.org/10.1371/journal.pone.0257957.s002

Based on the population health needs, the country requires 7,116 Government/Hospital Medical Officers, this is anticipated to increase to 8,599 by 2030, translating into a need of at least 5.15 generalist doctors per 10 000 population (or a ratio of 1:1942 population). The country will also require 6.93 Primary Care Nurses per 10,000 population (or a ratio of 1:1444 population). For the Registered General Nurse the calculated requirement was 13.26 per 10,000 (or 1:750 population), and that for Midwives was 3.04 per 10000 (or 1:3290 population).

In absolute numbers, the country's requirement for the Registered General Nurse was estimated to be 18, 279, which is anticipated to rise to 19,697 in 2025 and 22,214 by 2030, an increase of 21.4 %. Table 18 provides a year-by-year estimate of the need for various cadres of health workers to address the disease burden of the country and the demographic evolution of the population.

BOX 4: HOW MANY HEALTH WORKERS ARE NEEDED IN ZIMBABWE TO ATTAIN 80 OUT OF 100 UHC SERVICE COVERAGE?

By 2030, Zimbabwe would need at least 133,128 Health Workers across 63 health occupations, including 31,031 community health workers, to make substantial progress towards attainment of 80 universal health coverage (UHC) index in line with its upper middle-income aspirations.

This should comprise of:

- 5.15 generalist doctors per 10,000 population (or 1:1942 population)
- 6.93 Primary Care Nurses per 10,000 population (1:1444 population)
- 13.26 Registered General Nurses per 10,000 (or 1:750 population)
- 3.04 Midwives per 10,000 (or 1:3290 population)
- 0.65 Pharmacists per 10,000 (or 1:15384 population).
- 0.54 Laboratory scientists and technicians per 10,000 (or 1:18518 population)
- 1.82 Physiotherapists per 10,000 (or 1:5494 population)
- 16.78 Community Health Workers per 10,000 (or 1:595 population)

TABLE 18: *Projected needs-based requirements for health workers, 2021–2030*

No	Health Professionals	Projected Need for Health Workers based Population Health Needs (Displayed in Headcounts & Densities)								
		2022	2023	2024	2025	2026	2027	2028	2029	2030
1	Clinical Psychologist	280	288	294	301	309	319	327	335	342
2	Anaesthetist	125	129	132	135	138	143	146	149	153
3	Audiologist	153	158	161	165	169	173	178	182	186
4	Cardiothoracic Surgeon	18	18	19	19	19	20	20	21	21
5	Clinical Officer	1,025	1,054	1,078	1,105	1,132	1,163	1,190	1,217	1,244
6	Community Nurse	1,997	2,053	2,100	2,152	2,205	2,263	2,317	2,370	2,422
7	Dental Surgery Assistant	229	238	245	254	262	275	284	293	302
8	Dental Technician	71	73	74	76	78	81	83	85	87
9	Dental Therapist	157	163	168	174	181	191	198	204	211
10	Dermatologist	16	16	17	17	18	18	19	19	19
11	Dietitian	402	413	422	433	444	455	466	477	487
12	Dispensary Assistant	1,545	1,589	1,625	1,666	1,707	1,757	1,799	1,840	1,880
13	ENT Surgeon	26	27	27	28	29	29	30	31	31
14	Environmental Health Officer	322	331	338	347	355	364	373	381	390
15	Environmental Health Technician	2,363	2,429	2,485	2,547	2,610	2,673	2,737	2,800	2,861
16	General Surgeon	394	405	414	425	435	451	462	473	483
17	Government Dental Officer	193	199	204	210	217	226	233	239	246
18	Government/Hospital Medical Officer (All General Practitioners)	7,116	7,315	7,481	7,668	7,858	8,037	8,228	8,416	8,599
19	Haematologist	36	37	38	39	40	41	42	43	44
20	Health Promotion Officer	2,670	2,745	2,808	2,878	2,949	3,040	3,113	3,184	3,253
21	Hospital Equipment Technician	1,118	1,149	1,175	1,204	1,234	1,264	1,294	1,324	1,353
22	Hospital Food Services Supervisor	284	292	299	306	314	321	329	336	344
23	Intensive Care Nurse	754	775	793	813	833	860	880	900	920
24	Medical Laboratory Assistant	50	51	52	54	55	56	58	59	60
25	Medical Laboratory Scientist,	831	854	873	895	917	945	968	990	1,012

No	Health Professionals	Projected Need for Health Workers based Population Health Needs (Displayed in Headcounts & Densities)								
		2022	2023	2024	2025	2026	2027	2028	2029	2030
26	Medical Laboratory Technician/ State Certified Medical Laboratory Technician	1,254	1,289	1,318	1,351	1,385	1,429	1,463	1,496	1,529
27	Medical Physicist	25	26	27	27	28	29	29	30	31
28	Medical Social Worker	124	128	131	134	137	142	145	148	152
29	Mental Health Nurse	344	354	362	371	380	396	405	414	423
30	Midwife	4,195	4,312	4,410	4,520	4,632	4,745	4,858	4,969	5,077
31	Nurse Aide	2,924	3,005	3,074	3,150	3,228	3,304	3,383	3,460	3,536
32	Nurse Anaesthetist	221	227	232	238	244	250	256	261	267
33	Nutritionist	498	512	523	536	550	559	572	585	598
34	Obstetrician & Gynaecologist	92	95	97	100	102	105	107	109	112
35	Occupational Therapist	1,437	1,477	1,511	1,549	1,587	1,645	1,684	1,722	1,760
36	Operating Theatre Nurse	590	607	621	636	652	669	685	700	715
37	Ophthalmic Nurse	216	222	227	233	238	244	250	256	261
38	Ophthalmologist	46	47	48	49	51	52	53	54	56
39	Orthopaedic Assistant	732	752	769	788	808	828	847	867	885
40	Orthopaedic Boot Maker	299	308	315	323	331	339	347	355	362
41	Orthopaedic Nurse	128	132	135	138	142	145	149	152	155
42	Orthopaedic Surgeon	132	135	138	142	145	149	152	156	159
43	Orthopaedic Technologist	420	432	442	453	464	476	487	498	509
44	Paediatric Nurse	260	267	273	280	287	288	295	302	308
45	Paediatrician	190	195	199	204	210	211	216	220	225
46	Pathologist	96	99	101	103	106	109	111	114	116
47	Pharmacist	998	1,026	1,049	1,076	1,102	1,149	1,176	1,203	1,229
48	Pharmacy Technician	4,677	4,808	4,918	5,041	5,165	5,292	5,418	5,541	5,662
49	Physician	414	426	435	446	457	476	487	499	509
50	Physiotherapist	2,775	2,853	2,918	2,991	3,065	3,165	3,240	3,314	3,386
51	Plastic Surgeon	56	57	58	60	61	63	64	66	67
52	Primary Care Nurse	9,580	9,847	10,071	10,323	10,578	10,805	11,062	11,315	11,561

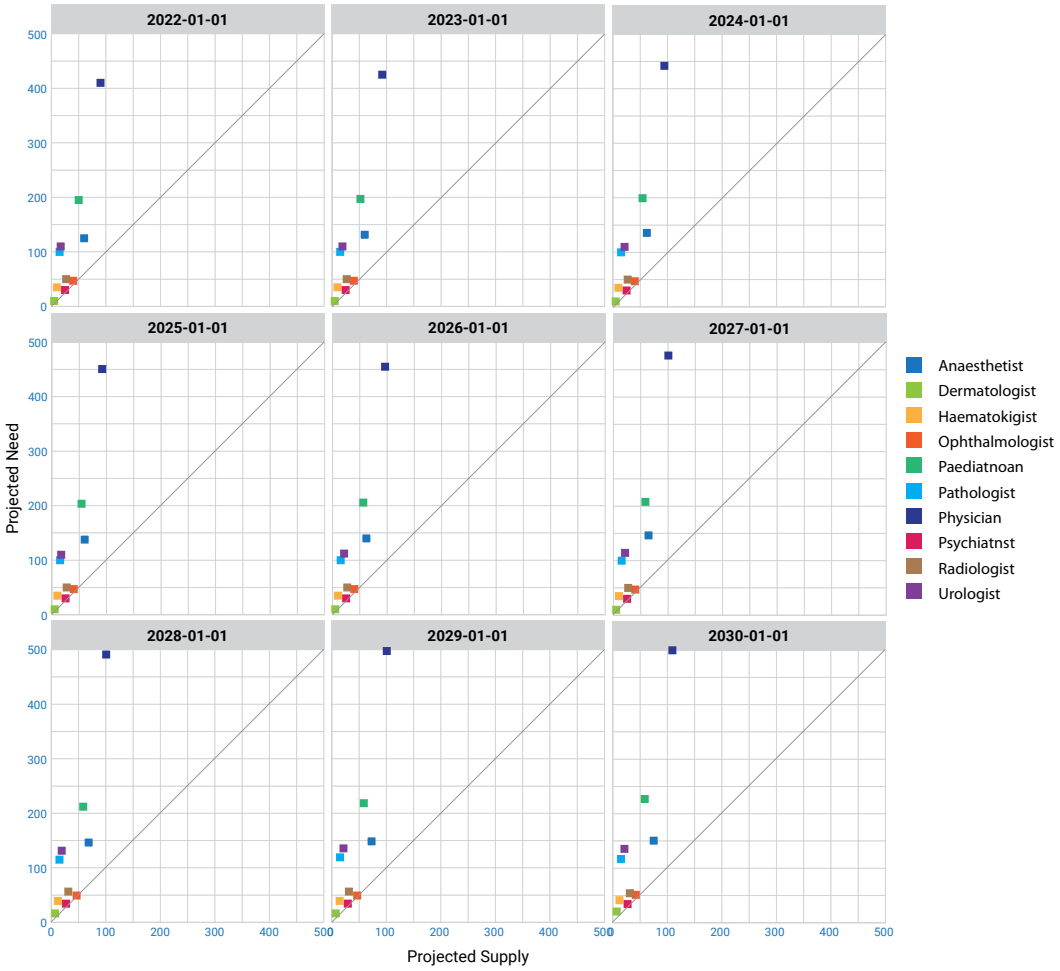
No	Health Professionals	Projected Need for Health Workers based Population Health Needs (Displayed in Headcounts & Densities)								
		2022	2023	2024	2025	2026	2027	2028	2029	2030
53	Psychiatrist	32	33	34	35	36	37	38	39	40
54	Radiographer Diagnostics	514	529	541	554	568	583	597	611	624
55	Radiographer Therapy	50	52	53	54	55	58	59	61	62
56	Radiologist	52	54	55	56	57	60	61	62	64
57	Radiotherapist/Oncologist	44	46	47	48	49	51	52	53	55
58	Registered General Nurse/ State Certified Nurse	18,279	18,790	19,217	19,697	20,184	20,762	21,256	21,741	22,214
59	Rehabilitation Technician	8,106	8,333	8,522	8,735	8,951	9,298	9,519	9,736	9,949
60	Renal Nurse	1,719	1,768	1,808	1,853	1,899	1,945	1,991	2,037	2,081
61	Speech Therapist	220	226	231	237	243	253	259	265	270
62	Urologist	111	114	117	120	123	128	131	134	137
63	Community Health Worker	25,617	26,334	26,932	27,605	28,287	29,001	29,692	30,369	31,031

5.3 Analysis of need and supply gaps and mismatches

It is projected that by 2030, the aggregate demand for health workers would be 66,100 against projected aggregate supply of 64,306. The aggregate need for health workers was projected to rise from 109,645 in 2022 to 133,128 in 2030, which is higher than both the projected supply and demand.

Despite the forecasted increase in the projected supply of practicing medical practitioners, the number of specialist doctors would remain significantly lower relative to the projected health force needed in the period 2022 to 2030 as shown on Figure 48.

FIGURE 48: *Scatterplot of Projected Supply of Practicing Medical Specialists and Projected Health Workforce Need*

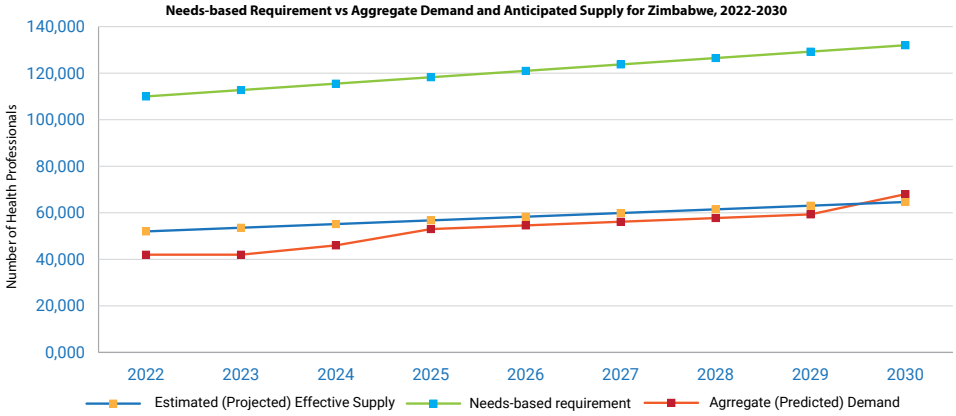


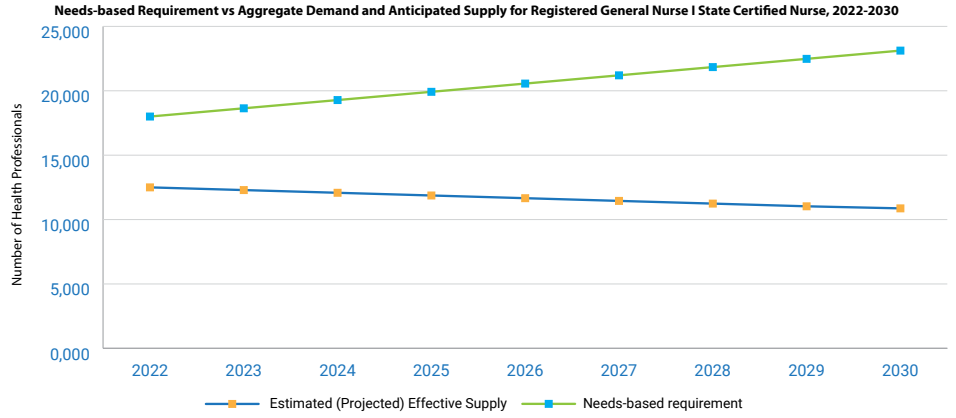
The projected supply for the Government Medical Officer remains lower than the need-based requirement to meet 80 Universal Health Coverage. It was anticipated that the need for Government Medical Officer would rise to 8,599 in 2030 against projected supply of 2123.

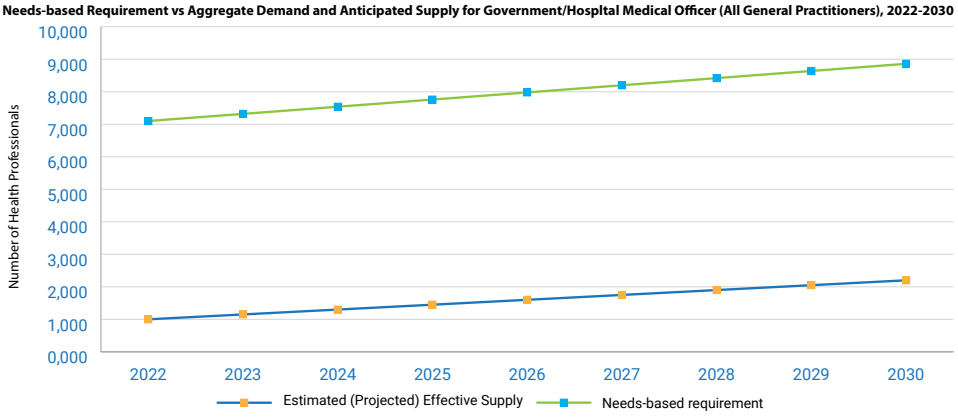
The anticipated supply for Registered General Nurse/State Certified Nurse for the period 2022-2030 would be lower than the need-based requirement for the country to meet the 80 Universal Health Coverage. It was anticipated that the projected need for Registered General Nurse/State Certified Nurse would rise to 22,214 against a projected supply of 11,016.

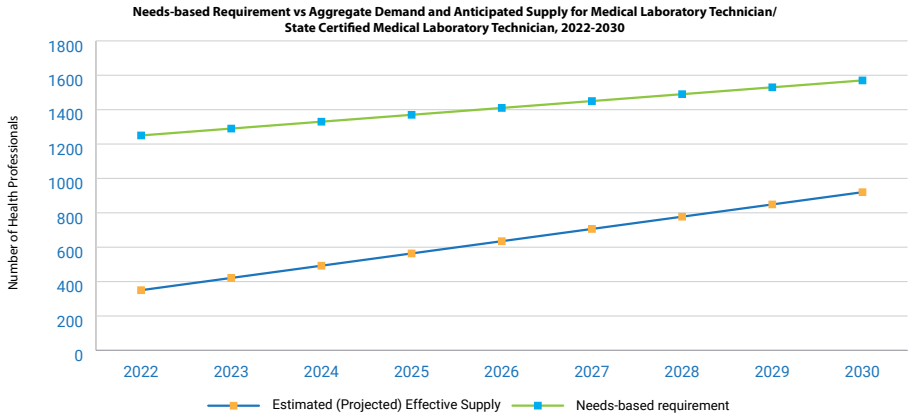
The projected supply for Medical Laboratory Technician/State Certified Medical Laboratory Technician from 2022-2030 though on an upward trajectory would be lower than the need. It was anticipated that the projected need would rise to 1,529 against a projected supply of 917.

FIGURE 49: *Aggregate need versus supply of health workers in Zimbabwe, 2022–2030*









An analysis of need versus supply gap reveals that the need for Health Workers was higher than supply in 2022 in all staff categories except for Nurse Aides whose supply surpassed need. In 2030, the need for Health Workers was generally higher than supply in most categories. However, an oversupply was projected for Environmental Health Officers, Environmental Health Technicians, Nurse Aides, Midwives, Medical Social Workers and Hospital Food Services Supervisors. It was projected that by 2030, the population health need would be 133,128 against supply projection of 64,306, representing a deficit of 68,822 and staff availability ratio of 48.3% as shown in Table 19.

BOX 5: SCENARIOS FOR ADDRESSING THE HEALTH LABOUR SHORTAGE

Scenarios of health labour shortages based on the relationship between training output under various levels of attrition and needs based shortage by 2030 are explored.

- Maintaining average production of 3,334 from training under the 2022 levels of attrition, the need-based shortage for health workers was projected to be **75,646** by 2030.
- Assuming maximum production of 4,476 from training under 2022 levels of attrition, the need for health workers was projected to be **68,822** by 2030.
- Assuming that attrition was reduced by 10% under maximum production from training, the need-based shortage for health workers was projected to be **67,758** by 2030.
- Assuming that attrition was reduced by 25% under maximum production, the need-based shortage for health workers was projected to be **66,089** by 2030.
- Assuming that attrition was reduced by 50% under maximum production of training, need-based shortage for health workers was projected to be **62,345**.

TABLE 19: *Projected needs-based requirements versus projected supply gap analysis for health workers, 2022–2030*

No.	Health professionals	2022				2030			
		Need (a)	Supply (b)	Gap (b-a)	SAR (b/a)	Need (a)	Supply (b)	Gap (b-a)	SAR (b/a)
1	Clinical Psychologist	280	39	(241)	13.9%	342	298	(44)	87.1%
2	Anaesthetist	125	41	(84)	32.7%	153	83	(69)	54.7%
3	Audiologist	153	6	(147)	3.9%	186	4	(182)	2.1%
4	Cardiothoracic Surgeon	18	5	(13)	28.3%	21	3	(18)	15.3%
5	Clinical Officer	1,025	47	(978)	4.6%	1,244	82	(1,162)	6.6%
6	Community Nurse	1,997	61	(1,936)	3.1%	2,422	226	(2,195)	9.3%
7	Dental Surgery Assistant	229	95	(134)	41.5%	302	73	(229)	24.3%
8	Dental Technician	71	24	(47)	34.0%	87	100	13	115.0%
9	Dental Therapist	157	127	(30)	80.9%	211	202	(9)	95.7%
10	Dermatologist	16	4	(12)	25.1%	19	3	(17)	13.4%
11	Dietitian	402	14	(388)	3.5%	487	4	(483)	0.8%
12	Dispensary Assistant	1,545	126	(1,419)	8.2%	1,880	46	(1,834)	2.4%
13	ENT Surgeon	26	14	(12)	54.2%	31	9	(22)	29.3%
14	Environmental Health Officer	322	208	(114)	64.6%	390	473	84	121.5%
15	Environmental Health Technician	2,363	1,688	(675)	71.4%	2,861	3,237	377	113.2%
16	General Surgeon	394	42	(352)	10.7%	483	71	(411)	14.8%
17	Government Dental Officer	193	102	(91)	53.0%	246	184	(61)	75.0%
18	Government/Hospital Medical Officer (All General Practitioners)	7,116	1,030	(6,086)	14.5%	8,599	2,123	(6,476)	24.7%
19	Haematologist	36	4	(32)	11.0%	44	3	(41)	5.9%
20	Health Promotion Officer	2,670	69	(2,601)	2.6%	3,253	161	(3,092)	4.9%
22	Hospital Equipment Technician	1,118	63	(1,055)	5.6%	1,353	43	(1,310)	3.2%
23	Hospital Food Services Supervisor	284	188	(96)	66.2%	344	397	53	115.5%
24	Intensive Care Nurse	754	57	(697)	7.6%	920	276	(645)	29.9%
26	Medical Laboratory Assistant	50	7	(43)	14.1%	60	5	(56)	7.6%
27	Medical Laboratory Scientist,	831	363	(468)	43.7%	1,012	463	(549)	45.8%

No.	Health professionals	2022				2030			
		Need (a)	Supply (b)	Gap (b-a)	SAR (b/a)	Need (a)	Supply (b)	Gap (b-a)	SAR (b/a)
28	Medical Laboratory Technician/ State Certified Medical Laboratory Technician	1,254	338	(916)	27.0%	1,529	917	(612)	60.0%
29	Medical Physicist	25	6	(19)	23.8%	31	4	(27)	12.8%
30	Medical Social Worker	124	82	(42)	66.1%	152	1,618	1,466	1066.7%
31	Mental Health Nurse	344	274	(70)	79.6%	423	414	(9)	97.9%
32	Midwife	4,195	3,090	(1,105)	73.7%	5,077	8,036	2,959	158.3%
36	Nurse Aide	2,924	6,092	3,168	208.4%	3,536	5,135	1,600	145.2%
37	Nurse Anaesthetist	221	147	(74)	66.6%	267	239	(28)	89.4%
38	Nutritionist	498	68	(430)	13.7%	598	220	(378)	36.8%
39	Obstetrician & Gynaecologist	92	42	(50)	45.4%	112	107	(5)	95.5%
40	Occupational Therapist	1,437	74	(1,363)	5.1%	1,760	205	(1,555)	11.7%
41	Operating Theatre Nurse	590	104	(486)	17.6%	715	239	(476)	33.4%
42	Ophthalmic Nurse	216	113	(103)	52.4%	261	247	(14)	94.5%
43	Ophthalmologist	46	11	(35)	24.0%	56	41	(15)	73.1%
44	Orthopaedic Assistant	732	22	(710)	3.0%	885	11	(875)	1.2%
45	Orthopaedic Boot Maker	299	1	(298)	0.3%	362	1	(362)	0.2%
46	Orthopaedic Nurse	128	25	(103)	19.5%	155	20	(135)	12.9%
47	Orthopaedic Surgeon	132	9	(123)	6.8%	159	20	(140)	12.3%
49	Orthopaedic Technologist	420	6	(414)	1.4%	509	0	(509)	0.0%
50	Paediatric Nurse	260	82	(178)	31.6%	308	56	(252)	18.1%
52	Paediatrician	190	35	(155)	18.4%	225	75	(150)	33.5%
53	Pathologist	96	12	(84)	12.5%	116	3	(113)	2.6%
54	Pharmacist	998	791	(207)	79.2%	1,229	1,556	327	126.6%
55	Pharmacy Technician	4,677	588	(4,089)	12.6%	5,662	596	(5,066)	10.5%
56	Physician	414	43	(371)	10.4%	509	103	(407)	20.2%
57	Physiotherapist	2,775	88	(2,687)	3.2%	3,386	228	(3,158)	6.7%
58	Plastic Surgeon	56	2	(54)	3.6%	67	1	(66)	1.9%
59	Primary Care Nurse	9,580	2,764	(6,816)	28.9%	11,561	3,788	(7,773)	32.8%

No.	Health professionals	2022				2030			
		Need (a)	Supply (b)	Gap (b-a)	SAR (b/a)	Need (a)	Supply (b)	Gap (b-a)	SAR (b/a)
60	Psychiatrist	32	8	(24)	24.9%	40	25	(14)	63.9%
61	Radiographer Diagnostics	514	217	(297)	42.2%	624	312	(312)	50.1%
62	Radiographer Therapy	50	39	(11)	77.8%	62	16	(46)	25.4%
63	Radiologist	52	4	(48)	7.7%	64	29	(34)	46.1%
64	Radiotherapist/Oncologist	44	9	(35)	20.2%	55	32	(22)	58.8%
65	Registered General Nurse/State Certified Nurse	18,279	12,380	(5,899)	67.7%	22,214	11,016	(11,198)	49.6%
66	Rehabilitation Technician	8,106	299	(7,807)	3.7%	9,949	457	(9,492)	4.6%
67	Renal Nurse	1,719	48	(1,671)	2.8%	2,081	96	(1,985)	4.6%
68	Speech Therapist	220	12	(208)	5.5%	270	8	(263)	2.9%
69	Urologist	111	4	(107)	3.6%	137	9	(128)	6.4%
70	Community Health Worker	25,617	19,722	(5,895)	77.0%	31,031	19,714	(11,317)	63.5%
	Zimbabwe	**109,645**	**52,102**	**(57,543)**	**47.5%**	**133,128**	**64,306**	**(68,822)**	**48.3%**

Source: *HLMA Data Analysis Tool*

DEMAND VERSUS NEED PROJECTIONS

It was projected that to meet middle-income economy Universal Health Service Coverage (UHC) index of 80 and the 99, 1% disease burden coverage, Zimbabwe would require 133128 health cadres by 2030. The 2022 demand was at 41.36% of the projected 2030 need. This would require 78,064 additional posts to meet the country's need by 2030. Ideally it would require an average of 9,758 additional posts per year from 2023 to 2030 to meet the targeted country need. A combination of supply side interventions, deliberate establishment expansion by the public and private sectors and review of the current salaries to meet transfer wage by 2025 would contribute to addressing the challenge.

Due to issues of demand affordability, it was noted that Zimbabwe may consider prioritising its establishment expansion instead of an omnibus approach. The prioritisation in the staff establishment expansion should be based on considerations such as attrition levels, difficulty to fill, criticality and overall vacancy levels. It was noted that the staff establishment for the Community Health Workers required to be formalised to allow for systematic management frameworks in line international best practice norms.

5.4 Health workforce financing and economic feasibility analysis of the labour market

This section seeks to illustrate the potential of financial space available or required to absorb the supply of health workforce to satisfy 2022 and future demand of the health system assuming all the other things are held constant. It would also forecast the need based financial space required to address the future disease burden. Financial space is determined by the amount of funding available from the fiscus (govt), partners and private sector to absorb 2022 and future supply. Supply is a function of training throughput and attrition from the system, therefore supply projections are based on the estimated need of health workers to address the disease burden.

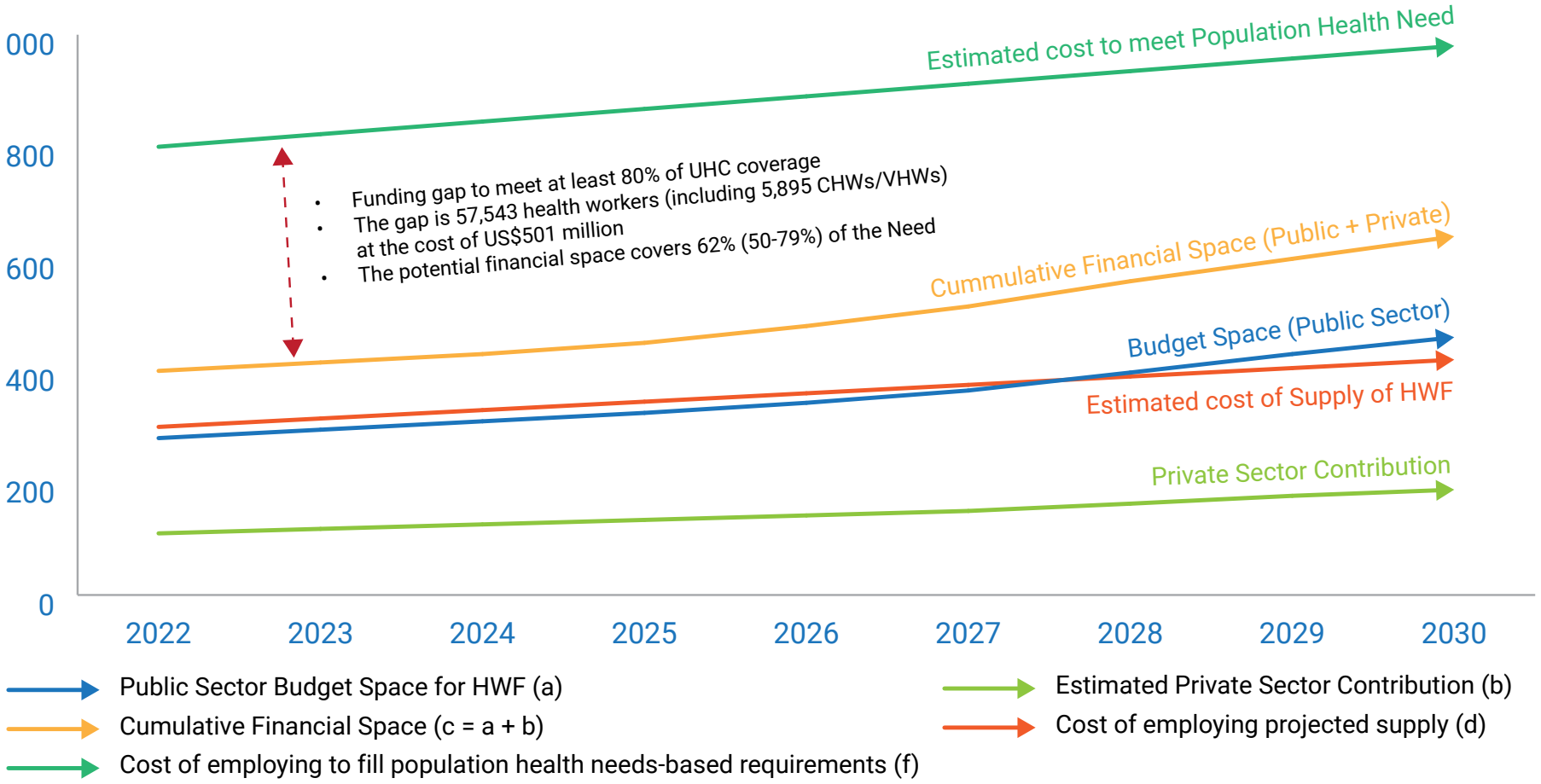
The 2022 fiscal space (government funding) committed to health workforce financing is US$284 million which is anticipated to rise to US$472,59 million by 2030 at 2022 wages, salaries and disease burden. Private sector financing for Health Workforce for 2022 was US$102.87 million and projected to increase to US$170.61 million by 2030. Financial space available in 2022 was US$387.82 million and projected to increase to US$634.2 million by 2030 at 2022 wages and salaries. The cost of employing projected supply by 2030 would require an average of US$357 million, whilst the minimum financial space required to employ population-based staff need would be a minimum of US$793 million to a maximum of US$964 million. On another note the cost of training to meet population based health needs was projected to be an average US$5,738 billion by 2030. Overall investment required to meet population health need (Needs-based Employment + Cost of Training), is projected to average US$6.6 billion by 2030 (Table 20).

TABLE 20: *Estimates of economic feasibility of supply and needs compared with potential financial space*

Cost implications and financial sustainability estimates	2022	2023	2024	2025	2026	2027	2028	2029	2030	Average	Minimum	Maximum
Public Sector Budget Space for HWF (a)	284.95	299.20	315.35	331.75	356.08	382.19	410.22	440.30	472.59	365.85	284.95	472.59
Estimated Private Sector Contribution (b)	102.87	108.01	113.84	119.76	128.55	137.97	148.09	158.95	170.61	132.07	102.87	170.61
Cumulative Financial Space (c = a + b)	387.82	407.21	429.20	451.52	484.63	520.17	558.31	599.25	643.20	497.92	387.82	643.20
Cost of employing projected supply (d)	293.02	310.09	326.87	343.17	358.98	374.33	389.21	403.65	417.67	357.44	293.02	417.67
Cost of employing to fill population health needs-based requirements (f)	793.98	816.22	834.80	855.70	876.89	901.35	922.86	943.95	964.58	878.93	793.98	964.58
Cost of training to fill population health needs-based gaps (g)	1,556.09	2,601.65	3,647.21	4,692.77	5,738.33	6,783.89	7,829.45	8,875.01	9,920.57	5,738.33	1,556.09	9,920.57
Overall investment required based population health need (Needs-based Employment + Cost of Training), (f+g)	2,350.07	3,417.87	4,482.01	5,548.47	6,615.22	7,685.24	8,752.31	9,818.97	10,885.15	6,617.26	2,350.07	10,885.15
Proportion of supply-side wage bill that could be absorbed by the estimated financial space (d/c)	132.35%	131.32%	131.30%	131.57%	135.00%	138.96%	143.45%	148.46%	154.00%	138.5%	131.3%	154.0%
Proportion of Staffing Norms that could be covered by financial space (e/c)	528.33%	596.94%	610.15%	621.29%	630.58%	638.22%	644.38%	649.22%	652.91%	619.11%	528.33%	652.91%
Proportion of population health need that could be covered by financial space (f/c)	48.84%	49.89%	51.41%	52.77%	55.27%	57.71%	60.50%	63.48%	66.68%	56.3%	48.8%	66.7%
Percent of financial space required to absorb “unemployed” health workers	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%		0.00%	0.00%
Percent of public health sector wage required to absorb “unemployed” health workers	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%		0.00%	0.00%
Current HWF expenditure as % of GDP	1.89%	1.89%	1.89%	1.89%	1.89%	1.89%	1.89%	1.89%	1.89%	1.89%	1.89%	1.89%
Cost of supply as % of GDP	1.42%	1.44%	1.44%	1.43%	1.40%	1.36%	1.31%	1.27%	1.22%	1.37%	1.22%	1.44%

Cost implications and financial sustainability estimates	2022	2023	2024	2025	2026	2027	2028	2029	2030	Average	Minimum	Maxi-mum
Cost of population health need as % of GDP	3.86%	3.78%	3.67%	3.57%	3.41%	3.27%	3.12%	2.97%	2.83%	3.39%	2.83%	3.86%
Additional cost of need as % of GDP	1.98%	1.89%	1.78%	1.69%	1.53%	1.38%	1.23%	1.08%	0.94%	1.50%	0.94%	1.98%
Additional cost of supply as % of GDP	-0.46%	-0.45%	-0.45%	-0.45%	-0.49%	-0.53%	-0.57%	-0.62%	-0.66%		0.00%	-0.45%
Per Capita HWF Financing based on Need	52.02	52.02	52.03	52.03	52.03	52.21	52.21	52.21	52.22	52.11	52.02	52.22

FIGURE 50: *Economic feasibility analysis under different projection scenarios*



BOX 6: **ZIMBABWE CAN AFFORD TO PRIORITISE EXPANSION IN TRAINING AND EMPLOYMENT OF HEALTH WORKERS BY AN AVERAGE OF 62% TO ATTAIN UNIVERSAL HEALTH COVERAGE INDEX OF 80 BY 2030**

- Basing on the 2030 need-based projections and the budgetary space affordability levels, the country may focus on expanding establishments by 66.7% for high priority staff, 56.3% for medium priority staff and 48.8% for low priority staff by 2030. The prioritisation would result in the country not meeting its total 2030 staff projections.
- In view of the 19% self-reported productivity gap, the country would require aproductivity improvement plan to meet the 2030 UHC target.
- The preferred scenario in relation to health system development would be to attain an upper middle income health system by 2030. This would entail achieving a Universal health Service coverage Index of 80. At that level the projections for health workforce needs estimate an additional 57,543 health workers from current levels of effective demand given the available financial space.
- The projections for financial space will only cover an average of 62% of the projected need which will translate to US$501 million. The 2022 fiscal space managed to absorb the available supply and the combined financial space (public and private sector) creates additional potential alluded to above.
- The 2030 projected need for Community Health Workers was 11,317 to meet the UHC index of 80.

Section 6.

Analysis of Aggregate Productivity of Health Workers

6.1 Overview of Methodology

Summary of the approach

This chapter examines the aggregate health workforce productivity levels in Zimbabwe using Workforce Productivity Index (WPI). Productivity is a measurement of service outputs that come per units of inputs such as labour, capital, or any other resource. Health workers performance can be measured across dimensions that contribute to the achievement of better service delivery and health, such as staff availability, quality of work (competence, responsiveness), and productivity. Thus, determining workforce productivity is apart of the performance management process. While productivity is a critical measure of health worker performance, there are no universally agreed standards and metrics of health workforce productivity (and performance at large), as these are often limited by concerns on quality of care and equity in access to health service.

The Zimbabwean Health Labour Market Analysis utilised the Workforce Productivity Index to appreciate the aggregate productivity levels of 63 Districts. Harare, Chitungwiza and Bulawayo were classified as Districts for the purpose of this analysis. The WPI was adopted to manage resources and time limitations.

The Methodology used.

The methodology involved aggregating the total number of health care services provided to the population in the 63 districts into a Composite Services Index (CSI). The relevant labour inputs were aggregated into some Composite Human Resources for Health measure (CHRH).

Workforce Productivity Index =CSI/CHRH.

To measure workforce productivity the following steps were followed:

1. **Determining the Service Unit.**

In this case, fifteen service units were used for productivity analysis. These included family planning visits, CWC Visits (0-59) antenatal visits, deliveries, general outpatient, total inpatient days, minor surgeries, caesarean sessions, major surgeries, specialised surgeries/treatments, specialist clinic visits, critical care patients, dialysis patients, CT scans and MRI scans for 63 districts. The annual services output data was provided by the Ministry of Health and Child Care Health Information Department.

2. **Determining the Categories of Health Services to Include as Outputs in the Numerator and Determining a Method of Aggregating Different Categories of Health Services into a Composite Service Indicator**

The services captured in the output measure were those that are provided by the categories of health workers captured in the input measure. The staff categories in Table 21 were used in determining the services to compose the output measure. The Health Service outputs were aggregated into a single Composite Service Indicator (CSI) by taking a weighted sum of the volume of various categories of services produced in a

Service unit: **CSIi =∑jαjSij**

CSIi = Composite service indicator for service unit i
Sij = Volume of service jin service unit i
αj = Weight assigned to service j(level of effort)

The Composite Service Index is the weighted sum of these service outputs. There are several approaches to the weighting but the one chosen for this analysis is based on the equivalence to outpatient consultation using weights derived from the costs of the various service units in Zimbabwe. Refer to Table 21: Service output weighting to the equivalence of outpatient consultations.

3. Aggregating Different Staff Categories in Composite Human Resources for Health Measure

Similar to the Composite Service Indicator, it was necessary to determine weights to assign to different categories of staff to come up with the Composite Human Resources for Health Measure (CHRHi):

$$CHRHi = \sum k \beta k HRHik$$

CHRHi = Composite human resources for health indicator for service unit i
HRHik = Number of health workers of category kin service unit i
βk = Weight assigned to health worker type k

The aggregate cost of wages and salaries of thirty-three (33) occupational groups of health workers was used as the inputs for productivity measurement. The health workers included were General Medical Practitioners, Specialist Doctors, Specialist Nurses, Registered General Nurses, Medical Laboratory professionals, Pharmacy professionals, Radiographers amongst others. Their contribution to the service output was deemed to be weighed against their wages and salaries. This approach placed the greatest weight on the highest paid health worker to generate a human resource for health input measure that is equal to total salaries paid out to all health workers. Therefore, it is extremely useful for measuring services delivered per unit of salary expenditure and for making cost-effectiveness comparisons across service units.

Using the salary of Government Medical/Hospital Officer as the reference cadre to weigh health worker contribution, Medical Specialists had the highest weighted staff contribution at 1.74 (100 Specialists equivalent to 384 GMOs), whereas the grade with the lowest weighted staff contribution was Nurse Aide with 0.56 (100 Nurse Aides equivalent to 40 GMOs). Registered General Nurses had 0.65 as the weighted staff contribution (100 RGNs equivalent to 54 GMOs), Medical Laboratory Scientists had a weighted staff contribution of 0.80 (100 Laboratory Scientists equivalent to 80 GMOs), whilst it was 0.67 for Pharmacists (100 Pharmacists equivalent to 57 GMOs) and 0.75 (100 Clinical Psychologists equivalent to 72 GMOs) for Clinical Psychologists as shown in Table 21.

TABLE 21: *Cadres included in analysis & Service output weighting*

CADRE	BAS_SAL (Monthly)	ALLWS (Monthly)	GROSS_ SAL (Monthly)	ANN_SAL (Annual)	Weighted Staff Contribution	Weighted Salary - in 100 LCU
Clinical Psychologist	80	716	796	9,547	0.75	72
Medical Laboratory Scientist/ Technologist	80	761	841	10,092	0.80	80
Medical Laboratory Technician/ State Certified Med Lab Technician	71	637	708	8,497	0.67	57
Primary Care Nurse	69	604	673	8,074	0.64	51
Medical Social Worker	80	583	663	7,956	0.63	50
Health Promotions Officer	80	548	628	7,536	0.60	45
Nutritionist	80	539	619	7,425	0.59	44
Dietitian	80	685	765	9,180	0.72	67
Hospital Food Services Supervisor	71	590	661	7,933	0.63	50

CADRE	BAS_SAL (Monthly)	ALLWS (Monthly)	GROSS_ SAL (Monthly)	ANN_SAL (Annual)	Weighted Staff Con-tribution	Weighted Salary - in 100 LCU
Government Dental Officer	118	812	930	11,160	0.88	98
Dental Therapist	80	585	665	7,977	0.63	50
Dental Technician	71	585	656	7,868	0.62	49
Radiographer Therapy	80	703	783	9,396	0.74	70
Occupational Therapist	80	747	827	9,925	0.78	78
Nurse Aide	48	542	590	7,080	0.56	40
Medical Specialist	313	1,524	1,837	22,050	1.74	384
Speech Therapist	80	747	827	9,924	0.78	78
Physiotherapist	80	747	827	9,924	0.78	78
Orthopaedic Technologist	80	591	671	8,052	0.64	51
Nurse Specialist	80	657	737	8,844	0.70	62
Orthopaedic Technician	71	581	652	7,824	0.62	48
Pharmacist	80	631	711	8,532	0.67	57
Pharmacy Technician	71	603	674	8,088	0.64	52
Environmental Health Officer	80	548	628	7,536	0.60	45
Environmental Health Technician	71	536	607	7,284	0.58	42
Hospital Equipment Technician	71	588	659	7,912	0.62	49
Radiographer Diagnostic	80	703	783	9,395	0.74	70
Medical Physicist	80	713	793	9,516	0.75	72
Hospital Medical Officer	118	937	1,055	12,664	1.00	127
Government Medical Officer	118	937	1,055	12,660	1.00	127
Registered General Nurse/ State Certified Nurse	71	620	691	8,292	0.65	54

6.2 Summary of aggregate level of productivity by district

The analysis revealed a national average health Workforce Productivity Index (WPI) of 75.94. This means that on average, for every US$100 spent on the salaries and wages of health workers, it yields various service outputs that are equivalent to 76 outpatient consultations. On average US$1 054 888.14 spent on wages and salaries for the health worker categories studied yielded an equivalent of 18 624 outpatient services.

Looking at the WPI index for the districts under study, 24 districts were performing above average and 39 districts were performing below the national average as shown in Figure 52. With regards to health worker productivity by district, Mt Darwin had the highest WPI of 208.13, followed by Mudzi 168.19, Mberengwa 149.28, Gokwe North 139.27 and Hurungwe 138.61. The districts with the lowest worker productivity index were Chitungwiza 21.6, Marondera 32.12 and Chikomba 34.25.

The Zimbabwe Workforce Productivity Index was fairly higher than the studies on WPI conducted in other African countries such as Ghana, Ethiopia and Kenya. It should be underscored that a Workforce Productivity Index (WPI) is a partial productivity study therefore to fully interpret and understand the productivity variations among individual employees, a Multidimensional Productivity Index is appropriate.

Figure 51 illustrates districts productivity by the density of colours. Districts with higher density of green have higher productivity than those with a lower shade of green.

FIGURE 51: *Heatmap of Districts on Aggregate Health Worker productivity, 2021–2022*

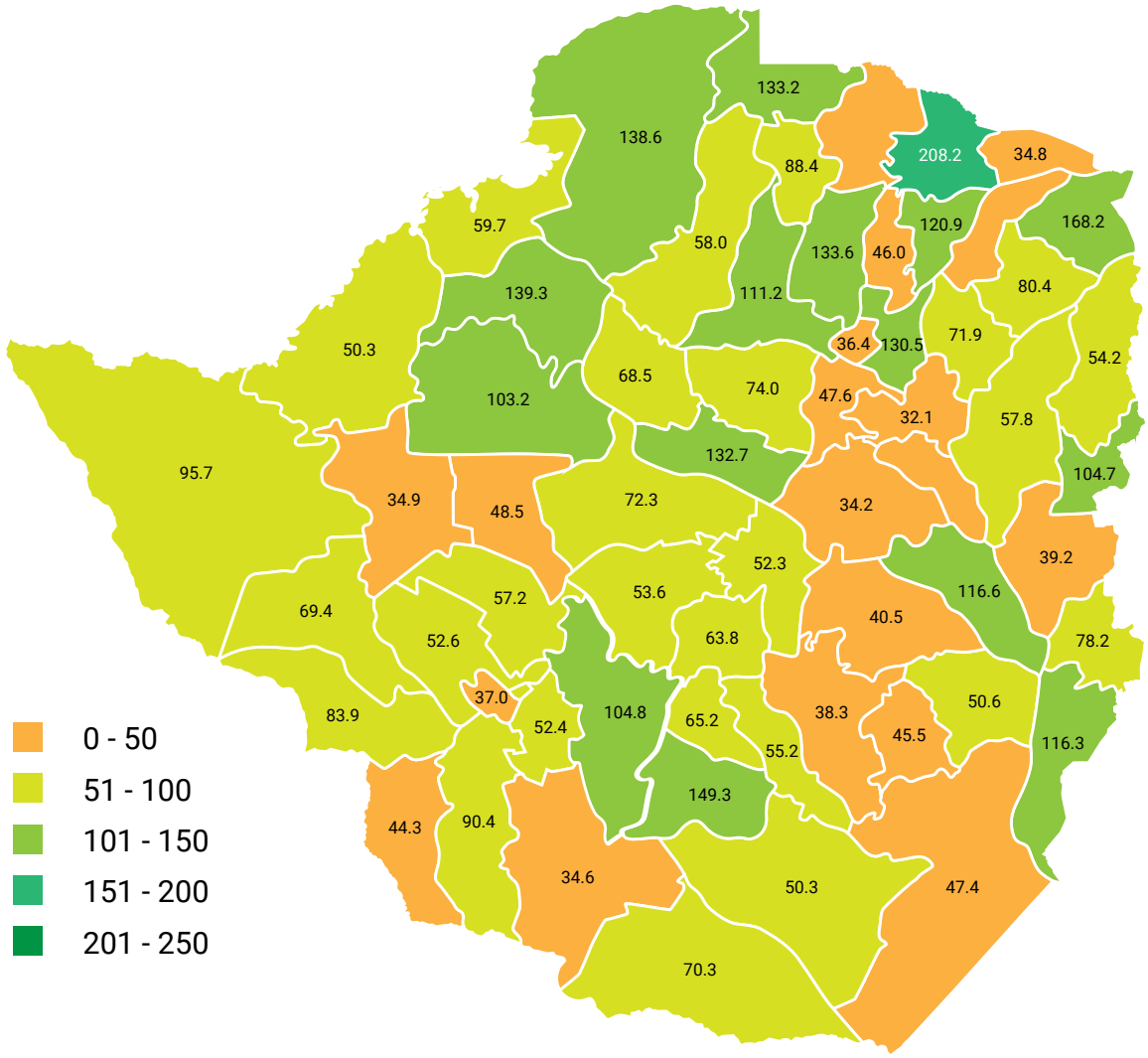
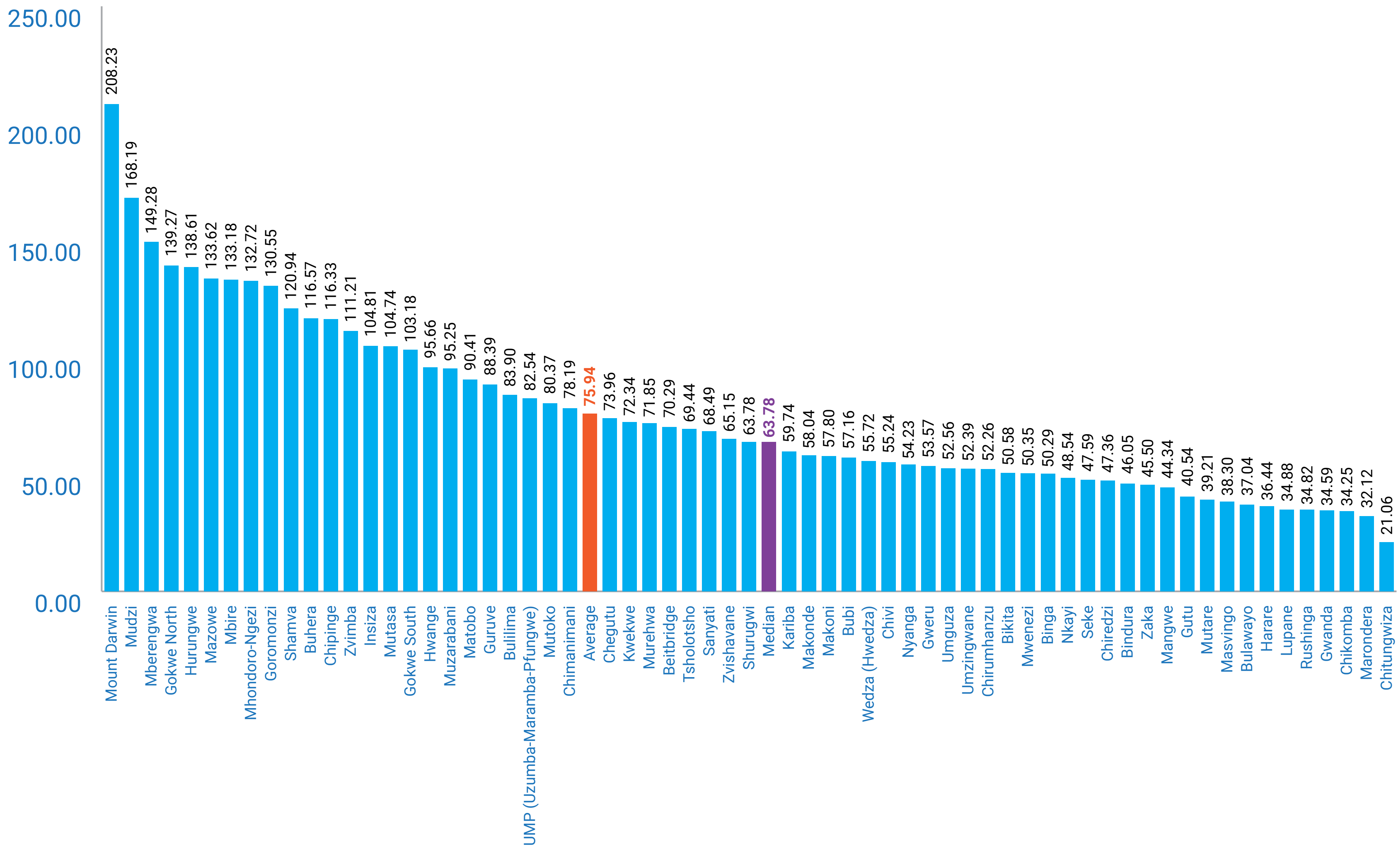


FIGURE 52: *District Ranking on Aggregate Health Worker productivity, 2021–2022*



6.3 Implications of productivity study on health workforce deployment and management

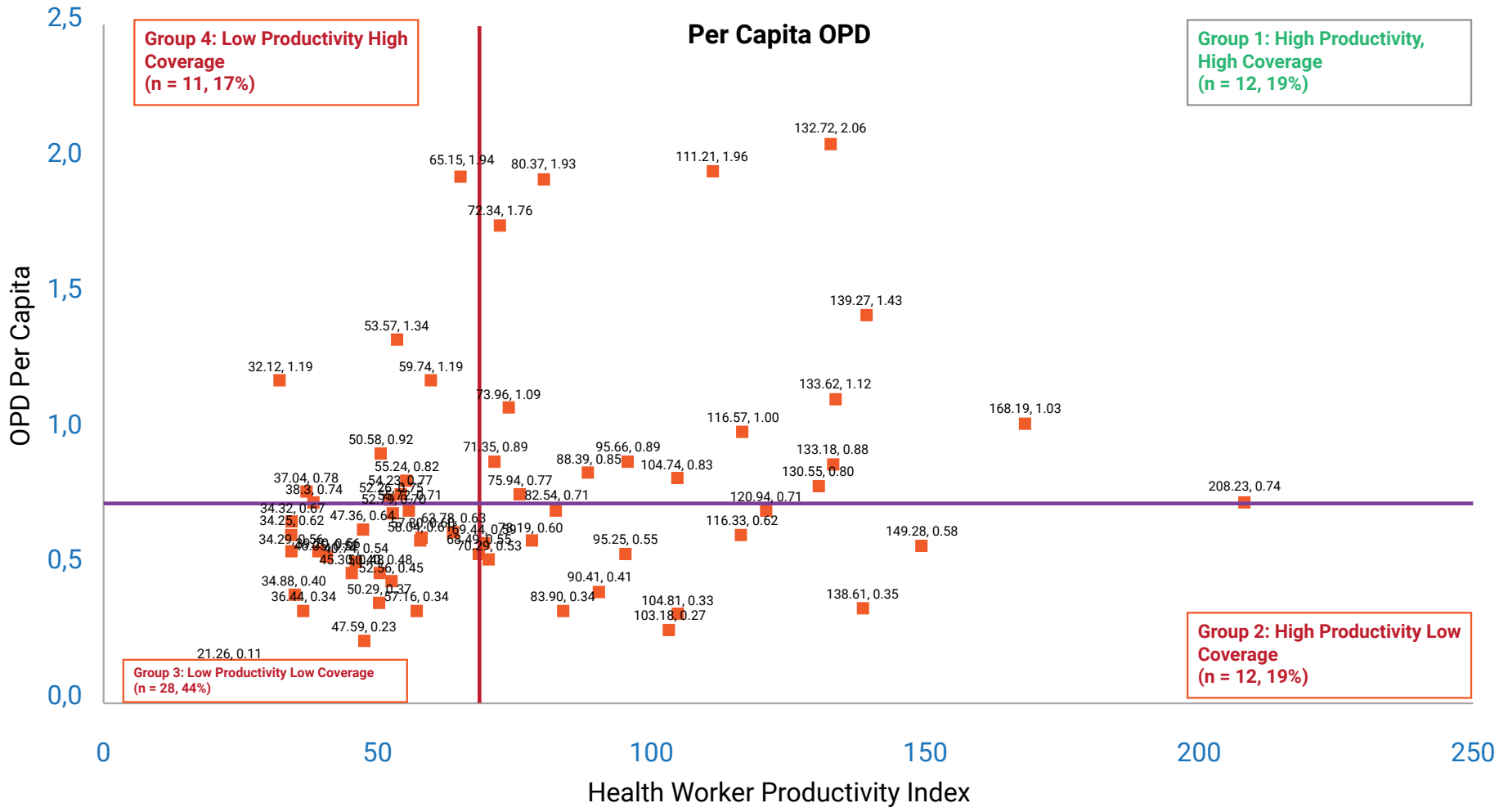
GROUP 1: *Districts* that have high workforce productivity and high service coverage (good performers) – keep them motivated

GROUP 2: *Districts* that have high workforce productivity, but low service coverage are those where the workforce is functioning well (i.e. each worker is providing an above-average number of services) **but much of the population does not receive care**. In these facilities/districts, ***service coverage is unlikely to increase without additional staff***. But more facilities may also be needed, if it is the case that the population does not have access to facilities hence they are not using services.

GROUP 3: *Districts* that have low productivity and low service coverage are those where the **workforce is not functioning well, and the population is not receiving adequate health care**. Within this group, staffing levels are likely to be adequate to increase coverage of services.

GROUP 4: *Districts* that have high coverage and low productivity may potentially be overstaffed. This judgment depends in part on the population density of the district.

FIGURE 53: *Aggregate Health Worker Productivity vs Service Coverage using (using OPD as proxy)*



Section 7.

Exploratory Labour Market Analysis from a Health Worker Survey

7.1 Categorisation of Respondents

A total of 2,687 health workers responded to the survey from the sampled facilities. The highest percentage of health workers who responded were Registered General Nurses (38.5%), followed by Nurse Aide (14.4%) and Primary Care Nurse (9.6%). Out of the total respondents 7.4% were Government/ Hospital Medical Officers. Table 22 shows percentage of health workers who responded to the survey by occupation.

TABLE 22: *Percentage (%) of health workers who responded to the survey*

Health Worker	Number of health workers who responded to the survey	Percent
Nurse Aide	387	14.4
Registered General Nurse / State Certified Nurse	1034	38.5
Medical Laboratory Technician/ State Certified Medical Laboratory Technician	51	1.9
Environmental Health Technician	116	4.3
Environmental Health Officer	33	1.2
Nutritionist	13	.5
Health Promotion Officer	8	.3
Midwife	115	4.3
Primary Care Nurse	257	9.6
Medical Laboratory Scientist,	51	1.9
Other	28	1.0
Government/Hospital Medical Officer	199	7.4
Nurse Anaesthetist	1	.0
Community Nurse	8	.3
Hospital Equipment Technician	16	.6
Community Health Worker	117	4.4
Hospital Food Services Supervisor	39	1.5
Physiotherapist	21	.8
Dental Therapist	22	.8
Operating Theatre Nurse	1	.0
Medical Laboratory Assistant,	4	.1
Pharmarcist	9	.3
Clinical Officer	9	.3
Rehabilitation Technician	53	2.0
Radiographer Diagnostics	8	.3
Dental Surgery Assistant	11	.4
Dispensary Assistant	11	.4
Pharmacy Technician	19	.7
Occupational Therapist	20	.7
Radiographer Therapy	1	.0
Dental Technician	11	.4
Orthopaedic Technician	3	.1
Medical Social Worker	3	.1
Traditional Medicine Practitioner	1	.0
Clinical Psychologist	2	.1
Dietitian	1	.0

Health Worker	Number of health workers who responded to the survey	Percent
Hospital Equipment Engineer	2	.1
Orthopaedic Technologist	1	.0
Orthopaedic Boot Maker	1	.0
Total	**2687**	**100.0**

Source: *HLMA Survey*

7.2 Demographic Characteristics of the Respondents (Health Workers)

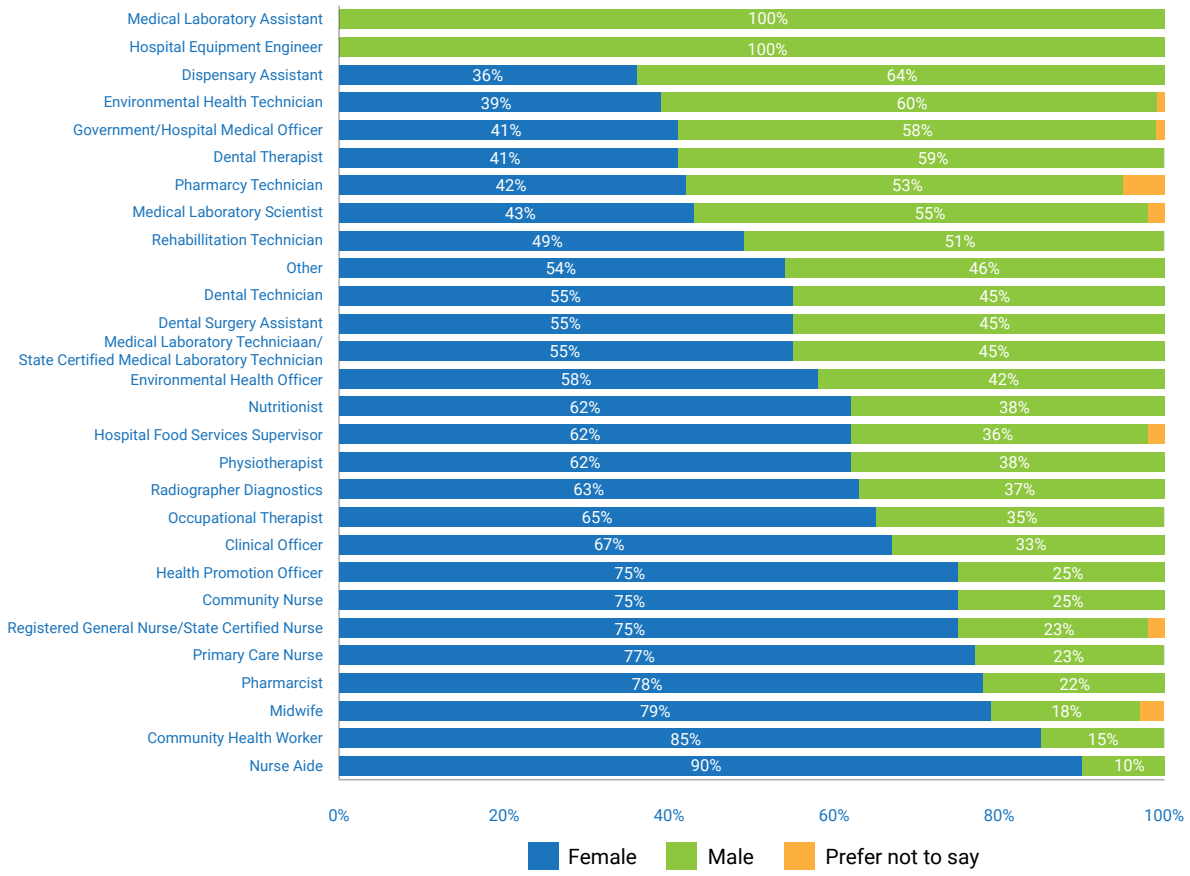
The respondents had an average age of 41 years (range: 18–70 years) and an average of 11 years of work experience (Range: 1–49 years). The highest proportion of respondents were between the ages of 35 and 44 (41.94%) followed by 25-34 age group with 26.08%. About 2.13 %of respondents were less than 25 years. This is shown by Table 23.

TABLE 23: *Characteristics of Health Worker Survey Respondents*

	Female (N=1877)	Male (N=784)	Undisclosed (N=26)	Total (N=2687)
What is your age (in years)?				
Mean (SD)	40.7 (9.63)	39.6 (9.53)	37.2 (9.50)	40.3(9.61)
Median (Min. Max]	40.0 (18.0, 70.0]	38.5(21.0. 69.0]	37.0 (24.0, 55.0]	39.0(18.0, 70.0]
Missing	11 (0.6%)	2 (0.3%)	1 (3.8%)	14 (0.5%)
Location				
Rural	737 (39.3%)	308 (39.3%)	1 (3.8%)	1046 (38.9%)
Semi-Urban	147 (7.8%)	90(11.5%)	3(11.5%)	240 (8.9%)
Urban	993 (52.9%)	386 (49.2%)	22 (84.6%)	1401 (52.1%)
Facility_Type				
Rural Health Centre	419(22.3%)	156(19.9%)	1 (3.8%)	576 (21.4%)
District Hospital	318(16.9%)	177 (22.6%)	2 (7.7%)	497(18.5%)
Private Health Facility	113(6.0%)	47 (6.0%)	0 (0%)	160 (6.0%)
Rural Hospital	126 (6.7%)	62 (7.9%)	0 (0%)	188 (7.0%)
Health Post	33(1.8%)	12(1.5%)	1 (3.8%)	46(1.7%)
Community Level	75 (4.0%)	15(1.9%)	1 (3.8%)	91 (3.4%)
Central Hospital	531 (28.3%)	221 (28.2%)	17(65.4%)	769 (28.6%)
Provincial Hospital	262 (14.0%)	94 (12.0%)	4 (15.4%)	360(13.4%)
Employer				
Public Sector	1618(86.2%)	699 (89.2%)	25 (96.2%)	2342 (87.2%)
Mission (Private Not for Profit)	91 (4.8%)	32 (4.1%)	1 (3.8%)	124 (4.6%)
Other	74 (3.9%)	20 (2.6%)	0(0%)	94 (3.5%)
Private for Profit	87 (4.6%)	32 (4.1%)	0(0%)	119(4.4%)
Non-Governmental Organisation - NGO	7 (0.4%)	1 (0.1%)	0(0%)	8 (0.3%)

The survey results showed that 70% of health workers were female, 29% were male and 1% chose not to disclose their gender. About 59% of doctors were male. Males also dominated as dispensary assistants (64%), Environmental technicians (60%) and government/hospital medical officer (58%). There were more females than males who were nurse aides (90%), community health workers (85%), midwives (79%), pharmacists (78%) and primary care nurses (77%). This is illustrated in figure 54.

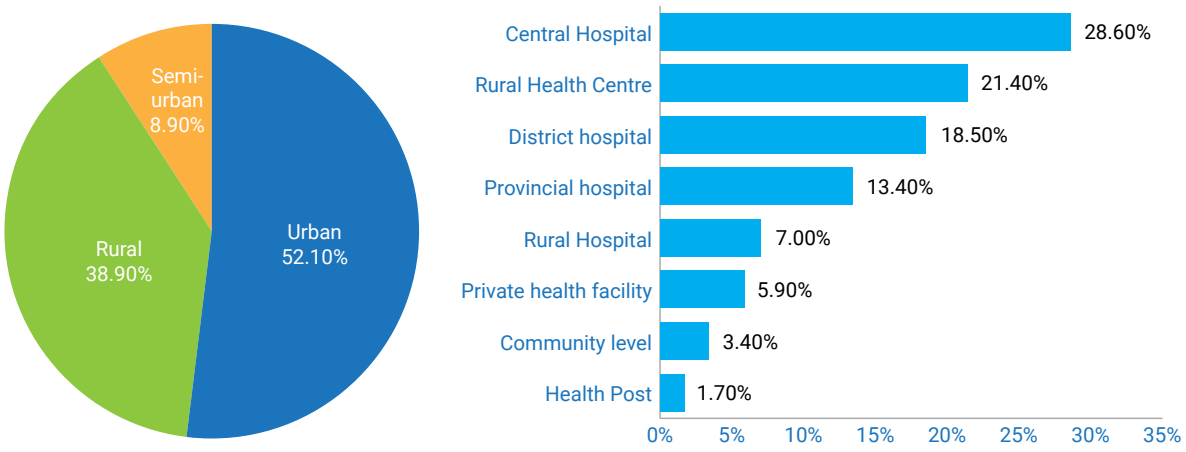
FIGURE 54: *Gender Distribution of the respondents*



7.3 Facility Type and Rural-Urban Distribution of Health Workers

The survey revealed that 52.1% of health workers work in urban areas, 38.9% in rural areas, and 8.9% in semi-urban areas. The distribution of health worker by facility type indicated that the highest proportion were in Central Hospitals (28.6%), followed by Rural Health Centres (21.4%), District Hospitals (18.5%) and Provincial Hospitals (13.40%). The health posts had the lowest proportion of health workers (1.7%) as shown in Figure 55.

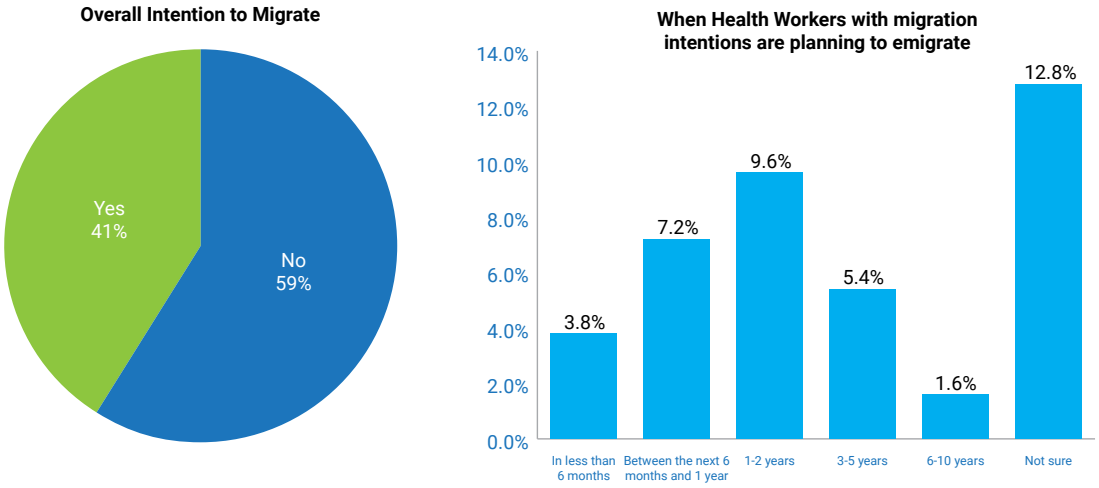
FIGURE 55: *Facility Type and Rural-Urban Distribution of health workers*



7.4 Intention to Migrate Amongst Health Workers

Of the 2,687 respondents, 41% (1102) had intentions to migrate abroad sometime in the future. Of these 75% had the intention to migrate for work and about 21% intended to migrate for further studies. Of the 41% intending to migrate, 53% had started working on their plans to migrate abroad. Amongst those with intentions to migrate, 3.8% were planning to leave within the next 6months and another 7.2% have plans of migrating within a year. Nearly 16.6% had plans to migrate from one year or more. Thirteen (13%) were not sure of when they will migrate though they intend to do so, as shown in Figure 56.

FIGURE 56: *Overall Migration Intention*



General Practitioners: Sixty two percent (62%) of General Practitioners intended to migrate abroad. Fifty-three (53%) of the Medical Practitioners had already started working on their plans to migrate. Around 2% intended to leave in less than 6months, 19% intended to leave between 6 months and 1 year.

Registered General Nurse: The survey revealed that 54% of Registered General Nurses intended to migrate. Of these 60% had initiated the process of migration. The survey revealed that 11% intended to leave in less than 6 months while 21% had intentions to leave between 6 months and one year. Almost 60% of Registered General Nurses intended to migrate from one year or more.

Midwife: Fifty three (53%) of Midwives had intentions to migrate abroad, of these 63% had already started working on their plans to migrate. About 5% of midwives intended to leave in less than 6months. Fourteen percent of Midwives intended to leave between 6 months and 1 year. The survey results showed that 38% of midwives intended to leave from 1 year or more.

Primary Care Nurse: About 26% of Primary Care Nurses had intentions to migrate. Out of the 26%, around 47% had started working on their plans to migrate abroad. Three percent intended to leave in less than 6 months, 25% intended to migrate in 1-2 years. See Table 24.

TABLE 24: *Migration Intentions Amongst Selected Cadres*

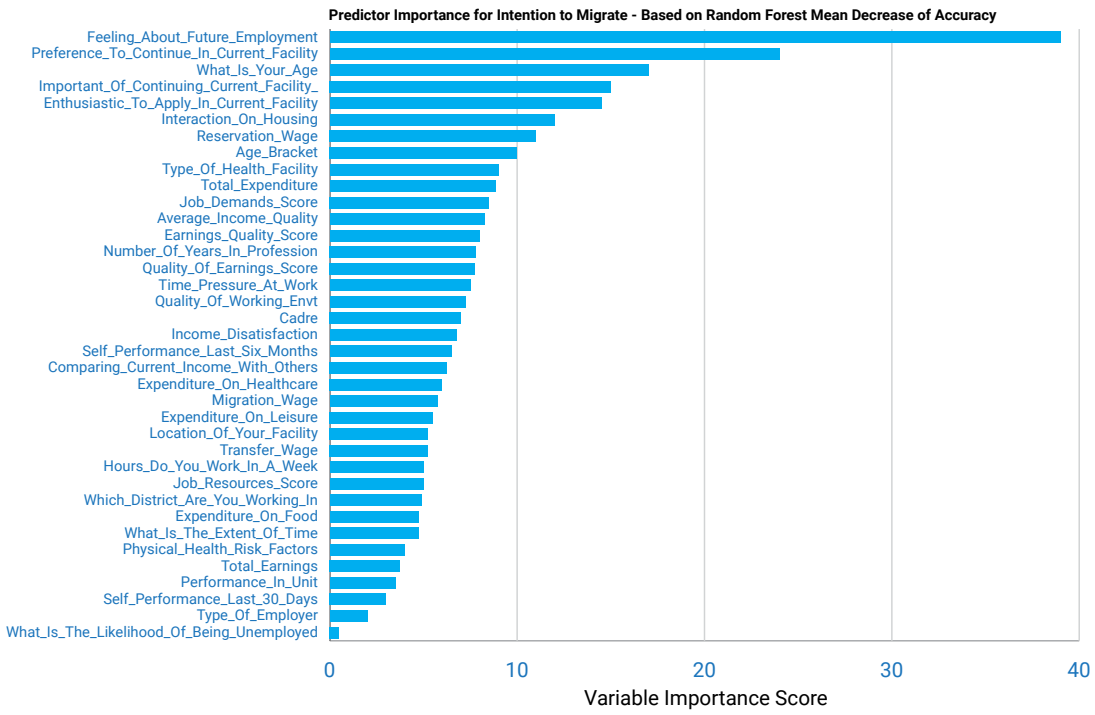
Cadre	Intention to Migrate	Already started working on your plans to migrate abroad	When the health worker intend to migrate					
			In less than 6 months	Between the next 6 months and 1 year	1-2 years	3-5 years	6-10 years	Not sure
Government/Hospital Medical Officer	62%	53%	2%	19%	36%	15%	6%	23%

Cadre	Intention to Migrate	Already started working on your plans to migrate abroad	When the health worker intend to migrate					
			In less than 6 months	Between the next 6 months and 1 year	1-2 years	3-5 years	6-10 years	Not sure
Midwife	53%	63%	5%	14%	19%	12%	7%	44%
Rehabilitation Technician	38%	40%	10%	15%	25%	15%	0%	35%
Medical Laboratory Technician/State Certified Medical Laboratory Technician"	35%	50%	6%	17%	28%	6%	17%	28%
Medical Laboratory Scientist,	31%	38%	13%	0%	19%	31%	6%	31%
Primary Care Nurse	26%	47%	3%	22%	25%	9%	5%	37%
Environmental Health Technician	25%	31%	7%	10%	34%	17%	7%	24%
Nurse Aide	20%	32%	12%	5%	12%	11%	4%	57%

7.5 Predictors of Intention to Migrate

This Section provides findings of an analysis of the HLMA individual health worker survey data that sought to identify predictors of Intention to Migrate (ITM). Using the question on whether a health worker had an intention to migrate or not as an outcome variable of interest against all possible predictor variables in the questionnaire, the authors used a Random Forest machine learning classification model against 35 predictor variables. The predictors were filtered having been confirmed as important predictors from the total of over 60 variables in the questionnaire, as part of a variable extraction step in the analysis. The Random Forest Model, which attained 82% accuracy and 79% precision in predicting ITM, was noted to have sufficiently good performance to provide some insights on factors influencing migration among health workers in Zimbabwe.

FIGURE 57: *Predictors of Intention to Migrate by Feature Importance*



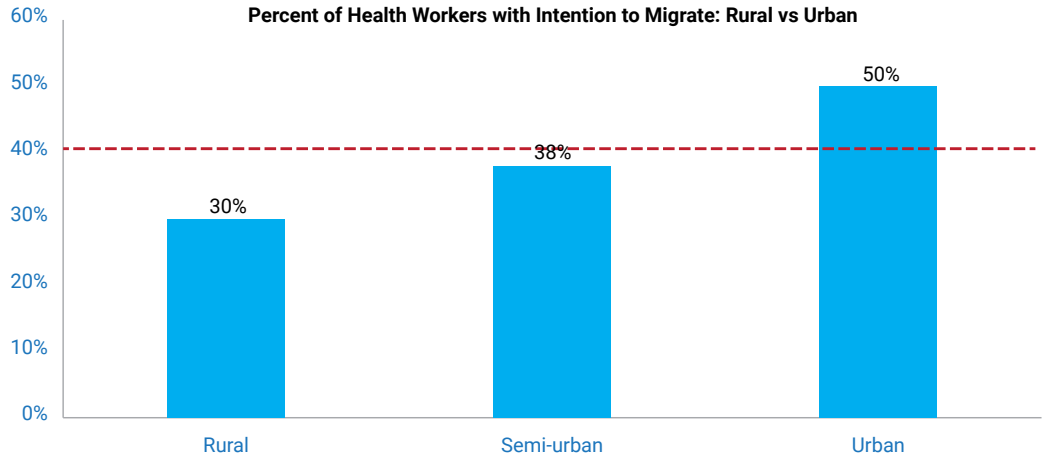
Source: *Authors Using HLMA Exploratory Data*

Figure 57 (see on the previous page) shows the ranking of variable importance in the prediction model, based on average decrease of accuracy - *number or proportion of observations that are incorrectly classified by removing the variable from the model*. In addition to directly and typically anticipated related factors such as health workers' feelings about future employment and preference to continue in current facility, other factors that ranked high were related to age, interaction of age and experience, housing expenditure, revenue wages and job demands. Other factors included in the list of confirmed predictors, albeit with relatively lower importance scores, reflect the diversity of push and pull factors that go beyond the income and expense burden to include work environment, job resources and physical health risk factors.

Rural vs urban comparison in intentions to migrate abroad

Figure 58 shows that health workers in urban areas (50%) had the highest percentage of intention to migrate followed by semi-urban areas with 38%. Of the Rural health workers 30% had intentions to emigrate (P<0.01).

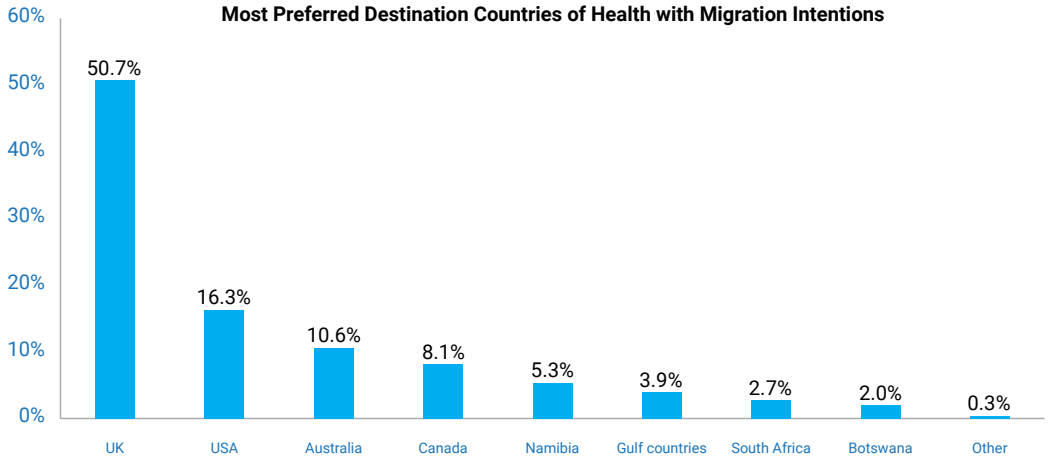
FIGURE 58: *Rural and Urban distribution of Health care workers with intentions to Migrate*



Likely Destination Countries for Health Workers with Migration Intentions

Consistent with current data on migration, the UK is the most preferred destination country for health workers with migration intentions. The survey revealed that the top 5most preferred countries that health workers intend to migrate to are the UK (50.7%), USA (16.3%), Australia (10.6%), Canada (8.1%) and Namibia (5.3%) as shown in Figure 59.

FIGURE 59: *Preferred destination countries*



7.6 Income and Wage Expectations of Zimbabwean Health Workers

The exploratory survey established that the average current income of all cadres of health workers excluding Village Health Workers were about US$463 (median =US$ 450) compared with an expected US$618 reservation wage. Although there were significant variations across cadres, the results indicated a gap of US$155 per month between what workers were earning and the minimum that they would accept if they were still unemployed. However, there were other health workers who did not state some allowances as part of their income therefore underestimating their total income. Nonetheless, 84% of the health worker categories had already attained their reservation wage when their reservation wages were compared to the payroll data. Therefore, any wage increase needed to be aimed towards reaching the transfer wage.

For community health workers, they earn an average of US$78 per months (as their work is not full time and they are remunerated at different rates depending on the funder). However, their reservation and transfer wages were US$130 and US$270, respectively. Towards salary harmonization for community health workers among the different funding partners, these could be considered as the benchmark.

The survey also revealed that the wage that makes them uninterested in taking up employment elsewhere was US$1,078 (transfer wage). The gap between their current income and their transfer wage was US$615, the potential retention gap. Thus, future retention strategies needed to incrementally close a gap of US$615. The migration wage to neighbouring, regional and international destinations was averaged at US$2,453.

Figure 60 summarises the average wage expectations of selected Health Workers and annex 1 has details.

FIGURE 60: *Summary of current income vs wage expectations*

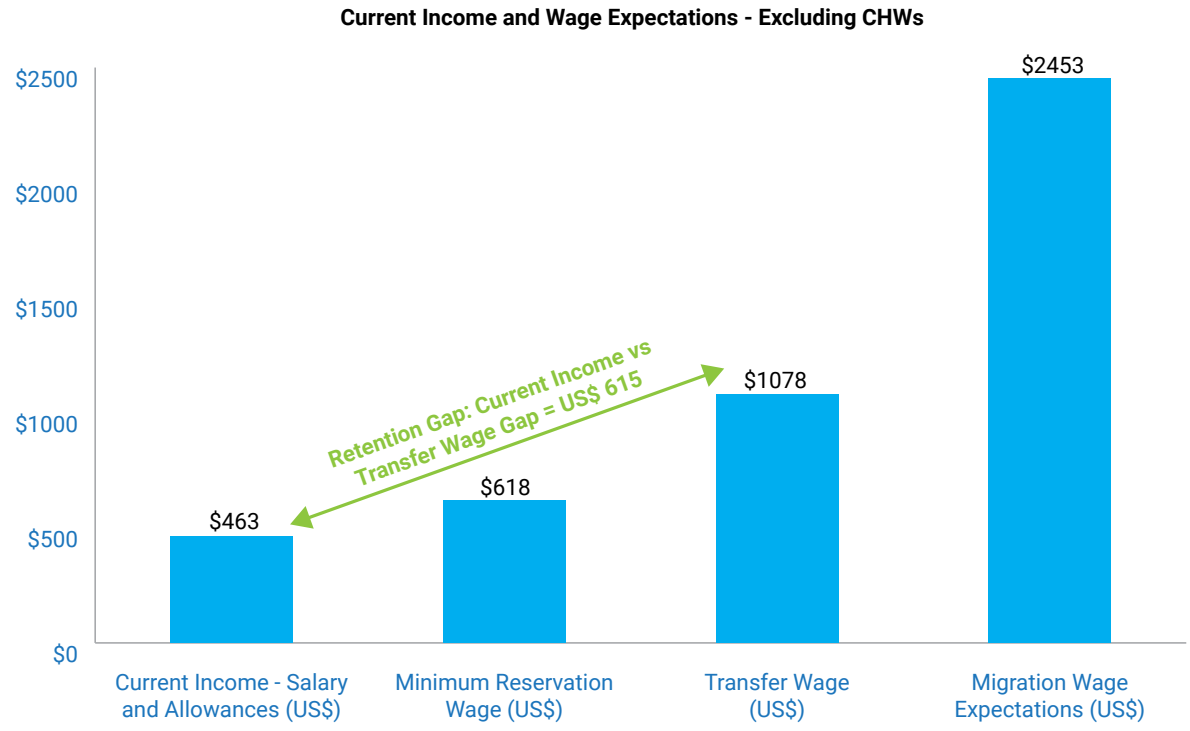
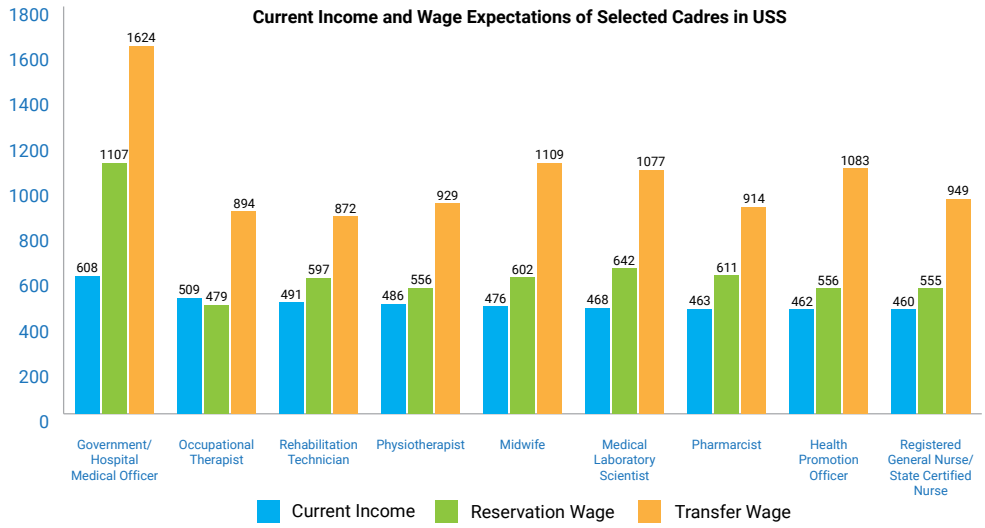


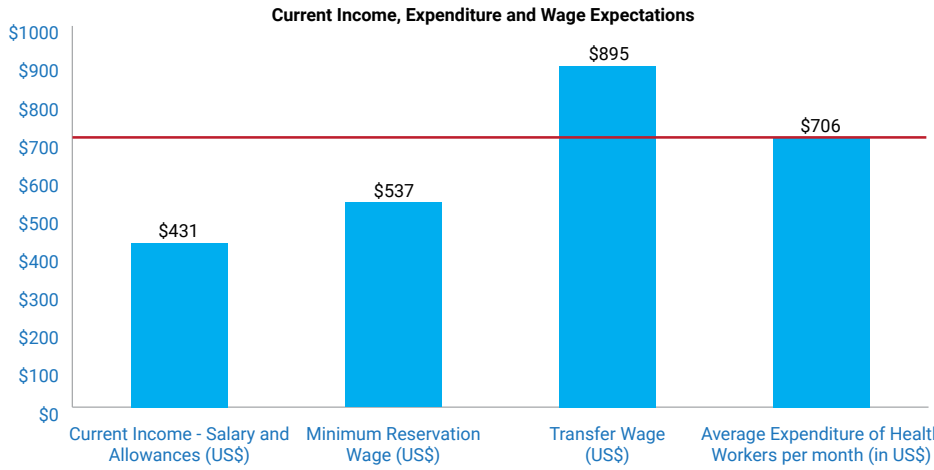
FIGURE 61: *Self-Reported Income and Wage Expectations by Cadre*



7.7 Health Workers' Personal Expenditure Compared with Current and Expected Income

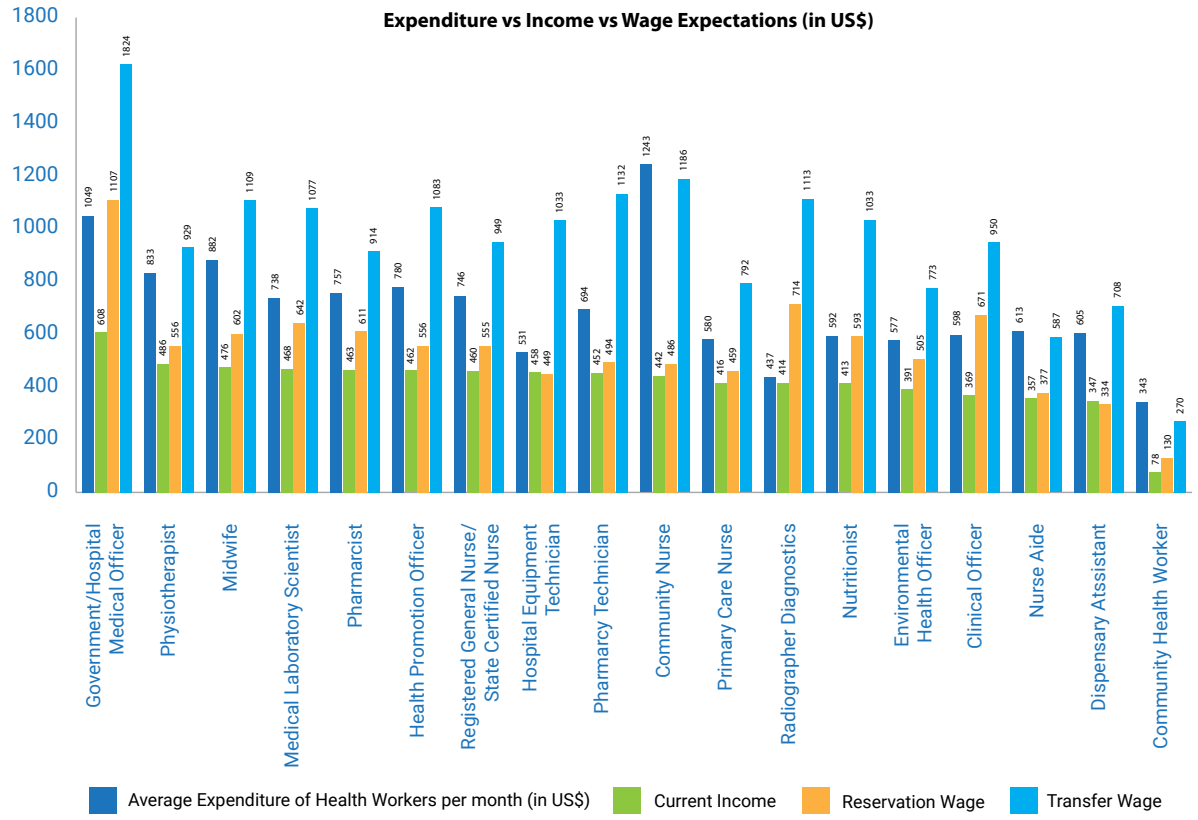
The survey established that health workers were averagely spending US$706 per month compared to their self-reported average income of US$431. If health workers were earning the average transfer wage of US$895, they would be earning a full living wage plus a potential savings of US$189, which would translate to 21% of income as savings. The gap between their current income and their expenditure is an average of US$275. Given the latter the health worker has to secure from other income sources about 64% of their current income to break even. In real terms the current health workers income only meets 61% of their basic needs as shown in figure 62.

FIGURE 62: *Summary of Health Workers' Personal Expenditure Compared with Current and Expected Income*



Overall, consumption expenditure by health workers varies by cadre with the General Medical Officer expenditure at US$1,049 compared to their self-reported average monthly earnings of US$608 giving a gap of US$441; and that of the Registered General Nurses being US$745 compared to their income of US$460 showing a gap of US$285. The net effect of the above scenario in real terms after statutory deductions as well as other basic deductions eg medical and funeral policy, the worker is worse off after expenses (net salary vs reported expenditure). Figure 63 shows the variations between income and expenditure by cadre.

FIGURE 63: *Personal Expenditure Compared with Current and Expected Income by Cadre*



7.8 Self-Reported Levels of Productivity and Absenteeism

The self-reported performance of Health workers in the last 30 days was 81% and 80% in the last 6months. They indicated that the job performance of co-workers in their ward or unit was 72%, meaning that health workers reported being 9% more productive than their peers in the same unit/ward. Therefore, actual self-reported productivity of health workers is anywhere between 72% and 81%.

The self-productivity gap was 19% and efforts should be made to improve productivity levels to 100%. However, salary adjustments to the health sector done in the last six months improved productivity by 1% and therefore did not effectively change the self-reported productivity of health workers.

FIGURE 64: *Self-Reported Levels of Productivity*

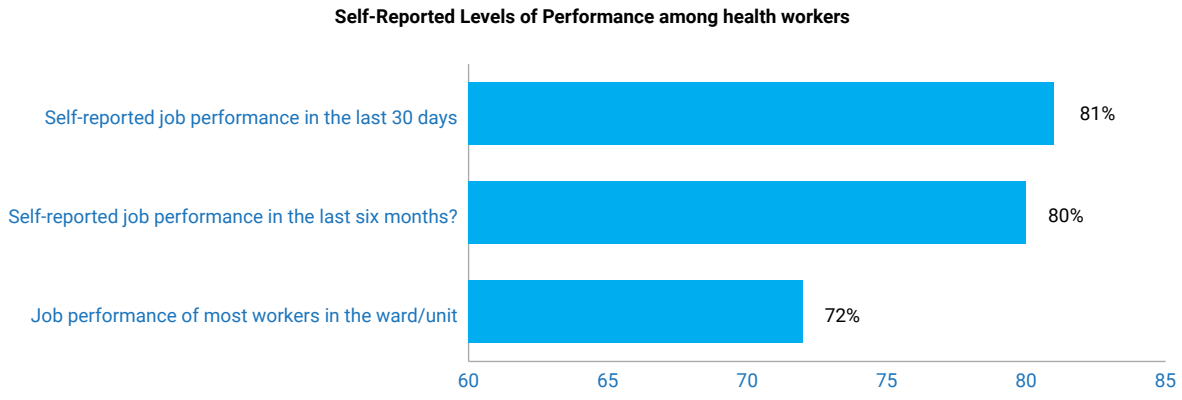
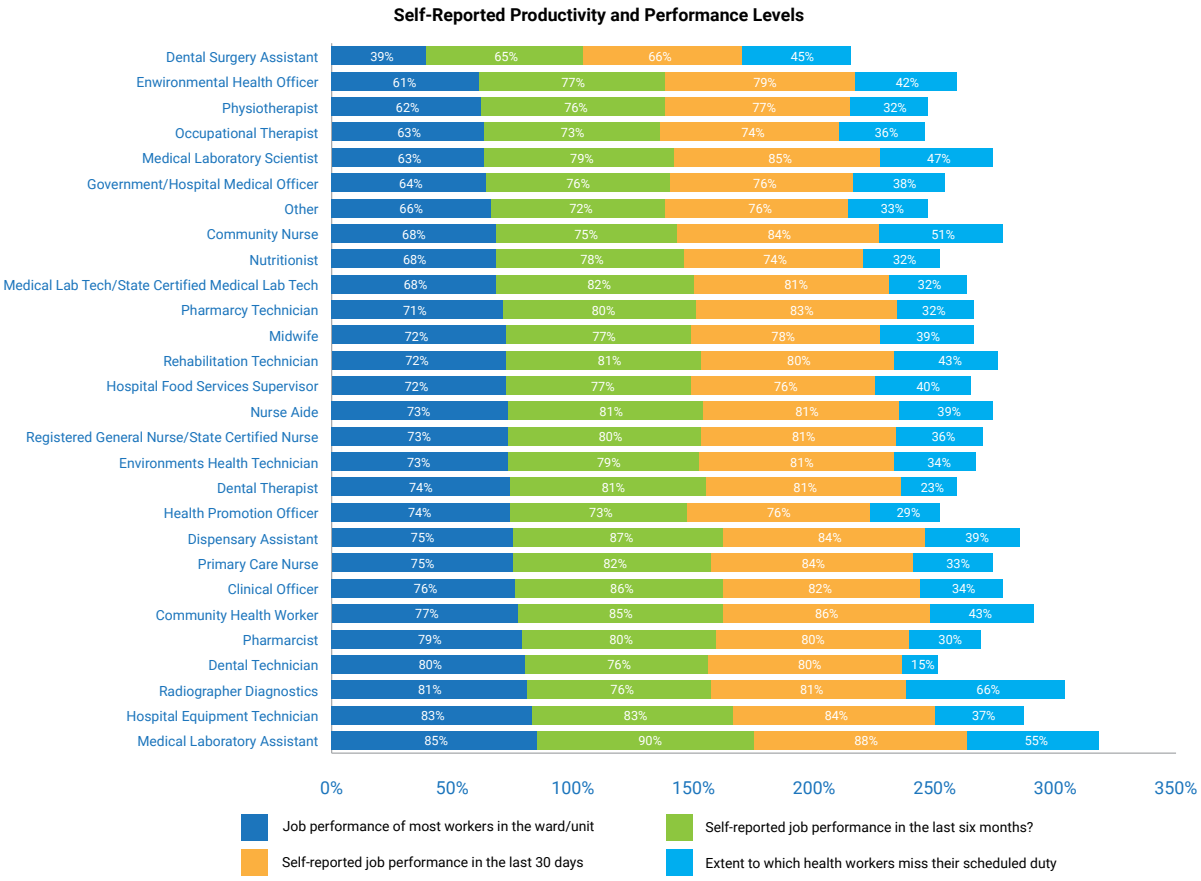


FIGURE 65: *Self-reported levels of productivity (selected cadres)*



Rural vs Urban Comparison of Self-reported productivity

Health workers in rural areas reported being 3.4% more productive compared to their urban counterparts (P<0.001). No statistically significant difference was detected between rural vs semi-urban and between urban and semi-urban. Predictors between urban and rural setting need to be modelled to establish their contribution to this outcome. Table 25 shows the comparisons between Rural vs Urban self-reported productivity.

TABLE 25: *Rural vs Urban Comparison of Self-reported productivity*

Location	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean	
					Lower Bound	Upper Bound
Rural	1046	8.31	1.894	0.059	8.19	8.42
Semi-urban	240	7.97	2.037	0.131	7.71	8.23
Urban	1399	7.91	2.143	0.057	7.80	8.03
Total	2685	8.07	2.048	0.040	8.00	8.15

Self-Reported Levels of Absenteeism

Health workers reported missing at least one day of their scheduled duties within the last month. This translated into an absenteeism rate of 3.3% (CI: 2.7–3.9%). However, this could be higher as health workers reported that for their colleagues, the tendency to be absent from work was roughly 37% which is more likely to be the level of absenteeism.

7.9 Quality of Health Worker's Job in Zimbabwe

The survey determined and measured the Global Job Quality Index which is composite measure of the following dimensions.

i. quality of earnings score,

ii. labour market quality score and

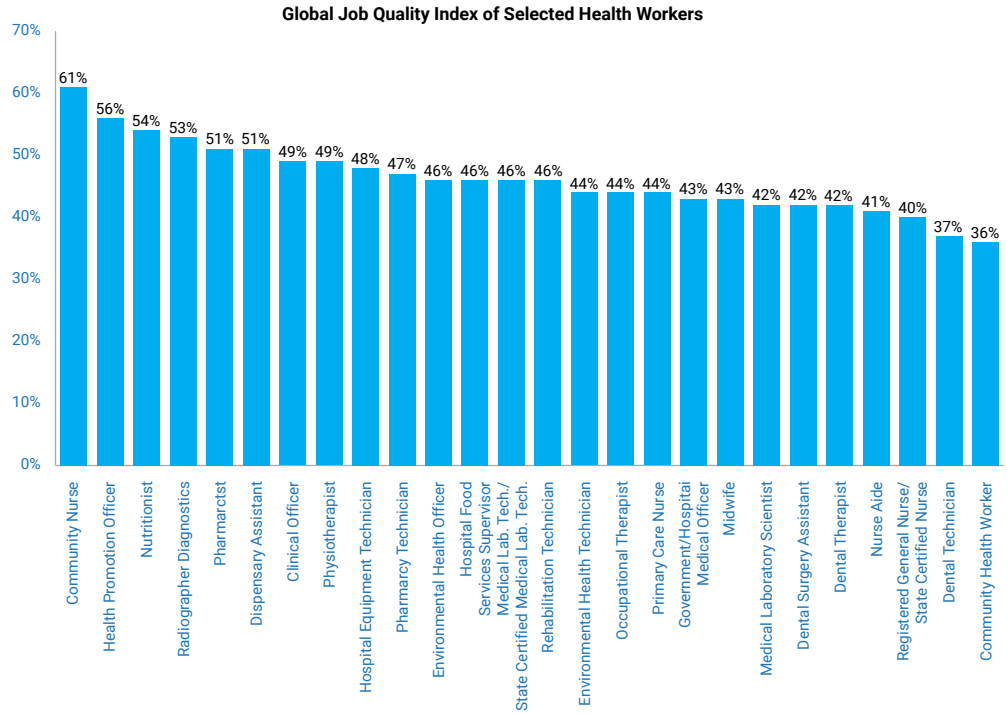
iii. quality of working environment.

Overall, the quality of health worker's job was rated at 42%. Of the three dimensions, the highest job quality score was on the quality of working environment (70%), and lowest was on the quality of earning which was rated at 16%. The labour market conditions (protection against unemployment and extreme low pay) also scored low at 38%. The global job quality score was brought down by the quality of earning score and the labour market quality score. The Global job quality index for the health workers was below 50% and efforts should be made to target the quality of earnings score and labour market quality score which were generally low.

FIGURE 66: *Overall job quality scores of health workers*

Job Quality Dimension	N	Std. Error	Mean	9% LCL	95% UCL
Global Job Quality Index	**1869**	**0.0217**	**42%**	**38%**	**46%**
Qualty of Earnings Score	***2091***	***0.03615***	***16%***	***9%***	***23%***
Labour Market Quality Score	***2456***	***0.03221***	***38%***	***32%***	***44%***
Unemployment Security Score	2686	0.04723	28%	18%	37%
Security Against Extreme Low Pay score	2457	0.04121	48%	40%	56%
Quality of Working Environment Score	**2681**	**0.03798**	**70%**	**62%**	**77%**
Job demands score	2681	0.04701	71%	62%	80%
Job Resources Score	2683	0.04101	69%	60%	77%

FIGURE 67: *Overall job quality scores of health workers by cadres*



Section 8.

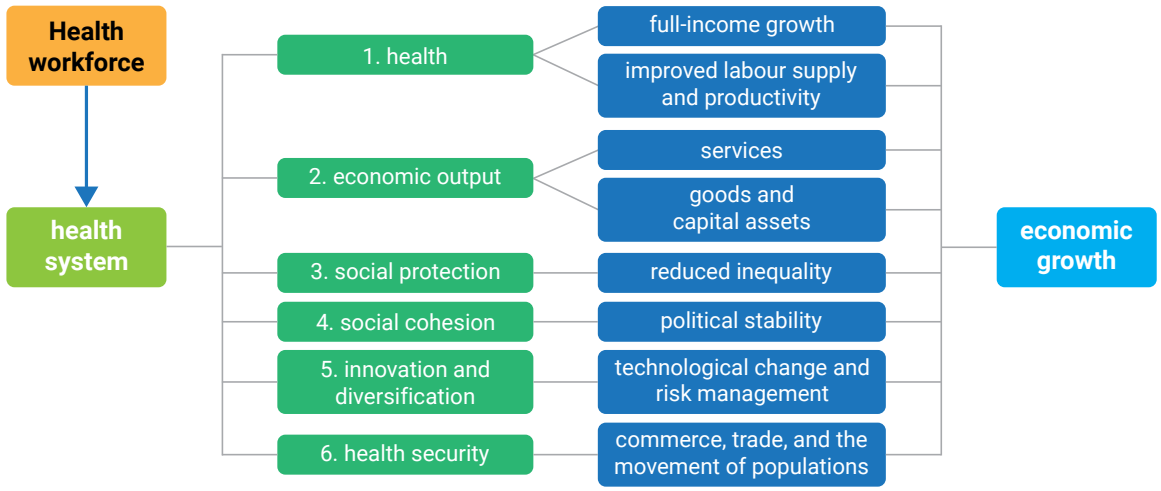
Return on Investment Analysis

8.1 Global evidence on returns on investing in the health workforce

As part of the global sustainable growth and development agenda, the United Nations member countries including Zimbabwe in 2015 adopted the Sustainable Development Goals (SDGs) of which Goal 3with its 13 targets aims at healthy lives and the well-being of people at all ages, including universal health coverage (UHC).

Health workforce expenditure has previously been considered a cost that needs to be contained to free up resources for investment in areas that have been traditionally considered productive sectors. However, recent evidence has shown that the health workforce is an important multiplier of economic growth through six main causal pathways (see Figure 65). These are (a) the health pathway -the intrinsic (non-market-value) health benefits of the health system; (b) the economic output pathway which concerns the intrinsic (market-value) economic benefits of the health system; (c) the social protection pathway, addressing sickness, disability, unemployment and old-age benefits, as well as financial protection against loss of income and catastrophic health payments; (d) the social cohesion pathway, addressing the role of a health system in promoting equity and fostering redistribution and growth; (e) the innovation and diversification pathway, addressing the role of the health system in driving technological development and in offering protection against macroeconomic shocks; and (f) the health security pathway, addressing the role of the health system in protecting against epidemic outbreaks and potential pandemics[3]

FIGURE 68: *Health pathway to economic growth*



Source: *Adapted from Lauer et al, 2017*

Furthermore, the report of the UN High Commission on Health Employment and Economic Growth (HEEG) demonstrated that investing in the health workforce yielded a 9-fold **return on investment**. WHO, 'Working for Health and Growth: Investing in the Health Workforce', 2016.However, this is an area that requires further exploration.

8.2 Return on Investment from Investing in Health Workforce

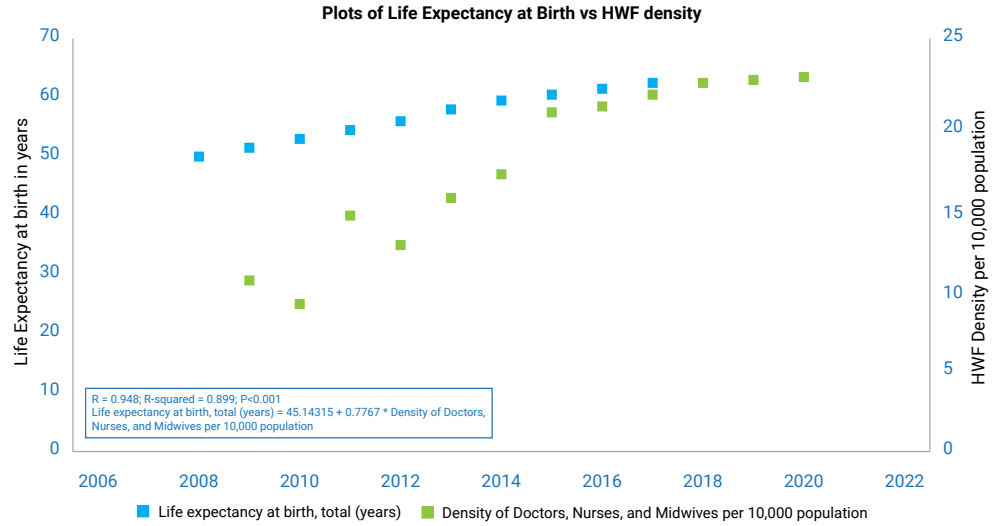
Owing to data limitations, sophisticated impact modelling was not feasible. Therefore, simple corrections and single variable models were used to explore between health workforce density and selected variables. The preliminary results largely reinforce the known global evidence that investing in the health workforce provides a significant return on investment.

3 J. Lauer and others, 'Pathways: The Health System, Health Employment, and Economic Growth', In Health Employment and Economic Growth: An Evidence Base. Geneva: World Health Organization, 174 (2017).

Increased Life Expectancy versus Health Workforce Investment

In Zimbabwe's context, increasing employed health workforce density by one unit per 10 000 population (that is, by approximately 1,520 per annum) is correlated with at least one year of added life expectancy to Zimbabwe (see Figure 69), which in turn has a great impact on GDP per capita.

FIGURE 69: *Scatter plot showing the relationship between health workforce per 10 000 population and life expectancy at birth in Zimbabwe*

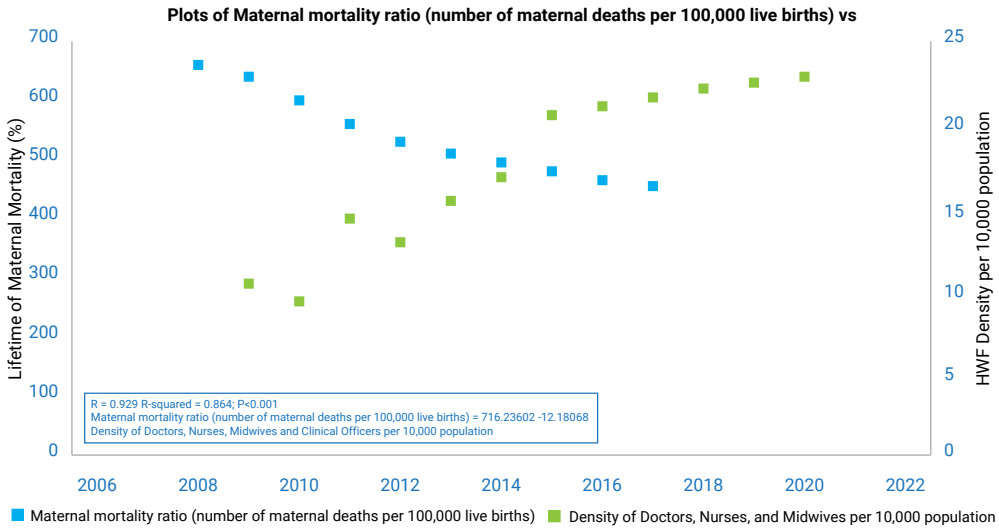


Source: *Analysed from World Development Indicators, World Bank (2022)*

Reduction in Maternal Mortality

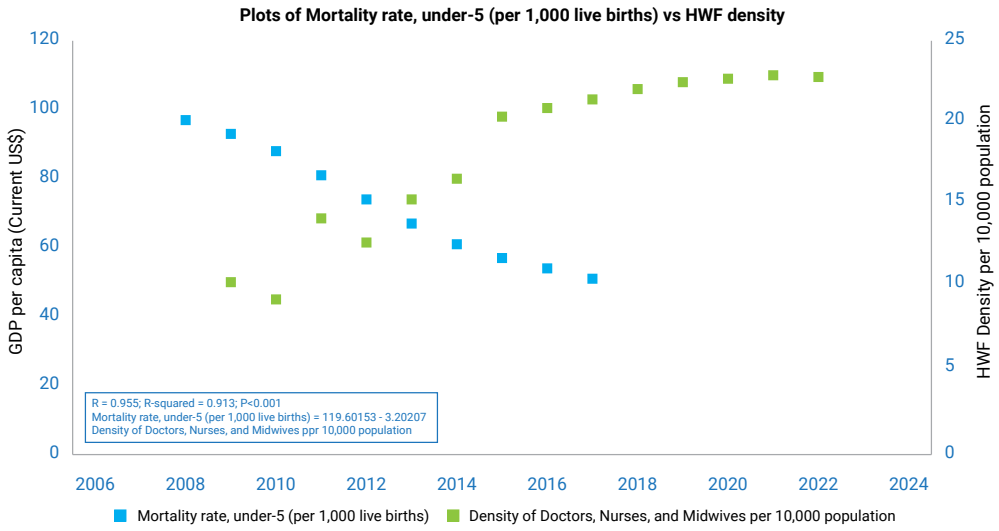
Also, the analysis shows a negative and statistically significant relationship between health workforce density and the lifetime risk of maternal death in Zimbabwe. ***For every 1,520 trained and retained health workers, 12 maternal deaths for every 100,000 live births per year are averted*** (see figure 70). This analysis should, however, be interpreted with caution as the time series was only 11 years and single predictor variable models were assumed, but in reality, several variables moderate or mediate or even confound these relationships.

FIGURE 70: *Scatter plot showing the relationship between health workforce per 10 000 population and lifetime risk of maternal death in Zimbabwe*



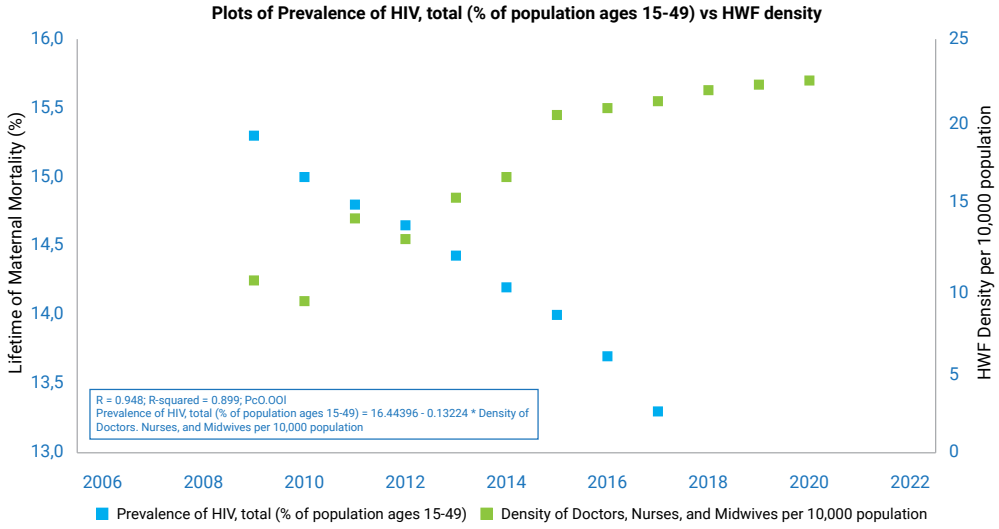
Health Workers keep the children alive and healthy: Also, the analysis showed a negative and statistically significant relationship between health workforce density and under-5 mortality per 1,000 live births. ***If Zimbabwe increases by one unit in the density of health workers per 10,000 population (say, 1520 doctors, nurses and midwives), they avert 3 under-5 mortality per 1,000 live births*** as shown in figure 71.

FIGURE 71: *Scatter plot showing the relationship between health workforce per 10 000 population and under 5 mortality rate per 1,000 live births*



Health workers boost HIV epidemic control: The analysis showed a negative and statistically significant relationship between health workforce density and HIV prevalence of population aged 15–49 years old. ***For every 1,520 trained and retained health workers, there is an associated reduction in HIV prevalence rate by 0.13%*** as shown in figure 72.

FIGURE 72: *Scatter plot showing the relationship between health workforce per 10 000 population and HIV prevalence of population aged 15-49*



NB: For every US$100 spent on the salaries and wages of health workers, it yields various service outputs that are equivalent to 76 outpatient consultations in relation the workforce productivity index

Zimbabwean health workers are highly productive, the investment will not be wasted:

BOX 7: RETURN ON INVESTMENT IN ZIMBABWE'S HEALTH WORKFORCE

i. In Zimbabwe's context, increasing employed health workforce density by one unit per 10 000 population (that is, by approximately 1,520 per annum) is correlated with at least one year of added life expectancy to Zimbabwe

ii. For every 1,520 trained and retained health workers, 12 maternal deaths for every 100,000 live births per year are averted

iii. If Zimbabwe increases by one unit in the density of health workers per 10,000 population (say, 1520 doctors, nurses and midwives), they avert 3 under-5 mortality per 1,000 live births

iv. For every 1,520 trained and retained health workers, there is an associated reduction in HIV prevalence rate by 0.13%

v. For every US$100 spent on the salaries and wages of health workers, it yields various service outputs that are equivalent to 76 outpatient consultations in relation the workforce productivity index

Recommendations for Policy and Strategic Actions

Based on the findings of the Zimbabwe comprehensive HLMA, the Health Services Board together with the Ministry of Health and Child Care recommended the following policy and strategic actions to address the findings of the report, which are categorised into 5 thematic areas as outlined below:

1. **Human Resources for Health Planning and Financing**

   Prioritize health workforce planning and financing to address population health needs and reduce health worker attrition from the health labour market

   1.1. Advocate for sustained political commitment to achieve an upper middle-income health system by 2030.

   1.2. Adopt 80 service coverage index for UHC as strategic direction for health system development towards upper middle-income health care system and progressively work towards meeting the financial space requirements to address the HRH needs, salaries and wages required to retain staff.

   1.3. Develop an HRH Investment Compact aimed at progressive development of a sustainable Health Workforce supply and demand towards an upper middle income health system.

   1.4. Secure and sustain Government commitment to support Community Health Workers through grant aiding.

   1.5. Utilise evidence on wage expectations (reservation wage, transfer wage and economic rent) to guide policies on Government and partner-supported posts.

   1.6. Initiate annual health workforce dialogue.

2. **Human Resources for Health Production, Training and Development**

   Rapidly scale up the quantity and quality of health workforce education and training (production) to address the current shortages and evolving population health needs

   To address the shortfall in the supply of additional healthcare workers the following should be considered:

   2.1. Establish and expand existing basic, post-basic, undergraduate and post-graduate training schools.

   2.2. Mobilize equipment, material resources and retain high quality human resources for training.

   2.3. Improve the skills mix for disciplines that are not being locally trained and provide targeted scholarships for critical shortage areas.

3. **Human Resources for Health Deployment, Utilisation and Governance**

   Optimize the HRH deployment governance system to ensure deployment of health workforce in an equitable manner to adequately address the population health needs in different geographical areas.

   Under this priority area focus should be on the following:

3.1. Expand MoHCC staff establishment by an average of 9 758 workers per year from 2023 to 2030 to meet the projected staff need of 133 128 required for 80% Universal Health Coverage and 99.1% disease burden coverage in an upper middle income economy. Due to issues of fiscal sustainability and demand affordability the establishment expansion shall be prioritised among the different cadres, 48,8% for low priority cadres, 56,3% for medium priority cadres and 66,7% for high priority cadres based on affordability levels and fiscal space. The prioritisation is based on difficulty in filling the post, attrition rates and criticality.

3.2. Improve the quality of earnings, unemployment security and security against extreme low pay to increase the health worker job quality index to favourable levels (above 70%).

4. Human Resources for Health Migration and Retention Management

Rapidly set up mechanisms to address and manage human resources for health migration and retention.

The following actions are proposed for consideration:

4.1. Reduce the intention to migrate from the current 41% to less than 10%.

4.2. Increase maximum production of health workers and reduce attrition by at least 50% of the 2022 levels.

4.3. Develop evidence-based ethical policies on the migration of health workers by the end of 2023 by reviewing the bonding agreement framework to reduce external migration.

4.4. Review salaries progressively to transfer wage levels by 2025.

4.5. Resuscitate a health sector employees vehicle loan guarantee fund by 2025.

4.6. Implement a Housing loan guarantee scheme to expand loan beneficiaries from the current 637 to cover all eligible cadres and use bank-supported schemes.

4.7. Advocate for Zimbabwe to be added to the health workforce support and safeguard list when it becomes eligible in 2023 and sign bilateral agreements with countries that have the highest intake of Health Workers from Zimbabwe.

5. Human Resources for Health Information, Research, Monitoring and Evaluation

Increase investment in strengthening health workforce data, evidence generation and use for decision making through a robust human resource for health information, research and Monitoring and evaluation system

To ensure robust HRH information is available for decision making the following should be considered:

5.1. Conduct a Multidimensional Productivity Index (MPI) study for the health sector to guide productivity improvement plans and salary incentives.

5.2. Develop and implement the National Health Workforce Accounts and the Zimbabwe National Health Workforce Observatory to enable triangulation and harmonisation of health workforce data and information across different sectors of the country.

5.3. Carry out periodic health labour market analysis using data generated from routine health information systems.

Annex 1: Income and Wage Expectations by Cadre

Cadre	Current Income	Reservation Wage	Transfer Wage	Migration	Current Income vs Reservation Wage	Current Income vs Transfer Wage	Return Migration Gap	Current Income vs Reservation Wage (%)	Current Income vs Transfer Wage (%)
Government/Hospital Medical Officer	608	1,107	1,624	3,050	-499	-1,016	-2,442	-82%	-167%
Occupational Therapist	509	479	894	2,467	30	-386	-1,958	6%	-76%
Rehabilitation Technician	491	597	872	2,251	-106	-381	-1,760	-22%	-78%
Physiotherapist	486	556	929	3,021	-70	-443	-2,535	-14%	-91%
Midwife	476	602	1,109	2,660	-126	-633	-2,183	-26%	-133%
Medical Laboratory Scientist,	468	642	1,077	2,154	-174	-608	-1,686	-37%	-130%
Pharmarcist	463	611	914	1,757	-148	-451	-1,294	-32%	-98%
Health Promotion Officer	462	556	1,083	1,880	-94	-621	-1,418	-20%	-135%
Registered General Nurse / State Certified Nurse	460	555	949	2,423	-95	-489	-1,963	-21%	-106%
Hospital Equipment Technician	458	449	1,033	2,736	9	-575	-2,278	2%	-126%
Pharmacy Technician	452	494	1,132	2,519	-42	-679	-2,066	-9%	-150%
Community Nurse	442	486	1,186	2,783	-44	-744	-2,341	-10%	-168%
Dental Surgery Assistant	439	1,040	1,372	2,029	-601	-933	-1,590	-137%	-213%
Environmental Health Technician	430	455	810	1,728	-25	-380	-1,298	-6%	-88%
Dental Therapist	429	503	852	1,600	-74	-423	-1,171	-17%	-99%
Medical Laboratory Technician/ State Certified Medical Laboratory Technician	425	484	761	2,293	-60	-336	-1,868	-14%	-79%
Hospital Food Services Supervisor	424	522	784	2,306	-98	-360	-1,883	-23%	-85%
Primary Care Nurse	416	459	792	1,865	-44	-376	-1,449	-11%	-91%
Radiographer Diagnostics	414	714	1,113	3,214	-300	-699	-2,800	-72%	-169%
Nutritionist	413	593	1,033	2,200	-180	-620	-1,787	-44%	-150%
Dental Technician	398	636	1,165	2,020	-239	-767	-1,622	-60%	-193%
Environmental Health Officer	391	505	773	1,755	-114	-382	-1,364	-29%	-98%
Clinical Officer	369	671	950	2,306	-302	-581	-1,936	-82%	-157%
Nurse Aide	357	377	587	1,471	-19	-230	-1,114	-5%	-64%
Dispensary Assistant	347	334	708	1,550	13	-361	-1,203	4%	-104%
Other	335	649	887	2,002	-313	-552	-1,666	-93%	-165%
Community Health Worker	78	130	270	657	-51	-191	-578	-66%	-244%

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