

**REPUBLIC OF RWANDA
MINISTRY OF HEALTH**



HEALTH LABOUR MARKET ANALYSIS REPORT

MAY, 2019

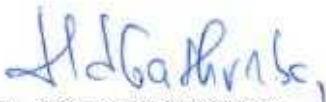
Foreword

Rwanda Ministry of Health undertook the Health labour market analysis (HLMA) in order to inform strategic planning and investment in the health workforce in order to contribute to national development agenda as well as attaining both the Universal Health Coverage and Sustainable Development Goals (SDGs).

The HLMA report analysed the human resources for health (HRH) situation in Rwanda including the HRH data for both the public and private health care sectors, the supply (education and training, flow of graduated, exit from health sector, etc.) and demand side factors (public versus private demand; migration etc.) and the absorption capacity of the public and private health care sectors as well as the financial sustainability aspects for HRH. It thus provides evidence for policy dialogue among relevant policy makers in order to improve the functioning (supply and demand) of human resources at both policy and implementation levels.

The HLMA report is a product of collaboration of the Ministry of Health stakeholders: High learning institutions, Professional Councils, Private Sector, Health facilities and relevant Development Partners who support the Ministry's efforts in the field of human resources for health. Thus, for the implementation of HLMA to be successful, combined efforts from different stakeholders will be needed. This calls upon all stakeholders from both the Government and its stakeholders to use this report to inform the development of strategic and operational plans as well as future human resources for health policies. We thus hope that this report will be a foundation upon which to address potential labour market failures for corrective policy actions

It is our utmost expectation that the current HLMA report will contribute immensely to strengthening the Human Resources for Health to achieve Universal Health Coverage and Sustainable Development Goals, through policy dialogues and evidence-based implementation of the recommendations—thereby overall contributing to improving human capital—much needed for the country's socioeconomic transformation.


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EXECUTIVE SUMMARY

Background: As part of efforts towards the attainment of the health-related targets of Rwanda vision 2050 and consistent with the global aspirations of Universal Health Coverage (UHC) and the Sustainable Development Goals (SDGs), the Government of Rwanda has been working assiduously to improve health through the implementation of various policies and strategies resulting in significant improvements in health outcomes of the population.

While these improvements have been fairly linked to substantial increase in the skilled health workforce density of the country since the beginning of the millennium, the Rwandan healthcare system continues to face a number of health workforce challenges requiring undertaking the health labour market analysis to understand the dynamics in the healthcare labour market in order to generate further evidence to support policy decisions.

Method: A triangulated approach was used to collect data and analyse the health workforce situation and labour market dynamics in Rwanda. These included desk review or document analysis, stakeholders' discussions (key informants and focus group discussion), descriptive analysis of existing data and supply-demand modelling based on an established and validated labour market framework.

Findings

Stock and composition: A total of 21,552 health professionals are registered in Rwanda comprising of 7% (1,521) Doctors, 70% (15,050) Nurses and Midwives, 19% (4,083) Allied Health Professionals, and 4% Pharmacists and Pharmacy Technicians. Doctor, nurse and midwife to population density is 1.01 per 1,000 population, 108% increase since 2005. There has been sustained improvements in the number of GPs registered in Rwanda since 2013 but records at the MOH show that since the year 2000, about 518 Rwandan Medical Specialists have been trained in various specialities out of which 13% migrated out of the country and 3% as attrition rate (death or retirement) from the labour market. Nurses and Midwives registered in Rwanda have more than doubled between 2013 and 2017 (218% increase). The number of pharmacists registered in Rwanda is growing by 22% annually since 2016.

Human Resources for Health Wage Bill: Between 2013 and 2015, public sector expenditure in the health workforce increased by 17% from Rwf 92 billion in 2013/2014 to Rwf 111 billion in the 2014/2015 financial year. Domestic funding for wages and salaries of health workers has been increased from 48% in 2013 to about 56% in 2016. Up to 44% of the public health sector remuneration is still funded through bilateral and multilateral support.

Distribution of health workers: About 65% of the aggregate health workforce works in the public sector while the rest work in private-for-profit organisations (20%) and faith-based organizations (15%). The geographical distribution of the health workforce is skewed in terms

of between provinces and within provinces with a crude geographical equity ratio¹ of 9.57 between districts and 3.26 between provinces. Thus, the best staffed district and province are respectively 10 times and 3 times better off than the worst staffed region and province.

Unemployment: It is estimated that 13% of the registered health professionals were unemployed and seeking employment opportunities; 3.3% pharmacists, 6.6% nurses and midwives and 45.8% of allied health professionals. A rapid assessment of the health workforce turnover in Rwanda revealed an average turnover rate of 8.7% among the health professionals in the public sector, most of who remained active in the country's growing private sector.

Labour market projections: Two projection scenarios were simulated for comparison. In the first projection scenario, the approved health facilities structure of 2016 was used as the staffing norms which yielded a total of 28,075 required health workers in 2018, increasing by 64% in 2024 and to more than double by the 2030. These estimates translate into 1.64 Doctors, Nurses and Midwives per 1,000 population which will increase steadily to 3.15 doctors, nurses and midwives per 1,000 population by 2030 and would cost Rwf 130.47 billion in 2018, Rwf 220.28 billion by 2024 and Rwf 339.74 billion by 2030. In the second scenario, the workforce targets in the Ministry's Fourth Health Sector Strategic Plan (HSSP4) yielded an aggregate health workforce need of 23,973 in 2018 which would increase to 27,386 by 2030, translating into a density of 1.79 Doctors, Nurses and Midwives per 1000 population in 2018 and 2.09 per 1,000 population by 2024. This scenario would also cost Rwf 105.86 billion in 2018 and Rwf 124.56 billion by 2024.

On the other hand, the aggregate health workforce supply is estimated to cost Rwf 99.5 billion in 2018 and increase to Rwf 131.02 billion by 2024 and Rwf 158.57 billion by 2030. Meanwhile, the cumulative economic demand/capacity is projected to be Rwf 168.00 billion in 2018 and increase dramatically to Rwf 458.67 in 2030 which is way above the HSSP4 and MOH structure scenarios. At the aggregate level, the foregoing points to a structural shortage of some health workers where the level of production is inadequate to cater for the projected level of needs under all the scenarios for some categories of health workers (need-based shortage); coupled with economic demand-based shortage whereby the supply is less than economic demand. On the back of a growing economy with expanding fiscal space, the situation presents job creation opportunities as envisaged in HSSP4 and Vision 2050. Nonetheless, the scaling up of training need to be examined from one cadre to another (as shown in the gaps analysis) and undertaken in an incremental approach given the increasing uncertainties around continuous external funding for HRH which is a significant part of the forecasted economic demand.

Recommendations: Based on the results of the analysis, a number of policy actions are recommended to address the current and emerging health labour market imbalances and

¹ A ratio of the Density of health workforce in the best staffed location to the worst staffed location

also respond to the population health needs. In this regard, the following broad areas of strategic focus with corresponding interventions are proposed for policy consideration:

1. Use evidence to align health workforce production with needs and demand
2. Optimise health workforce distribution, retention and utilisation for Universal Health Coverage
3. Address cross-cutting health workforce issues to catalyse health system performance.
4. Invest in health workforce information, evidence generation and use to support decision-making.

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LIST OF ABBREVIATIONS

GDP	Gross Domestic Product
GPs	General Practitioners
GSHRH	Global Strategy on Human Resources for Health
HIV	Human Immune Virus
HLMA	HRH Labor Market Analysis
HRH	Human Resources for Health
HRM	Human Resources Management
HSSP 4	Fourth Health Sector Strategic Plan
HSSP III	Third Health Sector Strategic Plan
KHI	Kigali Health Institute
MFL	Master Facility List
MOH	Ministry of Health
MOH-DGPHFIS	Ministry of Health - Directorate General of Planning, Health Financing and Information System
MSH	Management Sciences for Health
NGO	Non-Government Organization
NHWA	National Health Workforce Account
NPC	National Pharmacy Council
NUR-FOM	National University of Rwanda- Faculty of Medicine
NUR-SPH	National University of Rwanda - School of Public Health
PMO	Prime Minister's Office
PS	Permanent secretary
RAHPC	Rwanda Allied Health Professionals Council
RM	Registered Midwife
RMDC	Rwanda Medical and Dental Council
RN	Registered Nurse
RNMC	Rwanda Nursing and Midwifery Council
TB	Tuberculosis
TWG	Technical Working Group
UR	University of Rwanda
UR-CMHS	University of Rwanda - College of Medicine and Health Sciences
WHO	World Health Organization

DEFINITION OF TERMS

1. **Public sector Economic Demand for HRH/Fiscal Space for HRH:** The ability of the Government through its domestic resources and external funds to pay health workers placed in public sector health facilities, or other parts of the public health system. The public sector demand is often influenced by political decisions about the investment levels and composition of government general expenditure on health and may consider issues of equity.
2. **Private Sector Economic Demand for HRH:** The ability and willingness of the private sector to employ and pay health workers. This is largely influenced by population demand for health services from the private sector in turn culminate in the private sector's employment of health workers. (largely profit driven). Due to data paucity from the private sector, the aggregate share of the private sector health employment (36% for Rwanda²) in relation to the public sector economic demand is used.
3. **Cumulative economic demand for health workers:** The willingness and ability of the government, private sector, and/or development partners to pay to have health workers placed in health facilities, or other parts of the health system. The demand for health workers is the sum of the demand from all of these purchasers or funders.
4. **Health Workforce Supply:** the total number of health professionals with the appropriate skills and qualifications who are willing to enter the job market in the health sector and find acceptable jobs. As the level of compensation offered increases, more qualified workers should be willing to become employed as health professionals
5. **Wage bill:** The sum of all payments from the public or private sector to the health worker, via salary, capitation, or fee for service. Informal payments, housing allowances, and other benefits are also frequently offered to workers for their services and should be quantified as part of wages if feasible.
6. **Dual practice:** the phenomenon where health workers supplement their income from public health facilities by taking time off to working in private health facilities, thereby significantly undersupplying labor time to public health care facilities.
7. **Vacancy rates:** This is the proportion of funded positions that are unfilled.
8. **Total health expenditure:** All expenditure (public and private) of all sources that goes into health-related activities (Government and external funds, including private);
9. **Government (domestic) Health Expenditure (GHE):** The GHE are health care resources designed to meet the cost of all or most healthcare needs from a publicly managed funds.
10. **Percentage allocation of GHE to HRH:** The share of Government resources allocated the health sector that goes into the payment of wages for the health sector staff.
11. **Need-based health workforce requirement:** The number and mix of health workers required in a country (or geographical region) to address the health needs of a defined population. This is often determined by the epidemiology of the area, models of health care and staffing standards/norms.

² Estimated from the MFL Report (2018)

CHAPTER ONE

INTRODUCTION

1.1 Geographic and socio-economic context

Rwanda is classified as a low-income country with a Gross Domestic Product (GDP) at current market prices estimated at Rwf 7,898 billion³ (US\$ 9.14 billion) which represents about 0.01% of the size of the world's economy. Rwanda's economy grew at 7.2% in 2018⁴ which is one of the fastest growing economies in the world. The World Bank estimates that the economy is likely to grow at a higher pace of 8% by 2021. The economy is largely driven by the service sector which has a 47% share of GDP while the agriculture and industrial sectors contribute 31% and 16% respectively. The health sector's contribution to GDP is about 2.2%.

Over the last decade, the country has implemented two successive 5-year Economic Development and Poverty Reduction Strategies (EDPRS-1, 2008-2012 and EDPRS-2, 2013-2018) which have yielded substantial economic dividends. A National Strategy for Transformation (NST1) is in place which focuses on economic, social, and governance transformation toward the aspiration of becoming a high-income country by 2050. Rwanda's strong economic growth has translated into improvements in the living standards of its citizens with more than two-thirds reduction in child mortality and near-universal primary school enrolment. The proportion of people who are poor also marginally declined from 39.1% in 2013/2014 to 38.2% in 2016/17 while poverty gap rate (gap between people's spending and the poverty line) also declined to 11.7 in 2016/17, from 12 in 2013/14⁵.

1.2 Population, demographic and health status indicators

The population of Rwanda is estimated to be 12,040,628 people in 2018 with an annual growth rate of 2.4% which is above the global average of 1.07% but significantly lower than its neighbouring countries (3.2% for Burundi and DR Congo as well as 3.3% in Uganda)⁶. The country's population density of 495 people per square kilometre of land is considered one of the highest in Africa. About 79% of the population dwell in rural areas which are estimated to

³ National Institute of Statistics of Rwanda NISR, *GDP National Accounts, 2017-18 Fiscal Year* (National Institute of Statistics of Rwanda, September 2018) <<http://www.statistics.gov.rw/>>.

⁴ 'Rwanda | Data' <<https://data.worldbank.org/country/rwanda>> [accessed 27 January 2019].

⁵ National Institute of Statistics of Rwanda NISR, *Rwanda Poverty Profile Report 2016/17* (National Institute of Statistics of Rwanda, 2018) <<http://www.statistics.gov.rw/publication/eicv-5-rwanda-poverty-profile-report-201617>>.

⁶ 'Rwanda | Data'; National Institute of Statistics Rwanda, 'Life Expectancy at Birth' <<http://www.statistics.gov.rw/publication/life-expectancy-birth>> [accessed 27 January 2019].

decline to 73% by 2030 as a result of rural-urban drift⁷. The population pyramid shows a relatively young population which is expected to record a marginal shift by 2030 (see Table 1 and Figure 1 for the population projections up to 2030 and the population pyramid respectively). With youth friendly and responsive policies including job creation and descent employment, the country could harness the economic potential of the youth bulge as they move through the stages of the population pyramid to create a significant demographic dividend.

The country has an impressive trajectory in terms of the key health indicators. For instance, the average life expectancy of Rwandese is estimated to be 67 years in 2018 which is 3.08% improvement since 2014⁸. Antenatal coverage using first attendance improved by 8% since 2000 and is almost universal (99%). Skilled birth attendance has seen one of the drastic improvements in the Africa Region from 27% in 2000 to 91% in 2015 while maternal mortality ratio concomitantly declined from 1,071 per 100,000 in 2000 to 210 per 100,000 live births representing 80.4% improvement over 15 years⁹. Also, about 10% of under-five children are underweight and more than a third is stunted. Malaria prevalence increased from 2% in 2014 to 7% in 2017, with disproportionate distribution across provinces (ranging from 17% in Eastern province to 1% in Northern province)¹⁰. Non-communicable diseases are also rising due to changing lifestyles and ageing population.

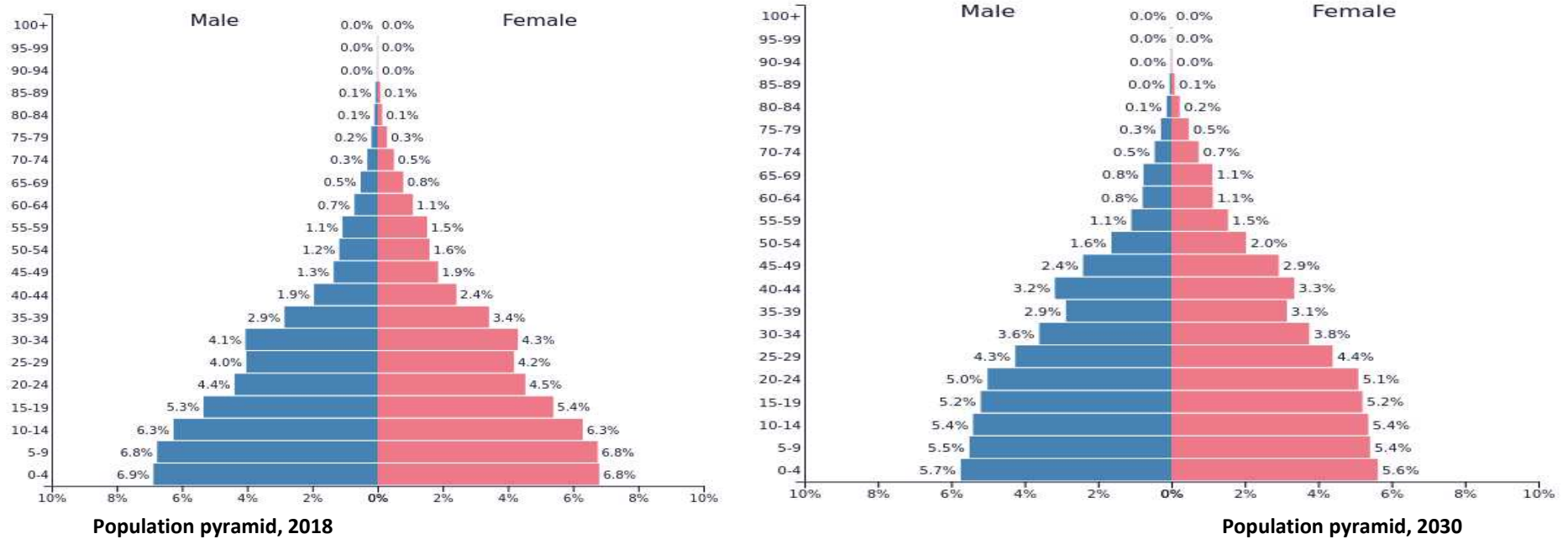
⁷ National Institute of Statistics of Rwanda NISR, *Fourth Population and Housing Census - 2012* (National Institute of Statistics of Rwanda, January 2014) <<http://www.statistics.gov.rw/publication/rphc4-population-projections>>.

⁸ National Institute of Statistics Rwanda.

⁹ National Institute of Statistics of Rwanda NISR, *Rwanda Demographic and Health Survey - 2014/2015* (National Institute of Statistics of Rwanda, June 2015) <<http://www.statistics.gov.rw/>>.

¹⁰ Malaria and Other Parasitic Diseases Division of the Rwanda Biomedical Centre, *Malaria Indicator Survey* (Kigali: Malaria and Other Parasitic Diseases Division of the Rwanda Biomedical Centre - Ministry of Health, 2017) <<https://www.dhsprogram.com/pubs/pdf/MIS30/MIS30.pdf>> [accessed 27 January 2019].

Figure 1: Population Pyramid for Rwanda, 2018 and 2030



Source: Adapted from: Fourth Population and Housing Census - 2012 (National Institute of Statistics of Rwanda)

1.3 Overview of Rwandan Health System

The Rwandan health system is pyramidally structured into the central level, intermediary level, and the primary/peripheral level. The Central level is made up of the national referral and teaching hospitals with the mandate to develop capacity, skills, and provide complex tertiary care to patients received through a referral system. The Intermediary level is comprised of regional (provincial) referral hospitals and regional hospitals to provide secondary level advanced care to reduce workload pressure from the national referral hospitals. The primary level (peripheral) is made up of district hospitals, health centres and health posts. At the community level are community health workers who provide mainly health promotion and prevention services as well as minor treatment. They are the link between their catchment population and the higher level of the health system.

The MOH commissioned the development of a Master Facility List (MFL) which provided updated information of the public and private health facilities in Rwanda¹¹. Overall, about 1,248 health facilities across the country were identified of which 53% (663) were publicly owned health facilities whilst 30% (380) are private health facilities. The remaining 205 facilities are faith-based but co-owned with the Government. About 40.5% (504) of the facilities were health centres followed by health posts (33.8%, n= 670) alongside 56 hospitals comprising of 5 national referral hospitals, 3 referral hospitals, 4 provincial hospitals and 36 district hospitals.

1.4 The Global and Regional Health Workforce Policy Agenda

As part of the global sustainable growth and development agenda, the United Nations member countries including Rwanda in 2015 adopted the Sustainable Development Goals (SDGs) of which Goal 3 with its 13 targets aims at healthy lives and the well-being of people at all ages, including Universal Health Coverage (UHC). The SDGs which are more ambitious, inclusive and comprehensive, require responsive and resilient health systems underpinned by adequate, motivated and equitably distributed health workforce. In recognition of this demand, target C of SDG 3 enjoins member countries to substantially increase health financing and the recruitment, development, training and retention of the health workforce in developing countries.

In furtherance of this agenda, the World Health Assembly (WHA) in 2016 also adopted the Global Strategy on Human Resources for Health: Workforce 2030 (GSHRH)¹² which aims at ensuring equitable access to qualified health workforce towards achieving UHC and SDGs. Its

¹¹ Ministry of Health MOH, A Report of the Development of Rwanda Master Facility List (Final Draft) (Ministry of Health, Rwanda, October 2018).

¹² WHO, 'Global Strategy on Human Resources for Health: Workforce 2030', 2016.

specific objectives are to:

1. Optimize the performance, quality and impact of the health workforce to accelerate progress towards UHC and SDG
2. Align investment in HRH with the current and future needs of the population and health systems to maximize job creation and economic growth
3. Strengthen the capacity of institutions at regional and national levels for effective public policy stewardship, leadership and governance on HRH
4. Strengthen data, evidence and knowledge for cost-effective policy decisions.

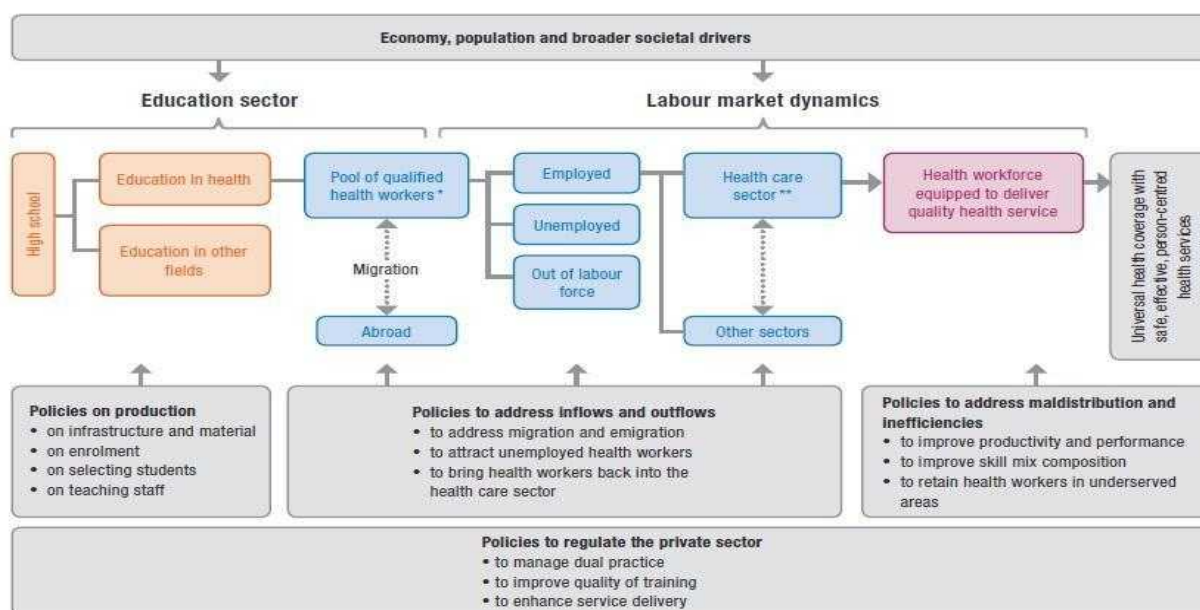
In pursuit of these objectives, the strategy advises countries to “build planning capacity to develop or improve HRH policy and strategies that quantify health workforce needs, demands and supply under different future scenarios ... in order to manage health workforce labour markets and devise effective and efficient policies that respond to today’s population needs while anticipating tomorrow’s expectations” (p.25). In this regard, HRH plans should be costed, financed, implemented and continually refined to address:

1. The estimated number, category and qualification of health workers required to meet public health goals and population health needs;
2. The capacity to produce sufficient and adequately distributed qualified workers (education and effective regulatory policies); and
3. The government and labour market capacity to recruit, deploy and retain health workers (economic and fiscal capacity, and workforce deployment, remuneration and retention through financial and non-financial strategies).

A health labour market analysis can provide insights on the aforementioned issues and point out areas of prevailing or potential labour market failures for corrective policy actions. The health labour market is dynamic and is influenced by policy decisions and actions across several sectors that include education, labour, finance, employment, foreign affairs (in relation to international migration) and health.

Figure 2 illustrates the Health Labour Market conceptual framework underpinning health labour market analyses. Developed by WHO, the framework includes the macro-economic and general labour market conditions of the country. It also comprises the production of health workers through the education system, the absorption capacity of health workers by the health system and the analysis of important parameters characterizing health workers engaged in the health sector (productivity, performance, skill mix and geographic distribution), as well as macro-economic factors.

Figure 2: Health Labour Market Framework for UHC



Source: Sousa et al., 2013

Also, in the context of the Africa Region, the Regional Committee (RC) of the World Health Organisation (WHO) adopted a roadmap for scaling up health workforce interventions in the Region (2012-2025). The roadmap also identifies strategic priority areas for action including the recruitment and appropriate deployment of the health workforce to address population health needs.

1.5 Rwanda's Policy Context

As said above; Rwanda is a signatory to the global compact on SDGs including UHC which is defined in terms of people having access to, and use of high quality and effective promotive, preventive, curative, rehabilitative and palliative health services according to their health needs and without suffering financial hardship in using these service¹³. The underlying principles of these global targets have underpinned Rwanda's health sector strategic drive and initiatives. In particular, the Fourth Health Sector Strategic Plan (HSSP4) seeks to build on the foundation of the health sector's contribution towards the attainment of the seven-year National Strategy for Transformation and Rwanda's Vision 2050. These blueprints envisage that the health sector will be playing pivotal roles in ensuring a healthy and productive population to drive the national economy into the upper-middle income bracket by 2035 and a high-income by 2050¹⁴. These aspirations have over the years guided efforts that have

¹³ Health Systems Financing: The Path to Universal Coverage, ed. by World Health WHO, The World Health Report, 2010 (Geneva, 2010).

¹⁴ Fourth Health Sector Strategic Plan (HSSP4), 2018 - 2024' (Ministry of Health, Rwanda, 2018).

culminated in significantly increasing the skilled health worker (physicians, nurses and midwives) to population density by more than 60% within 10 years, from 0.48 per 1,000 population in 2005 to 0.79 per 1,000 population by 2015¹⁵.

The HSSP4 has health workforce-related targets both medium term (2020) and the long term (2024) which is guiding efforts in the health sector (see Table 3). Therefore, understanding the health workforce supply and demand dynamics in the context of Rwanda has become imperative to establish factual updates of Rwanda's HRH situation and health sector labour market to inform strategic planning and investments in the health workforce to meet the needs of HSSP4.

Table 2: Baseline and Targets for the Health Workforce

Input/process indicators HSSP 4	Baseline 2016	Targets 2020 (mid-term)	Targets 2024
Doctor/pop ratio (GP & Specialists)	1/10,055	1/ 9,000	1/7,000
Nurse/pop ratio	1/1,094	1/ 900	1/ 800
Midwife/pop ratio (women aged from 15-49)	1/ 4,064	1/ 3,500	1/ 2,500
Pharmacist /pop ratio	1/ 16,871	1/16,000	1/15,500
Lab Technicians /pop ratio	1/ 10,500	1/ 9,000	1/ 7,500
Doctor attrition rate	NA	>10%	>5%

Source: Rwanda HSSP4

The health labour market approach also facilitates analysis of forecasted demand for health workers beyond the requirements of the public sector, adopting a broader overview of the potential for the creation of qualified employment opportunities in the country. This builds on a growing recognition of the health sector as an investment sector and as a contributor to job creation and economic growth, rather than a consumptive sector.

1.6 Objectives of the Health Labour Market Analysis

The main objective of the health labour market analysis is to generate evidence to support policy decisions to improve health workforce availability, distribution and efficient use with a view to support Rwanda achieve its health sector and broader development targets. According to the MOH priorities on HRH, the following specific objectives were formulated:

¹⁵ WHO, 'Equitable Access to Functional Health Workforce and Community Health Workers in the Africa Region' (presented at the WHO Regional Forum on Strengthening Health Systems for the SDGs and UHC, Windhoek, Namibia, 2016) <<http://www.afro.who.int/index>>.

1. Describe the current trends in HRH labour markets based on inflows and outflows of health workers in Rwanda
2. Describe the gap and coherence between the workforce supply and demand in Rwanda
3. Propose short and long-term health workers' projections based on the essential need, demand and supply.
4. Model and cost the workforce production, deployment and retention in Rwanda to inform affordability of wage bill and scale up plans, including financial sustainability.

CHAPTER TWO

METHODOLOGICAL OVERVIEW

Multiple methodological approaches were combined to collect the data and analyse the health workforce situation and health labour market dynamics in Rwanda. These included desk review, stakeholders' discussions (inception meetings, Key informants and focus group discussions), descriptive analysis of existing quantitative data and supply-demand modelling.

2.1 Desk review and stakeholder engagement

Several policy documents, reports and academic papers were obtained through the MOH for review and triangulation of information. Concurrently, the technical assistance team met members of the HRH Technical Working Group (HRH TWG) that is comprised of key persons from the MOH, Academic Institutions, Private Health Facilities representative and development partners such as USAID/ Rwanda, Rwanda Health Systems Strengthening Activity Project (RHSS), funded by USAID and implemented by Management Sciences for Health, U.S. Centers for Disease Control and Prevention (CDC), Belgian Development Agency (Enabel) and Swiss Development Cooperation (SDC). The role of the consultative meetings was to validate the study tools, identify and discuss the modalities for data acquisition and agree on the methodological approach. An outline with detailed work plan, including type of data to be collected was also presented to the HRH TWG to further enrich the inception report.

Also, key informant interviews were conducted with policy makers and development partners to understand their opinions on issues surround HRH policy (demand, supply, and distribution of health workers), challenges involved and their vision for future HRH policy direction. Additionally, focus group discussion was held with health care providers (young graduates, residents, those who left the clinical practice and district hospital directors) to understand and explore their experiences in the health sector in relation to training, dual practice, retention, and motivating factors for leaving the public sector. The participants were drawn from various categories of health professionals employed in public, private and international organisations (medical specialists, residents, senior nurses and midwives, allied health professionals, pharmacists etc.).

2.2 Descriptive analysis

Descriptive analysis of existing data was conducted to examine the size, composition, distribution and trend of the health workforce in Rwanda. The data was mainly obtained and triangulated from MOH, the regulatory bodies (Health professionals councils), the University of Rwanda (UoR), National Institute of Statistics of Rwanda (NISR), various reports and policy

documents. The results of the descriptive analysis are presented in the form of charts and tables.

2.3 Supply and demand analysis

The demand and supply analysis of the labour market was conducted using existing frameworks by the World Health Organisation¹⁶.

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 dismissals¹⁷. Using the health workforce production capacity (Table 7), 95% pass or success rate and an average attrition rate of 2%¹⁸, a stock-and-flow approach was used to estimate the future supply of the health workforce in Rwanda (see Box 1 for formulae).

Box 1: Stock and flow formulae for HRH Supply Projection

$$\text{HRH supply} = \text{Current stock} + [(\text{Training Capacity and foreign inflows}) \times \text{Pass rate}] - \text{Attrition}$$

b) Forecasting need-based requirements for health workers: The existing number of health facilities in Rwanda was taken from the Master Facility List Report and HSSP4 which provided targets for constructing, upgrading or expanding some health facilities. The MOH structure (staffing norms) and HRH targets in the HSSP4 were used to forecast two scenarios of a year-by-year health workforce needs in Rwanda up to 2030. 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 stated in various service targets of HSSP4 were used to adjust the annual projections¹⁹. Thus,

¹⁶ Barbara McPake, Anthony Scott, and Ijeoma Edoke, *Analysing Markets for Health Workers: Insights from Labour and Health Economics* (The World Bank, 2014) <<http://elibrary.worldbank.org/doi/book/10.1596/978-1-4648-0224-9>> [accessed 11 June 2016]; Jenny X. Liu and others, 'Global Health Workforce Labour Market Projections for 2030', *World Bank Policy Research Working Paper*, 2016 <http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2836537> [accessed 10 October 2016]; *Health Labour Market Analyses in Low- and Middle-Income Countries: An Evidence-Based Approach*, ed. by Richard M. Scheffler and others (The World Bank, 2016) <<https://doi.org/10.1596/978-1-4648-0931-6>>.

¹⁷ Mário Amorim Lopes, Álvaro Santos Almeida, and Bernardo Almada-Lobo, 'Handling Healthcare Workforce Planning with Care: Where Do We Stand?', *Human Resources for Health*, 13.1 (2015) <<https://doi.org/10.1186/s12960-015-0028-0>>.

¹⁸ Ministry of Health MOH, *Rapid Analysis of Staff Turnover in Health Facilities and Proposal of Retention Strategies (Draft)* (Ministry of Health, Rwanda, September 2016).

¹⁹ James Avoka Asamani and others, 'Forecast of Healthcare Facilities and Health Workforce Requirements for the Public Sector in Ghana, 2016–2026', *International Journal of Health Policy and Management*, 0.0 (2018) <http://www.ijhpm.com/article_3525.html> [accessed 7 August 2018]; R. N. Wichit Srisuphan and Nichakorn

modelling the future developments of healthcare facilities (or expansion in service utilisation) was undertaken upon which staffing norms scenario (or structure) was applied to generate the respective HRH requirements (see model in the accompanying excel workbook and appendix for more details).

- 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 interest of the government and the private market in purchasing health care, a large part of which includes the cost of health worker wages. 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 benchmark²⁰. Therefore, it is recommended that demand-based forecast uses indicators of overall economic growth or specific health sector indicators that represent spending within the health care sector.

To estimate public sector demand for health workers, the projected GDP growth rate of 7.45% by the World Bank²¹ was adopted and assumed to remain fairly similar until 2021 when the projected growth rate would decline to 5% up until 2030. A constant 10% of General Government Health Expenditure (GGHE) as a percentage of GDP was assumed based on available data from government sources. Also, based on the MOH annual reports, a constant proportion of 30% of the GGHE was assumed to be spent on wages of health workers. Using the aforesaid assumptions, and guided by previous examples, the economic capacity or demand for the health workforce was linearly simulated using the formulae below (Box 2).

Box 2: Fiscal Space Assumptions

- **Public Sector Economic Demand (HRH Fiscal Space) for the year, i** = (GGHE as % GDP _{i} * Nominal GDP Values _{i}) * HRH Expenditure as % GGHE _{i}
... **(1)**
- **Cumulative Economic Capacity for the year, i** = Public Sector Fiscal Space _{i} * (1+proportion of private sector HRH employment)
... **(2)**

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

Sirikanokwilai, 'Supply and Requirement Projection of Professional Nurses in Thailand over the Next Two Decades (1995-2015 AD)', 1995 <http://www.who.int/entity/hrh/en/HRDJ_2_3_05.pdf?ua=1> [accessed 23 June 2016].

²⁰ [1]

²¹ The World Bank growth forecasts was preferred because it takes into consideration various constraints for economic growth, which generates more realistic forests as compared to often optimistic view of governments

patterns in countries. With data constraints, these concepts guided the use of the above formulae in which we conservatively, it was assumed that if Government continue to spend similar proportion of GDP on health and similar proportion of GGHE on HRH, all things being equal, the fiscal space for HRH would be proportional to the size of the GDP. It was further assumed that private sector would not contract and that conservatively, similar proportion of private sector employment would continue.

Current data show that the private sector in Rwanda employs about 36%²² of the health workers which was used to estimate the proportion of future private sector demand for the health workforce in Rwanda.

2.4 Data validation

Different levels of data validation were built into the process to ensure validity, consistency and acceptability of the data and findings. First, a predefined data collection tool was developed and agreed upon between the technical assistance team and the MOH during which it was decided that the data would be collected only from official sources.

Secondly, the data was cross-validated with similar information from different sources to ensure consistency. For instance, data collected from the health professional Councils were compared with data contained in various reports of the MOH, those reported by the country to WHO as well as those from Labour Unions.

The third level of data validation occurred during the analysis when the technical team asked the institutions that provided the data to explain significantly unusual data points (outliers) whenever such was observed. Following the analysis, preliminary results were sent to WHO technical team at the country and headquarters and also the MOH HRH TWG Members for comments and validation of the data and methods. The report was subsequently presented to the MOH and some stakeholders who provided comments which have either been incorporated into the report or the data was re-examined to ensure its validity.

Whenever there were doubts about the validity of any data point, the team visited the relevant institutions for verification of the data which was either corrected or some explanation was received and incorporated in the report. In triangulating the data, MOH advised that the use of data sources should be prioritised as follows: MOH databases or reports, health professional Councils for staff data, National Institute of Statistics of Rwanda (NISR) for economic data and other sources.

²²Ministry of Health MOH, *A Report of the Development of Rwanda Master Facility List (Final Draft)* (Ministry of Health, Rwanda, October 2018). http://www.moh.gov.rw/fileadmin/user_upload/TWG_Archives/Rwanda_Master_Facility_List.pdf

CHAPTER THREE

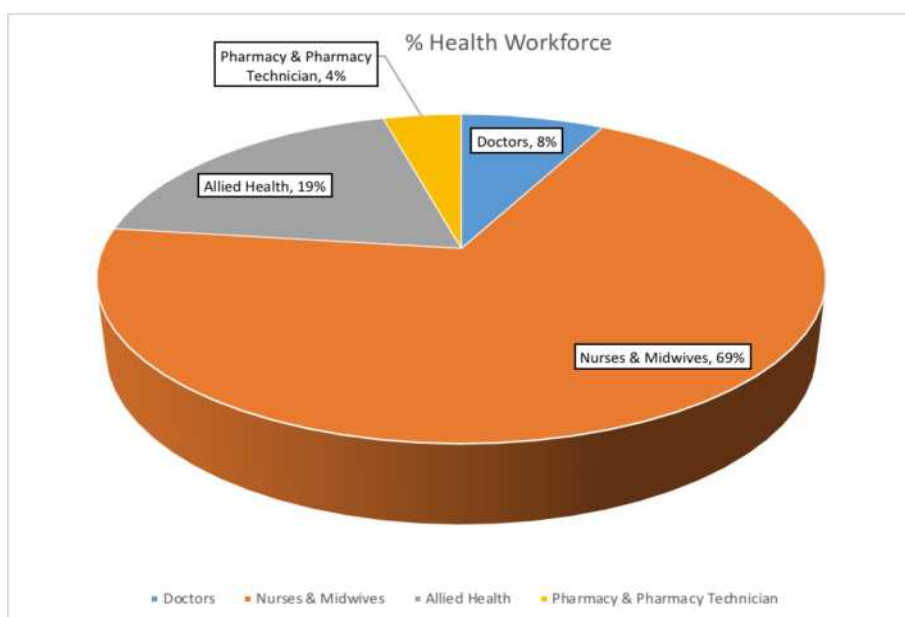
HEALTH WORKFORCE SITUATION ANALYSIS

This chapter highlights the health workforce situation in Rwanda based on data obtained from the various Health Professionals councils, the Ministry of Health and Training Institutions for health professionals. The data was discussed during meetings with key actors, key informant interviews and focus group discussions with persons involved in HRH and health policy development and implementation.

3.1 Health workforce stock and composition

As at the end of 2018, data obtained showed that the total number of registered health professionals in Rwanda was 21,679; made up of 8% (1,648) medical doctors, 69% (15,050) Nurses and Midwives, 19% (4,083) Allied Health Professionals, and 4% Pharmacists and Pharmacy Technicians.

Figure 3: Composition of the Health Workforce



General Practitioners (GPs) make up about 68% of the total number of medical doctors and 32% are Medical Specialists of varying levels of medical specialization. The medical specialists account for 2.3% of the total health workforce in the country. Nearly 70% of the health workforce was composed of nurses and midwives, 1.5% of who have received postgraduate level specialised nursing/midwifery training. The density of doctors, nurses and midwives per 1,000 population is estimated to be 1.01, 108% increase since 2005.

The bulk of the Allied Health Professionals was made up of Biomedical Laboratory (6.6%), Public Health (1.7%), Social Work (1.69%) and Clinical Psychology (1.4%) while there were

very paltry number of practitioners in the areas of chiropractic (n = 1), emergency care (n = 1), occupational therapy (n = 2), Speech and Language Therapy (n = 3) and Clinical Perfusion (n = 4) among others. Table 4 shows details of the aggregate stock and composition of the health professionals in Rwanda.

Table 3: Size and Composition of the Health Workforce –2018

Broad Classification	Staff Category	Total Number Registered in Rwanda	Percent (%)
Doctors	GPs ²³	1,114	4.73
	Medical Specialists	534	2.32
Nurses & Midwives	Registered Nurses	7,200	33.41
	Nurses (Enrolled)	5,592	25.95
	Mental Health Nurses	268	1.24
	Midwives	1,990	9.23
Allied Health	Nutrition & Dietetics	224	1.04
	Public Health	381	1.77
	Speech and Language Therapy	3	0.01
	Biomedical Engineering	18	0.08
	Clinical Medicine	119	0.55
	Environmental Health	201	0.93
	Clinical Perfusion	4	0.02
	Ophthalmic Clinical	90	0.42
	Prosthetics & Orthotics	26	0.12
	Clinical Psychology	310	1.44
	Biomedical Laboratory	1,415	6.57
	Dental & Oral Health	236	1.10
	Medical Imaging	152	0.71
	Anaesthesia	291	1.35
	Physical Therapy	225	1.04
	Optometry	13	0.06
	Social Work	364	1.69
	Orthopaedic Clinical	7	0.03
	Chiropractic	1	0.00
	Emergency Care	1	0.00
Occupational Therapy	2	0.01	
Pharmacy	Pharmacist	886	4.11
	Pharmacy Technician	12	0.06
TOTAL		21,679	100%

Source: Rwanda Health Professional Councils (RMDC, RNMC, NPC, RAHPC), November 2018

²³ General Practitioners refer to non-specialist medical doctors or medical officers.

3.2 Profile of doctors in Rwanda: Trends, Age and Gender Distribution

As shown in Figure 4, the number of registered GPs in Rwanda increased by 82.9% over the last 5 years. The period between 2013 and 2014 recorded the highest increase of 37% in the total number of GPs in the country. Also, records at the MOH²⁴ show that since 2000, about 518 Rwandan Medical Specialists have been trained in various specialities out of which 13% (n=67) migrated out of the country, 9 (2%) died and 7 (1%) are retired from active service. Thus, there are 502 Rwandan Medical Specialists who are still in practice. Also, data from the RMDC also show that 534 Medical Specialists are registered in the country. Of concern, however, is a rapid turnover of medical specialists from the public sector to the private sector coupled with dual practice (see more discussion in section 3.9).

Figure 5 depicts the age distribution of GPs and medical specialists in Rwanda which shows a generally young medical workforce. Majority of GPs (58%) are between the ages 25 and 34 years. Only 5% of the GPs are 55 years old or more and could be exiting the active labour force within the next 10 years.

In the case of medical specialists, the majority (43%) are between the ages 35 and 44; with as much as 16% aged 55 years or older. Against the backdrop of a seeming 5% annual decline in the aggregate number of registered specialists, an intensified specialist training and mentorship is imperative. However, in a focus group discussion with medical doctors (made up of Director-General of a hospital, private practitioners, consultants, residents and a GP), majority of the participants expressed concerns over the weaknesses in specialists' training curriculum coupled with inadequate mentorship programme to support the professional growth of young doctors; as depicted in the following quote:

“It looks like a generational divide where the older doctors are not willing enough to mentor the younger ones. The current curricula for most of the residency programs here are not addressing our learning needs and we have to finish and come to learn many things on the job mostly with limited supervision at that level”.

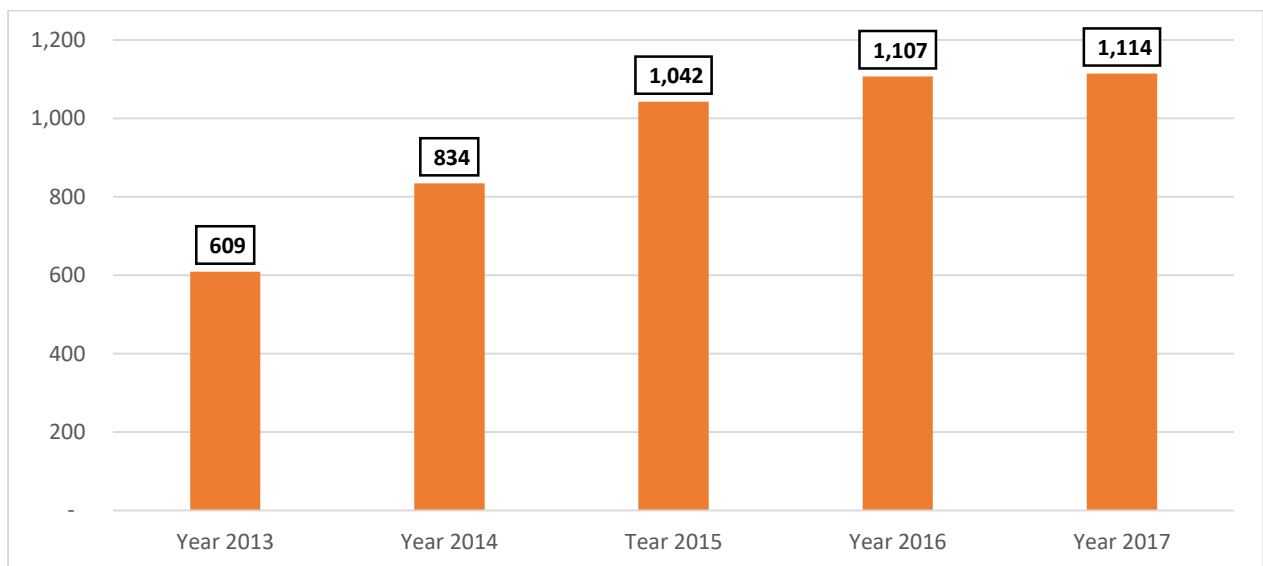
In terms of the gender distribution of doctors, between 2013 and 2018, about 19% of doctors were females as compared with 81% of their counterparts being males and this has been quite consistent over years as demonstrated in Figure 6 below. This disparity translates to a ratio of one female doctor to five male doctors.

Compared with all cadres of the health sector, the case of doctors signifies an apparent gender disparity even though it appears to follow the general trend of fewer women entering

²⁴ MOH-Directorate General for Planning, Health Financing and Health Information maintains an excel database of the names and employment status of all Rwanda Medical Specialists who were trained between 2000 and 2018. Informal information from peers is sometimes used to update the database. It, however, excludes non-Rwandans who are registered and/or practicing in the country.

the medical profession especially in low-and-middle income countries. For instance, developed countries such as United Kingdom (UK) and United States of America (USA) are also said to have significant gender gap with about 35% of the medical doctors being female whereas the Africa Region was estimated to have an average 30% in 2006²⁵ which has declined marginally to 28% in 2018²⁶. Nevertheless, in a country often cited for women empowerment, it would be worth tackling this level of gender disparity in the medical profession.

Figure 4: Trend of the Registered GPs in Rwanda, 2013 – 2018

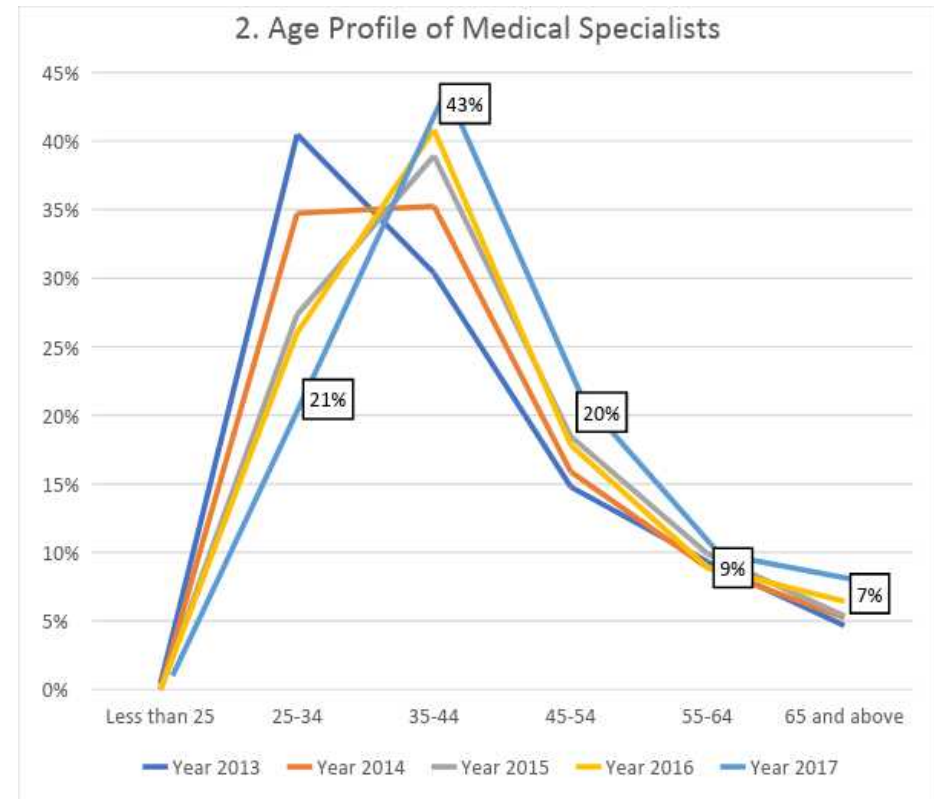
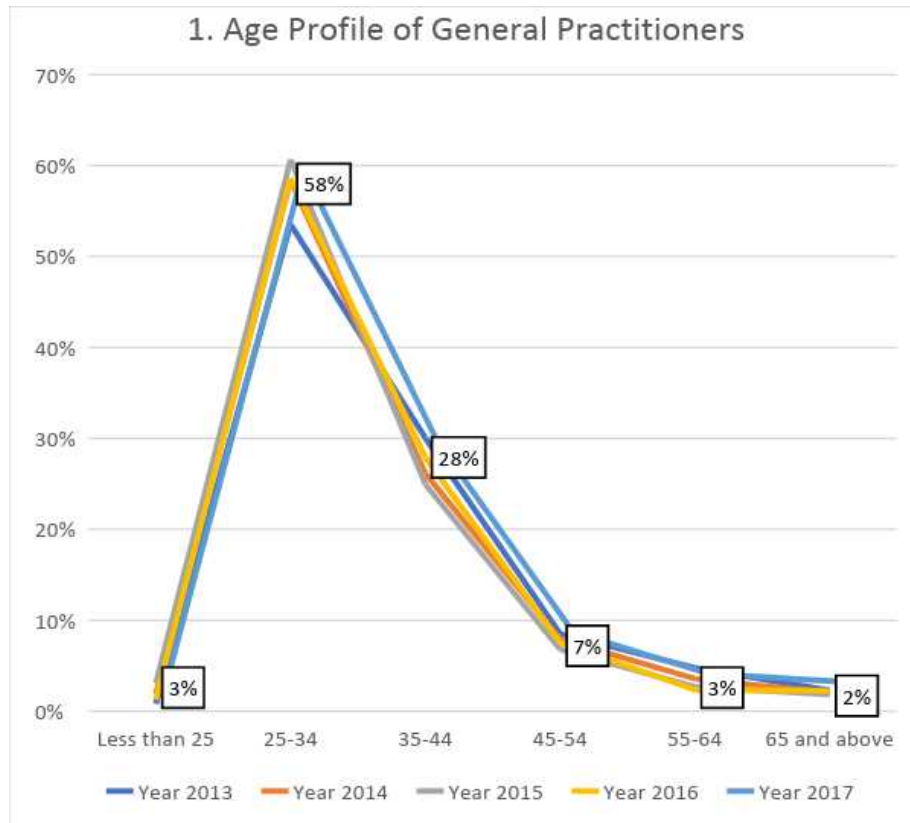


Source: Triangulated from RMDC, MOH and WHO-NHWA, 2018

²⁵ George, Asha, 'Human Resources for Health: A Gender Analysis', 57

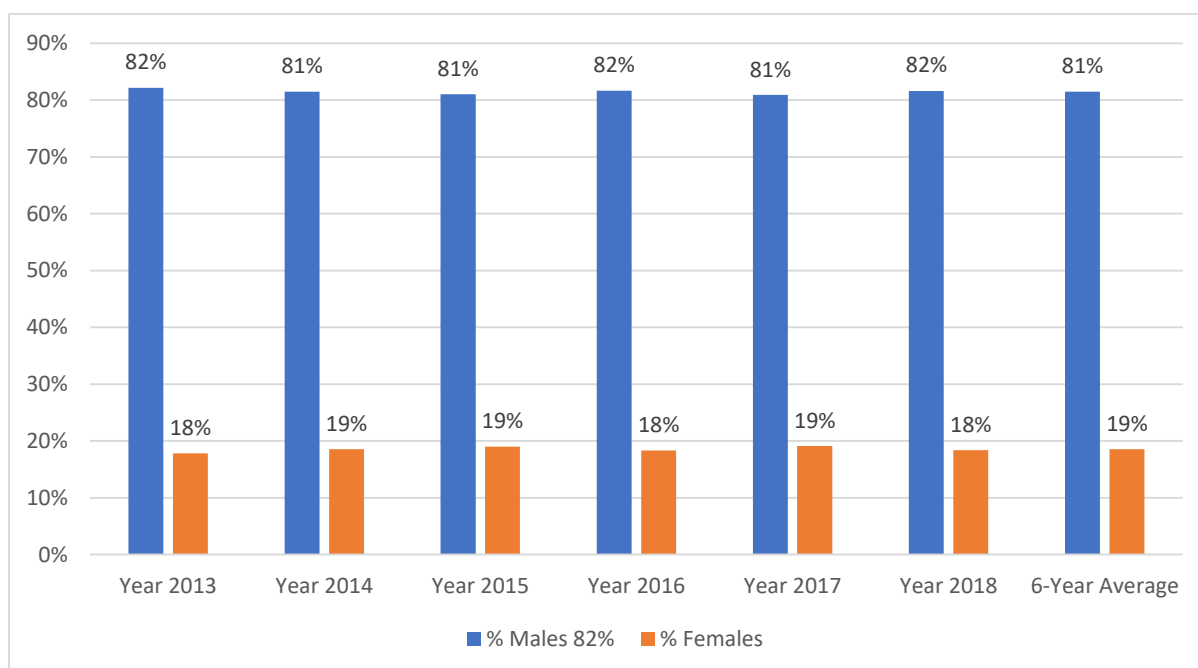
²⁶ Boniol, Mathieu, Michelle Mclsaac, Lihui Xu, Tana Wuliji, Khassoum Diallo, and Jim Campbell, 'Gender Equity in the Health Workforce: Analysis of 104 Countries', World Health Organisation, WHO/HIS/HWF/Gender/WP1/2019.1, 2019, 8

Figure 5: Trend of the Age Profile of Medical Doctors in Rwanda, 2013 - 2017



Source: RMDC Database - November, 2018

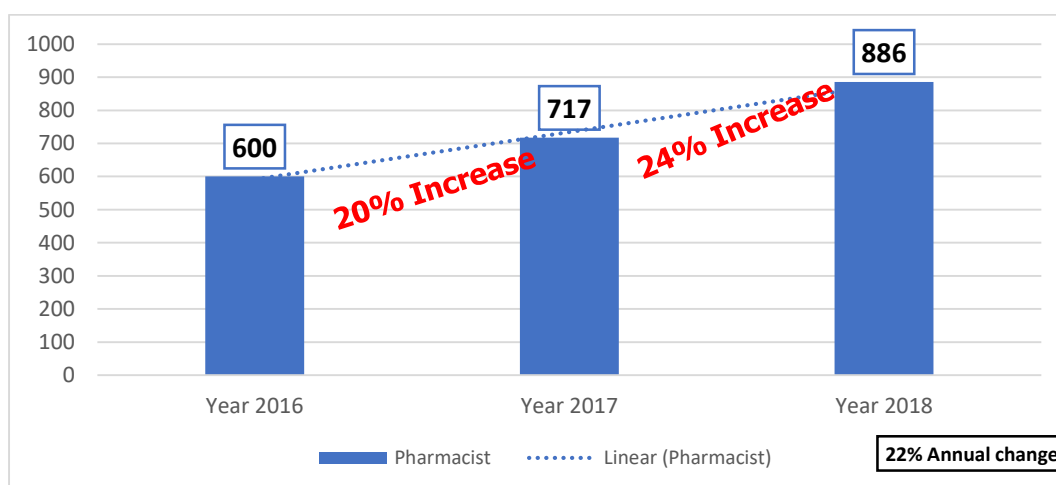
Figure 6: Trend of Gender Distribution of Doctors, 2013 - 2018



3.3 Trend and profile of Nurses and Midwives, Pharmacists and Allied Health Professionals

Available data obtained from the National Pharmacy Council (NPC) (as shown in Figure 7) indicates that the number of pharmacists in the country has been steadily increasing annually by about 22% since 2016. Eight different nursing specialty programs have been introduced and at least 96 nurses had enrolled at the University of Rwanda²⁷. However, there is an extreme paucity of data in relation to the current age and gender profiles of nurses and midwives as well as those of the allied health professionals.

Figure 7: Trend of the stock of Pharmacists, 2016 - 2018

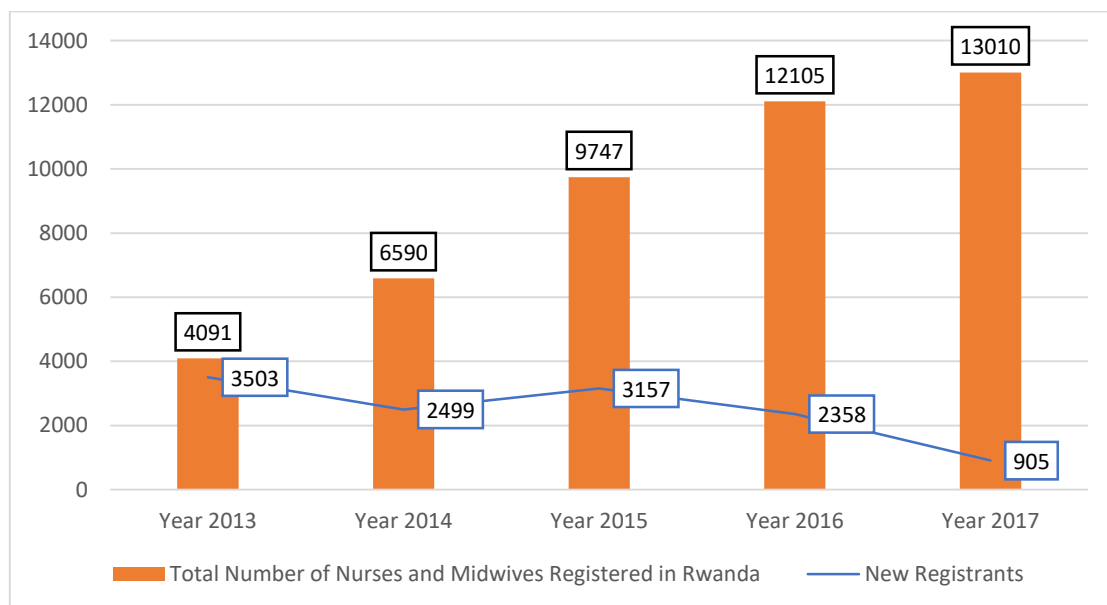


²⁷ Ministry of Health MOH, Annual Report - 2015/2016

As shown in Figure 8, the trend of all Nurses and Midwives registered in Rwanda has more than doubled between 2013 and 2017 (218% increase). However, since 2015, the number of newly qualified Nurses and Midwives registering with the Rwanda Nursing and Midwifery Council (RNMC) has been reducing. For instance, 25.3% decline in new registrants was recorded in 2016 while 2017 recorded almost 62% reduction. This may be a result of the halting of auxiliary nurses (A2 nurses) training. It is also worth noting that stakeholders including the MOH acknowledges some bottlenecks in the timely registration of nurses and midwives by the RNMC. Consequently, the total number of nurses and midwives in the country could be underestimated since some are lost in the official statistics of the Council.

In terms of nursing specialisation, about 1.5% (n =111) of the professional nurses have undergone various post-graduate (Master of Science) training in specialised areas of nursing including 16 in Critical care and Trauma Nursing; 14 in Nursing Education, leadership and management; 18 in Medical surgical Nursing; 14 in Neonatal Nursing; 7 in Nephrology Nursing; 9 in Oncology Nursing; 20 in Paediatric Nursing; and 13 Peri operative Nursing (see Appendix 7 for details).

Figure 8: Trend of Nurses and Midwives Registered in Rwanda, 2013 - 2017



3.4 Distribution of the health workforce by sector and geographical region/district

This section provides a descriptive analysis of the distribution of the health workforce by sector, districts and regions. Data was triangulated from professional councils, MOH and the MFL report 2018.

3.4.1 Distribution of the Health Workforce by Sector

Overall, official documents revealed that 65% of the health workforce whose employment records were available worked in the public sector while 20% and 15% were employed in the private-for-profit and the private-not-for-profit sectors respectively. Of 783 GPs, 58% worked in the public-sector whilst about 30% were in the private-for-profit sector and 13% in the faith-based organisations. On the other hand, slightly more than half (50.6%) of medical specialists were employed in the private-for-profit sector with only 47% working with the public sector. The employment status of 2.4% could not be validated. Except for Pharmacists of whom 77.3% worked in the private sector, the majority of the rest of the health workforce worked with the public sector (Table 4).

Table 5 also reveals an obvious disparity between the total number of health professionals registered in Rwanda as compared to the number whose employment status was obtained. For instance, the number of Medical Specialists, Laboratory Technicians and Anaesthetists in employment appears to be more than the number registered with the various regulatory bodies. This might imply two things; either an issue of accuracy of reported data or a more likely scenario could be that some practitioners were yet to be duly registered with the relevant regulatory bodies. On the other hand, the employment status of some registered practitioners could not be established denoting a situation whereby they maintained registration in Rwanda but were out of the active workforce in Rwanda.

Table 4: Distribution of the Health Workforce by employment sector

Category of Health Workforce	No. Registered in Rwanda	No. Employed in the Public Sector	No. Employed in the Private Sector	No. Employed in the Faith-Based Organisations	Total	Difference between registered and employment status	% in Public Sector	% in Private Sector	% in FBOs
GPs	1114	452	232	99	783	331	57.7%	29.6%	12.6%
Medical Specialists	534	266	287	14	567	-33	47%	50.6%	2.5%
Registered Nurses A1 and A0	7200	4072	728	876	5676	1524	71.7%	12.8%	15.4%
Nurse A2	5592	2572	552	751	3875	1717	66.4%	14.2%	19.4%
Midwives	1990	949	93	165	1207	783	78.6%	7.7%	13.7%
Laboratory Technician	1415	1295	419	276	1990	-575	65.1%	21.1%	13.9%
Physiotherapists	225	93	63	26	182	43	51.1%	34.6%	14.3%
Anaesthesia	291	222	35	35	292	-1	76%	12%	12%
Pharmacist	886	168	620	14	802	84	21%	77.3%	1.7%
Dentists	236	122	85	21	228	8	53.5%	37.3%	9.2%
Total	19,356	10,211	3,114	2,277	15,602	3881	65.4%	20%	14.6%

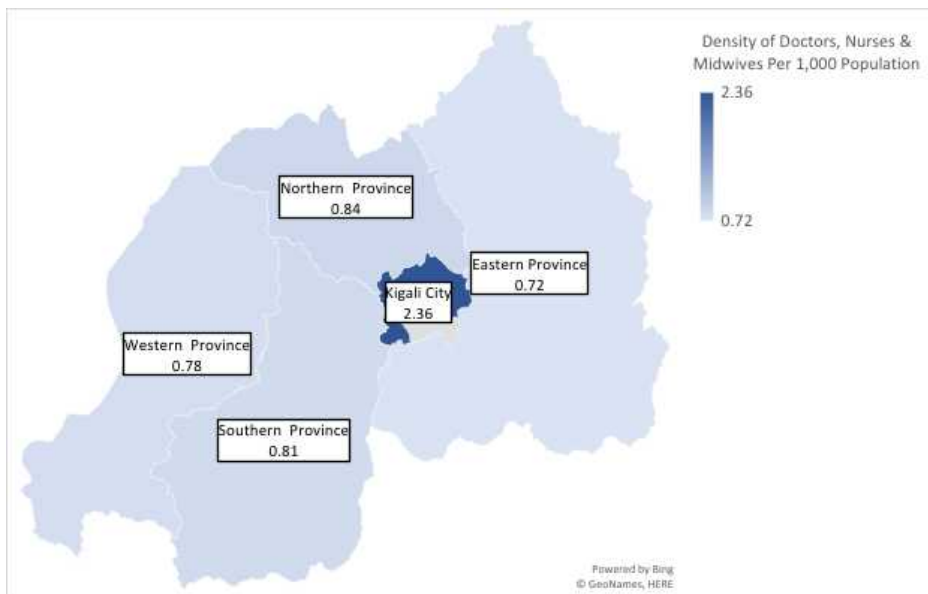
Source: Health Professionals Councils registers and MFL report (November 2018)

3.4.2 Distribution by districts and regions

Table 6 shows the distribution of selected health workforce by region and district. The distribution of the human resources for health is skewed geographically both in terms of between-provinces and within-provinces. For example, whereas Kigali City alone has about 36% of the total stock of GPs (280), only a third of that percentage (12%) is found in the Northern Province. Similarly, the Northern Province has the lowest across-board and across-cadre number of these professionals in relation to the other four provinces; although its percentage share of pharmacists is almost identical to the Eastern province. Figure 9 shows the density of doctors, nurses and midwives per 1,000 population across Provinces in Rwanda.

Meanwhile, the distribution of Medical Specialists presents huge disparities across districts, where for example, within the districts of Gatsibo, Nyagatare, Gicumbi, Rutsiro and Nyamagabe, there are no Medical Specialist as compared to Gasabo and Nyarugenge with about 41% and 20% of the total number specialists respectively. Additionally, the Nyaruguru district of the Southern Province has the lowest density of doctors, nurses & midwives per 1,000 population of 0.36; contrasting sharply with 3.47 density of doctors, nurses & midwives per 1,000 population in the Nyarugenge District.

Figure 9: Doctor, Nurse and Midwife density per 1,000 population by Province, 2018



The crude geographical equity ratio (doctor, nurse and midwife density per 1,000 population of the best to the worst staffed regions/districts) is 9.57 between districts and 3.26 between

provinces. Thus, the best staffed district is more than 9 times better off than the worst staffed district. The extent of inequality is, however, lower between provinces which has a crude equity ratio of 3.3, suggesting that the best staffed province (Kigali City) is about 3 times better off than the worst staffed province (East). There are no universally adopted levels of acceptable inequity in HRH distribution; thus, nationally agreed benchmarks are most useful. Even though there are no universally accepted geographical equity ratio benchmarks, experience from other countries have suggested that above a crude geographical equity ratio of ratio 5 could be associated with underlying disparities in key health outcome indicators across the sub-national structures.

Whereas the aforementioned demonstrates aggregate maldistribution of doctors, nurses and midwives across the regions and districts, the most inequitably distributed health professionals at the district level are Pharmacists (equity ratio of 37.04) followed by doctors (31.46), midwives (12.59) and nurses (7.90). In contrast, at the level of the province, doctors are the most inequitably distributed health professionals with crude equity ratio of 10.07 followed by Pharmacists (9.56), Midwives (3.86) and Nurses (2.69). From the foregoing, maldistribution of health workers within the provinces appears to be much more pronounced than maldistribution across the provinces.

Upon discussion with stakeholders, one reason assigned for the observed maldistribution is related to the population distributions, the level of care required to be delivered at different levels, the staffing capacity and diagnostic equipment and other equipment needed for those different levels. While the staffing levels are standardised across district hospitals and health centres, the population distribution across these facilities varies which leads to high disparities because a district catchment area with high population coverage will always experience higher disparities because of the large population expected to be served by the same number of staff. Additionally, provincial and the national referral hospitals are better equipped and have specialized staff to better accommodate the influx of patients in cities as well the referred patients for specialised care (see more discussion on this under the staffing norms).

Table 5: Geographical distribution of selected health workforce

Region	District	Estimated Population (2018)	GPs	Medical Specialists	Registered Nurses (A1)	Enrolled Nurses (A2)	Midwives	Pharmacists	Laboratory Technicians	Physiotherapists	Anaesthetists	Dentists	Density of Doctors, Nurses & Midwives Per 1,000 Population	Doctor to Population Ratio	Nurse to Population ratio	Midwife to WIFA Ratio	Pharmacist to Population Ratio
Eastern	Bugesera	416,748	19	6	85	242	20	2	68	3	2	5	0.89	16,670	1,274	5,001	208,374
	Gatsibo	536,025	21	0	163	164	29	2	59	3	6	4	0.70	25,525	1,639	4,436	268,013
	Kayonza	444,544	29	5	194	129	33	2	59	6	10	4	0.88	13,075	1,376	3,233	222,272
	Kirehe	413,929	11	1	156	99	21	1	57	1	4	3	0.70	34,494	1,623	4,731	413,929
	Ngoma	401,276	12	5	107	112	36	1	25	2	5	4	0.68	23,604	1,832	2,675	401,276
	Nyagatare	639,777	17	0	146	151	29	1	67	1	3	3	0.54	37,634	2,154	5,295	639,777
	Rwamagana	371,510	16	9	143	138	38	1	61	4	5	4	0.93	14,860	1,322	2,346	371,510
	Sub-Total	3,223,809	125	26	994	1,035	206	10	396	20	35	27	0.74	21,350	1,589	3,756	322,381
Kigali City	Gasabo	716,494	127	230	592	458	124	12	219	37	33	39	2.14	2,007	682	1,387	59,708
	Kicukiro	414,490	82	60	471	161	86	24	147	33	47	38	2.07	2,919	656	1,157	17,270
	Nyarugenge	319,067	70	115	543	231	148	7	231	27	38	32	3.47	1,725	412	517	45,581
	Sub-Total	1,450,051	279	405	1,606	850	358	43	597	97	118	109	2.41	2,120	590	972	33,722
Northern	Burera	338,699	12	5	176	118	29	1	44	1	6	2	1.00	19,923	1,152	2,803	338,699
	Gakenke	340,543	20	1	181	106	35	2	55	2	7	4	1.01	16,216	1,187	2,335	170,272

Region	District	Estimated Population (2018)	GPs	Medical Specialists	Registered Nurses (A1)	Enrolled Nurses (A2)	Midwives	Pharmacists	Laboratory Technicians	Physiotherapists	Anaesthetists	Dentists	Density of Doctors, Nurses & Midwives Per 1,000 Population	Doctor to Population Ratio	Nurse to Population ratio	Midwife to WIFA Ratio	Pharmacist to Population Ratio
	Gicumbi	409,196	19	0	142	138	40	1	51	3	6	11	0.83	21,537	1,461	2,455	409,196
	Musanze	400,188	22	15	152	72	34	1	60	4	8	6	0.74	10,816	1,787	2,825	400,188
	Rulindo	304,546	17	1	115	110	34	2	41	4	7	6	0.91	16,919	1,354	2,150	152,273
	Sub-Total	1,793,172	90	22	766	544	172	7	251	14	34	29	0.89	16,010	1,369	2,502	256,167
Southern	Gisagara	350,024	16	2	131	74	21	1	38	1	4	3	0.70	19,446	1,707	4,000	350,024
	Huye	357,566	38	42	360	99	87	5	86	10	26	5	1.75	4,470	779	986	71,513
	Kamonyi	382,008	14	3	89	123	16	1	41	2	3	2	0.64	22,471	1,802	5,730	382,008
	Muhanga	326,193	32	21	118	141	55	1	53	8	11	8	1.13	6,155	1,259	1,423	326,193
	Nyamagabe	368,736	13	0	144	65	27	3	44	3	3	3	0.68	28,364	1,764	3,278	122,912
	Nyanza	384,033	12	1	113	89	20	1	45	2	4	2	0.61	29,541	1,901	4,608	384,033
	Nyaruguru	325,595	6	0	65	35	12	1	27	0	0	2	0.36	54,266	3,256	6,512	325,595
	Ruhango	358,613	13	5	189	129	17	2	68	2	7	4	0.98	19,923	1,128	5,063	179,307
	Sub-Total	2,852,768	144	74	1,209	755	255	15	402	28	58	29	0.85	13,086	1,453	2,685	190,185

Region	District	Estimated Population (2018)	GPs	Medical Specialists	Registered Nurses (A1)	Enrolled Nurses (A2)	Midwives	Pharmacists	Laboratory Technicians	Physiotherapists	Anaesthetists	Dentists	Density of Doctors, Nurses & Midwives Per 1,000 Population	Doctor to Population Ratio	Nurse to Population ratio	Midwife to WIFA Ratio	Pharmacist to Population Ratio
Western	Karongi	361,282	28	11	192	106	45	3	51	6	10	5	1.06	9,264	1,212	1,927	120,427
	Ngororero	362,078	16	2	111	91	31	2	48	2	4	5	0.69	20,115	1,792	2,803	181,039
	Nyabihu	306,249	11	1	84	100	12	1	40	1	4	2	0.68	25,521	1,664	6,125	306,249
	Nyamasheke	412,684	22	6	250	128	45	2	70	4	10	5	1.09	14,739	1,092	2,201	206,342
	Rubavu	478,146	20	14	149	100	24	1	54	3	7	9	0.64	14,063	1,920	4,781	478,146
	Rusizi	440,303	34	6	201	89	44	2	48	5	8	6	0.85	11,008	1,518	2,402	220,152
	Rutsiro	360,086	14	0	114	77	15	1	33	2	4	2	0.61	25,720	1,885	5,761	360,086
	Sub-Total	2,720,828	145	40	1,101	691	216	12	344	23	47	34	0.81	14,707	1,518	3,023	226,736
Rwanda	12,040,628	783	567	5,676	3,875	1,207	87	1,990	182	292	228	1.01	8,919	1,261	2,394	138,398	
Crude Equity Ratio (Between Districts)													9.57	31.46	7.90	12.59	37.04
Crude Equity Ratio (Between Regions)													3.26	10.07	2.69	3.86	9.56

Source: Triangulated from MFL Report (2018) and Health Professional Councils registers

3.5 Production capacity (education outputs and training capacity)

The production of health workforce at the academic institutions of higher learning is largely within the mandate of the Ministry of Education. Production of the health workforce over the years has seen massive improvement largely attributable to the expansion of training institutions and establishment of new ones particularly the private institutions. Based on the College of Medicine and Health Sciences key informants, the University of Rwanda, which is the main public training institution in Rwanda underwent series of policy reforms that lead to changes in its internal structures. There was no recent data on the actual number of students graduating from the various health training institutions. However, between 2010 and 2013, the country produced about 4,290 health workers of various categories. Since then, there has been reduction in training of some cadres while scaling-up the production of other specific cadres.

Table 6: Trend of Health Workforce Production, 2010 - 2013

Course	Number of Graduates				Annual Average
	2010	2011	*2012	2013	
Physiotherapy (Bachelor's Degree)	20	41	63	38	32
Anaesthesia - Advanced diploma	20	22	69	27	28
Anaesthesia - Bachelor's degree			13		3
Biomedical Laboratory Services - Bachelor's Degree	11	36	90	67	41
Biomedical Laboratory Services - Advanced diploma			36		7
Medical Imaging Sciences - Advanced diploma	18	19	26	11	15
Dental Therapy - Bachelor's degree	21	15	44	46	25
Ophthalmology - Advanced diploma	17	13	4	7	8
Nursing - Advance Diploma	37	303	350	303	199
Nursing - BSc	22	36	134	39	46
Midwifery	6	187	193	176	112
Mental Health Nursing	44	25	48	13	26
Environmental Health Sciences - Bachelor's Degree		49	130	43	44
Clinical Medicine and Community Health - Bachelor's Degree				39	8
Bachelor of Pharmacy	40	35	168	95	68
Bachelor Degree of General Medicine and Surgery	100	42	165	130	87
Bachelor of Clinical Psychology	49	50	37	90	45
Bachelors in Human Nutrition	43				9
Master of Medicine in Internal Medicine	3	3	8	1	3
Master of Medicine in Obstetrics and Gynaecology	6	1	11		4
Master of Medicine in Paediatrics	5	5	9		4
Master of Medicine in General Surgery	3		8		2
Master of Science in Epidemiology	9	3	6	14	6
Master of Public Health	60	10	42	36	30
Master of Science in Family and Community Medicine			6		1
Masters of Medicine in anaesthesia			1	3	1

MSc in Clinical Psychology				22	4
Total	534	895	1661	1200	858

Source: KHI, NUR-FOM and NUR-SPH. * Two graduations took place in 2012

In recent years, there has been expansion in the training of some health professionals especially doctors, nurses and allied health professionals. There are concerns, however, that the expansion in training has not been accompanied by a commensurate expansion in infrastructure, faculty and clinical training sites. Although the number and technical capacity of tutors and academic faculty have markedly improved over the last decade, it has not been proportional to the increases in student enrolment. This has led to high lecturer-to-student ratios which could compromise the quality to teaching and learning. Furthermore, there is limited capacity of teaching hospitals in the country to accommodate students who must undergo clinical internships throughout the course of their training.

Table 7 shows the approximate enrolment level across the training institutions. Concerning success rate, the Campus Manager of the College of Health Sciences at University of Rwanda again clarified that:

“... more than 95% of students who join various [health] programs graduate and join the labour market ... [and] compared to the private training institutions, more than 90% are trained in public (at the University of Rwanda)”.

Table 7: Current Health Workforce Production Capacity of Rwanda

Category	Average Annual Enrolment	Years of Education
Medical Specialist - Anaesthesiology	5	4
Medical Specialist - Emergency Medicine & Critical Care	8	4
Medical Specialist - General Surgery	5	4
Medical Specialist - Urology	0	4
Medical Specialist - Orthopaedic Surgery	5	4
Medical Specialist - Neurosurgery	4	6
Medical Specialist - Gynaecology & Obstetrics	15	4
Medical Specialist - Internal Medicine	18	4
Medical Specialist - ENT	4	4
Medical Specialist - Anatomical Pathology	8	4
Medical Specialist - Paediatrics	15	4
Medical Specialist - Psychiatry	5	4
GPs	110	6
Registered Nurses - A0 (Degree)	150	3
Registered Nurses - A1 (Diploma)	517	2
Midwives	160	2
Laboratory assistant (A1)	56	2
Laboratory Technologists (A0)	64	2
Physiotherapists	20	2
Anaesthetists	35	5
Pharmacists	88	5
Dentists (Dental Surgeons)	14	5
Dentists (Dental Therapists)	30	2
Nutritionists	35	2
Environmental Health Scientists	35	2
Clinical Officers	20	2
Ophthalmic Clinical Officers	25	2
Occupational Therapists	10	2
Clinical Psychologists	32	2
Orthopaedic Technologists	15	2
Total	1,508	

Source: UR-CMHS Data- November 2018

3.6 Health workforce policies and governance mechanisms

The MOH has the overall responsibility of leading and coordinating HRH interventions in Rwanda. Key ministries involved in HRH planning, production and management are the MOH, the Ministry of Education, Ministry of Public Service and Labour. Due to a seeming fragmentation of the HRH mandate within MOH, there appears to be limited coordination and alignment of the health workforce production with needs.

The planning and management of the health workforce take place within a decentralized context in which districts and health facilities have a degree of autonomy thereby speeding up decision making and improved management of the health workforce.

In terms of HR management practices such as recruitment, disciplinary procedures, payment mechanisms and evaluation of performance, these are usually handled in line with the law (No. 86/2013) establishing the general statutes for public service, Presidential orders determining modalities for recruitment, appointment and nomination of public servants²⁸ and PMO determining the structure of the MOH²⁹ among others. It was observed that there is a general perception amongst national level actors that there are good public sector HR governance processes using the aforesaid rules, regulations and guidelines. Nevertheless, there are concerns that efforts at disseminating the public service rules, regulations and policies, which are necessary for responsive industrial relations in the health sector are limited.

As part of measures to improve the retention of highly skilled health workers, the MOH introduced the concept of signing retention contracts with employees who benefit from further training, especially in the specialized fields. The National HRH policy³⁰ stipulates that each Training Course should go with a retention contract to be signed between the Ministry

²⁸ Ministry of Public Service and Labour, *Presidential Order Determining Modalities for Recruitment Appointment and Nomination of Public Servants - 2017* (Ministry of Public Service and Labour, 2017)
<https://www.mifotra.gov.rw/fileadmin/user_upload/Presidential%20Orders/Presidential_Order__determining_modalities_for_recruitment__appointment_and_nomination_of_Public_Servants%202017.pdf>.

²⁹ Ministry of Public Service and Labour, *Prime Minister's Instructions Determining Organizational Structure, Salaries and Fringe Benefits for Employees of Referral Hospitals, Provincial Hospitals, District Hospitals, Ndera Neuro-Psychiatric Hospital and Health Centres* (Ministry of Public Service and Labour, 2016)
<https://www.mifotra.gov.rw/fileadmin/user_upload/Presidential%20Orders/Presidential_Order__determining_modalities_for_recruitment__appointment_and_nomination_of_Public_Servants%202017.pdf>; Ministry of Public Service and Labour, *Prime Minister's Order Determining Organizational Structure, Salaries and Fringe Benefits for Employees of University Teaching Hospital (CHU)* (Ministry of Public Service and Labour, 2016)
<https://www.mifotra.gov.rw/fileadmin/user_upload/Presidential%20Orders/Presidential_Order__determining_modalities_for_recruitment__appointment_and_nomination_of_Public_Servants%202017.pdf>.

³⁰ Ministry of Health MOH, *National Human Resource for Health Policy* (Ministry of Health, Rwanda, October 2014)
<http://moh.gov.rw/fileadmin/templates/policies/Human_Ressource_for_Health_Policy.pdf>.

of Health and its concerned Staff before starting the training course according to the training period as follows:

- 1) 1 year of service with MOH after a training course of 6 months and below;
- 2) 2 years of service with MOH after a training course of 7 months to 1 year;
- 3) 4 years of service with MOH after a training course of 2 years or a Masters;
- 4) 5 years of service with MOH after a training course of 3 to 4 years or a PhD.
- 5) For staff who did more than one training course, the duration of the retention contract will be cumulative; which means that the total of duration to work for the MOH has to take into account the duration of the service rendered after completion of the previous training.

The policy provides that staff in breach of their retention contract would be held to pay back the cost of the training investment made on them plus interest. Although this initiative is considered laudable, its impact is yet to be evaluated amidst anecdotal evidence that attrition has not started declining. The enforcement of the punitive measure against staff in breach of their retention contracts is perceived to be not strong enough. *"I do not know about this year but from my experience, the retention contract is not being enforced when someone fails to accept posting to a particular place..."*, a doctor who left the public sector alleged during a focus group discussion. There is also a well-designed performance management system, including individual job descriptions and supportive supervision program, monitoring and evaluation mechanism.

The MOH established an HR information system which was used for routine reporting and not for transactions. This system has, however, faced operational challenges affecting the reliability and timeliness of HR information from all districts and facilities. HR gap analysis is routinely conducted by health facilities but rarely if at all collated and analysed in aggregate form to inform annual HR production, recruitment and deployment plan and decisions.

3.7 Current staffing norms – MOH Structure

The Prime Minister's order number 221/03 (2016) sets out the organizational structure, salaries and fringe benefits for employees of University Teaching Hospital (CHU) including the staffing standards. Similarly, Prime Minister's order number 001/03 of 21/11/2016 determines the organizational structure, salaries and fringe benefits for employees of Referral Hospitals, Provincial Hospitals, District Hospitals, Ndera Neuro-Psychiatric Hospital and Health Centres in Rwanda. These constitute the structure of the Ministry of Health (MOH) owned health facilities. There is no similar instrument setting out staffing standards for the private health facilities. Perhaps one main limitation of the staffing is that, it is a fixed facility staffing norm without an explicitly in-built mechanism of adaptation to population, workload levels or epidemiology. Thus, all facilities with similar designation are given same staffing levels irrespective of the extent variation in service utilisation amongst them. The Director of

Health Policies and Regulation at the MOH during an interview buttressed the point, noting that:

“... the structure or staffing norms does not take into account the distribution of population across districts or health centres and community. For example, the staffing norms (structure), says districts shall have let’s say 4 doctors, 10 nurses and 2 pharmacists. This means that the same number will be applied to all districts regardless of the population sizes in those districts. In such case, districts with extreme high population (e.g. 400,000) face more HRH shortages than districts with lowest population (e.g. 150,000)”.

Going forward, there are ongoing efforts to scale-up Workload Indicators of Staffing Needs (WISN) study which may present an opportunity for adjusting the staffing norms to reflect workload dynamics.

Health Centre: A total of 21 health workers are expected to be placed in health centres as specified by the staffing norm. Out of this number, 9 (40.9%) of the various categories of nurses form the majority of health workers required in health centres. No medical officer is expected to be at post there and for some selected categories like Midwife, Mental Health Nurse, Social worker and Nutritionist, only one in each of the categories is required to be in a health centre. 4 (18.2%) out of the total health workforce are designated to be administrative and support staff of various categories.

District Hospital: The staffing norm provided that a total of 168 health workers are required in each district hospitals. Of this number, 8 (4.8%) are expected to be medical specialists and consultants while about 34 (20.2%) are earmarked to be administrative and support staff of various categories. Nurses form the majority (42%) while Biomedical Technician, Clinical Psychologist, Environmental Health Officer and Nutritionist, are expected to form the least percentage (0.6% each) of the total number of health workers designated to work in the district hospitals. Also, about 13 (7.7%) of the various categories of midwives are required to be in the district hospitals.

Provincial Hospital: The staffing norm specifies that 206 health workers are needed in provincial hospitals of which the various categories of Nurses form the majority (44.6%). Medical specialists are expected to take 6.3% of the total health workforce required in the provincial hospitals while the various categories of GPs take about 6.8%. Dental Therapists, Imagery Technicians and Midwives are also expected to take 1.9%, 2.4% and 5.8% of the total health workforce respectively. Also, about 16.5% of the total health workforce is earmarked to be administrative and support staff of various categories.

Referral Hospital: The staffing norm states clearly that 207 health workers are required at the referral hospitals. Out of this total, 34 (16.4%) are designated to be administrative and

support staff of various categories. Medical specialists and the various categories of General practitioners are expected to be 14 (6.8%) respectively. 92 (44.4%) out of the total health workforce are expected to be nurses while 12 (5.8%) are anticipated to be midwives. Laboratory scientists and technicians are also expected to form 4.3% of the total health workforce required at the referral hospitals.

University Teaching Hospital of Butare (CHUB): The staffing norm specifies that 695 health workers are required at the University Teaching Hospital of Butare (CHUB). Out of this total, 47 (6.8%) are expected to be medical specialists while 8 (1.2%) are General practitioners. On the other hand, about 147 (21.2%) are designated to be administrative and support staff of various categories. Nurses form the majority (37.3%) while Allied Health Staff, Pharmacist and Pharmacy Technicians, Midwives, and Radiographers are stipulated to form 1.7%, 3.6%, 10.1%, 1.6% respectively of the total number of health workers designated to work at the University Teaching Hospital of Butare (CHUB).

University Teaching Hospital of Kigali (CHUK): The staffing norm specifies that 1,068 health workers are needed at the Teaching Hospital of Kigali (CHUK). Out of the total number required, 218 (20.4%) are designated to be administrative and support staff of various categories. 64 (6%) are expected to be Medical specialists while General practitioners are only expected to be 6 (0.6%) in total. 44.7% of the total health workforce are stipulated to comprise of the various categories of nurses and 11.9% midwives. Laboratory scientists and Technicians, allied health staff and Anaesthesia Technicians are also expected to form 3.7%, 1.8% and 3.3% respectively of the total health workforce required at the University Teaching Hospital of Kigali (CHUK).

3.8 Current salary scales

The public sector health workers in Rwanda are remunerated according to the established salary scale determined by the Ministry of Public Service and Labour and the Prime Minister order No. 221/03 and 001/03 of 2016. As of 2018, the prevailing salary scale for public sector health workers was contained in the Prime Minister's orders number 221/03 (2016) and 001/03 (2016) which clearly define the organizational structure, salaries and fringe benefits for employees of University Teaching Hospital, Referral Hospitals, Provincial Hospitals, District Hospitals, Ndera Neuro-Psychiatric Hospital and Health Centres in Rwanda. Table 8 below provided a summary of the annual gross income including salaries and fringe benefits for selected health professionals. The salary levels are deemed to be competitive in relation to other categories of civil servants, and in line with remuneration levels in countries at similar levels of socio-economic development. There are, however, attractive packages from a growing private health sector which sometimes offer more than double of the public sector salaries particularly for doctors and pharmacists.

Table 8: Salary levels for selected health workers in the public sector

CATEGORY OF STAFF	Gross Annual Salary (RWF)	USD Equivalent
General Practitioner	9,479,407	\$11,152
Doctor - Specialist	15,568,195	\$18,316
Nurse	3,930,300	\$4,624
Midwife	3,939,804	\$4,635
Mental Health Nurse	3,939,804	\$4,635
Laboratory Technologist	3,930,300	\$4,624
Physiotherapist	3,930,300	\$4,624
Anaesthetist	3,930,300	\$4,624
Pharmacist	6,530,524	\$7,683
Dentist (Dental Surgeon)	3,930,300	\$4,624
Nutritionist	3,930,300	\$4,624
Environmental Health Officer	3,930,300	\$4,624
Clinical Officer	3,930,300	\$4,624
Ophthalmic Clinical Officer	3,930,300	\$4,624
Clinical Psychologist	5,676,899	\$6,679
Administration and Support staff	5,676,899	\$6,679
Average	5,386,515	\$6,337

Source: Prime Minister's Orders No. 221/03 and 001/03 of 2016

3.9 Unemployment of health workers, turnover and dual practice

Available data showed that all registered doctors in the country who were ready to be employed had employment. However, 988 nurses and midwives were reportedly unemployed and responded to the Nursing Council's call for registration of unemployed nurses and midwives. This represents about 6.6% unemployment rate among the nurses and midwives. The unemployment rate for Allied Health Professionals is the highest across all the staff categories in the health sector as at October 2018 with an average of 46%. Overall, out of the estimated health workforce of 21,552 the unemployment rate averaged 13% among trained health workers. There are no studies of Rwandan context that examines the factors influencing the level of health worker unemployment.

In the case of the allied health professionals amongst whom about 1,891 are reportedly unemployed, it was observed that the MOH structure have not made provision for the employment of some of the cadres. For instance, whilst the University of Rwanda is training Clinical Officers or Medical Assistants, same is not in the MOH structure to enable the public sector to employ and deploy them to health centres where they are considered more useful. Also, the requirement per health facility for most of the allied health professionals within the MOH structure is deemed by some stakeholders as too restrictive which is culminating in their unemployment. In this regard, scaling-down the production of some cadres as well as reconfiguring the MOH structure or staffing profiles of health facilities to create space for their employment may be necessary.

A rapid assessment of the health workforce turnover health facilities in Rwanda (2017) revealed an average turnover rate of 8.7% among the health professionals in the public sector³¹. However, most of these staff remained active in the country's health labour market, mostly in the private sector. About 2% reportedly leaves the labour market annually which has been taken into consideration in the analysis.

Table 9: Turnover rates by cadre and year

Cadre	2012	2013	2014	2015	2016	Overall turnover
Doctors	15.4%	23.1%	26.0%	23.2%	21.2%	21.8%
Laboratory technicians	1.9%	1.8%	0.0%	12.5%	3.6%	4.1%
Midwives	3.7%	7.2%	8.2%	7.5%	5.0%	6.3%
Nurses	4.1%	12.0%	9.1%	6.6%	5.9%	7.6%
Grand Total	5.2%	11.9%	10.1%	9.1%	7.3%	8.7%

Source: Report of Rapid analysis of staff turnover (2017)

In an interaction with health professionals particularly doctors, it was noted that dual practice is very common even though there were no official statistics to quantify the impact of the phenomenon on the public sector workforce. One specialist doctor intimated that: *“where I work in the private sector, one can get two to three times the Government salary and so everyone would like to do some work at the private facility”*. A nexus between quality of residency (specialists) training and dual practice was also suggested; *“we go to the hospitals to learn from the consultants but they often desert us for their private jobs, so we are sometimes on our own without the expected mentorship”*, one doctor in residency bemoaned of the impact of dual practice on their training during a focus group discussion. Limited opportunities for dual practice was considered one of the reasons some doctors fail to take up postings to rural areas. One doctor remarked, *“... there are only 6 well established private hospitals in Rwanda which are all in Kigali... they also pay well or better when you also attach yourself to one of them”*

The MOH plan to stem dual practice included a new order that a specialist doctor needed to be cleared by MOH before they could be employed in the private and NGO sector. The impact of this directive was however yet to be evaluated even though some stakeholders have not been too optimistic of a dramatic impact.

³¹ MOH, *Rapid Analysis of Staff Turnover in Health Facilities and Proposal of Retention Strategies* (2017)

Table 10: Estimated Unemployment Rates Among Health Workers

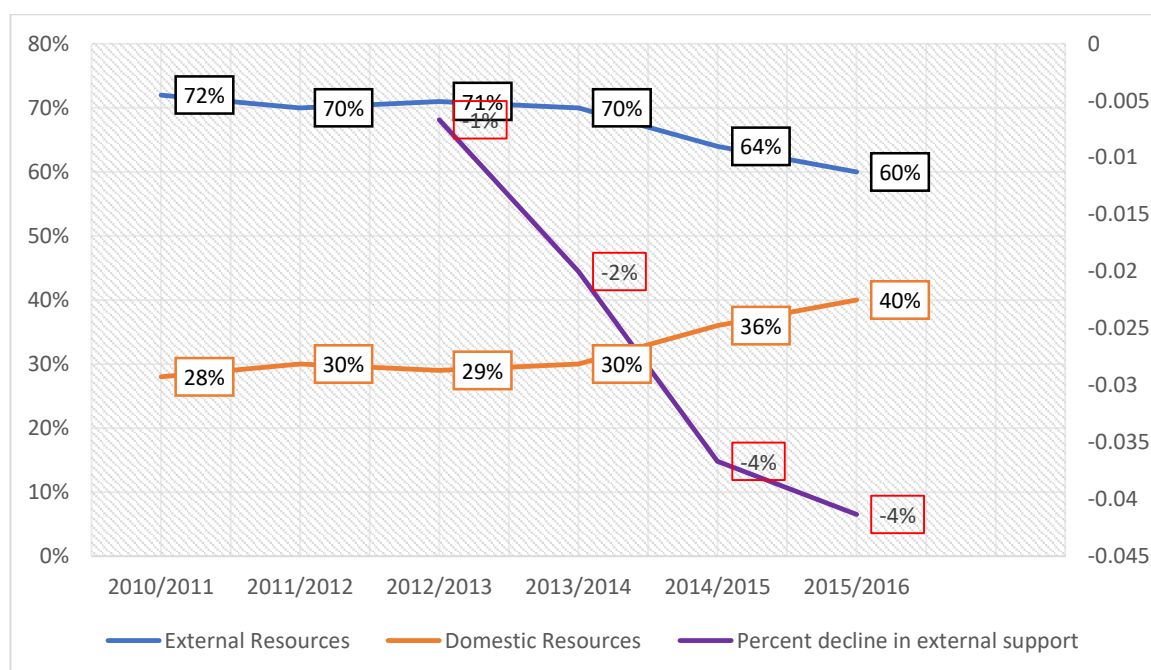
Broad Classification	Staff Category	Total Number Registered in Rwanda	Number unemployed	Unemployment rate (%)
Medical Doctors	Medical Doctors	1,648	0	0
	GPs	1,114	0	0
	Medical Specialists	534	0	0.
Nurses & Midwives	Nurses and Midwives	15,050	988	6.6
	Registered Nurses	7,200	N/A	-
	Nurses (Enrolled)	5,592	N/A	-
	Mental Health Nurses	268	N/A	-
	Midwives	1,990	N/A	-
Allied Health	Allied Health Profess	4,083	1,870	45.8%
	Nutrition & Dietetics	224	159	70.9%
	Public Health	381	255	66.9%
	Speech and Language Therapy	3	1	33.3%
	Biomedical Engineering	18	9	50%
	Clinical Medicine	119	64	53.7%
	Environmental Health	201	104	51.7%
	Clinical Perfusion	4	0	0%
	Ophthalmic Clinical	90	44	48.9%
	Prosthetics & Orthotics	26	13	50%
	Clinical Psychology	310	151	48.7%
	Biomedical Laboratory	1,415	673	47.5%
	Dental & Oral Health	236	102	43.2%
	Medical Imaging	152	51	33.5%
	Anaesthesia	291	95	32.6%
	Physical Therapy	225	63	28%
	Optometry	13	2	15.3%
	Social Work	364	84	23.1%
	Orthopaedic Clinical	7	0	0%
	Chiropractic	1	0	0%
Emergency Care	1	0	0%	
Occupational Therapy	2	0	0%	
Pharmacy	Pharmacy Professionals	898	33	3.6%
	Pharmacist	886	29	3.2%
	Pharmacy Technician	12	4	33.3%
TOTAL		21,552	2,891	13%

Source: MOH and Health Professionals Councils databases (October 2018)

3.10 Financing of Human Resources for Health

Data from the Health Resources Tracking Tool (HRTT) at the Ministry of Health indicate that health sector budget has been increasing in nominal terms from Rwf 321 billion in 2010/11 to Rwf 360 billion in 2014/15 and to Rwf 413 billion in 2015/16, reflecting an increase of 12% and 27%, respectively. Of this, external funding accounted for the largest share of funding (60% in 2015/16) although the share is declining by about 2-3% annually mainly due to the exit of some development partners and a slight decline in the share of international NGOs funding.

Figure 10: Trend of Domestic versus external funding for health



Source: Adapted from the Health Financing Strategic Plan, 2018 - 2024

The public sector wage bill of the Rwandan health sector grew by 16% from Rwf 92 billion in 2013/2014 to Rwf 111 billion in the 2014/2015 financial year which was expected to increase significantly by the end of the 2017/2018 fiscal year (at the time of this study, the MOH was still analysing the data to finalise the HRTT report for 2015/2016 and 2016/17). Owing to the dwindling external funding and coupled with increased Government's investment in the health sector, domestic funding for wages and salaries of health workers has been increasing over the years, from 48% in 2013 to about 56% of the public health sector remuneration leaving a large proportion public health sector remuneration is still being funded through bilateral and multilateral support.

Table 11: Trend of the size of the public sector wage bill

Financial Year	COST IN BILLION RWF							
	Health Sector Budget	Wages and Salaries (Earmarked)	Contractual Staff	Technical Assistance	Total Wage Bill	Staff Development	Overall HRH Cost	Wage Bill as % of Health Sector Expenditure
2013/2014	336	34	52	6	92	3	95	27%
2014/2015	360	43	55	5	103	8	111	29%
Average	348	39	54	6	39	6	41	28%

Source: MOH Annual Reports and HRTT report 2015/2016

About 14% of bilateral funds and 5% of multilateral funding in the health sector is spent on health workforce remuneration while 27% - 33% of Government's annual health budget is earmarked for the payment of wages and salaries³².

3.11 Health Workforce Migration

Even though some emigration is occurring, Rwanda is a net gainer of health worker migration within the sub-region. Individual staff data kept by the MOH about medical specialist who graduated from the University of Rwanda between 2000 and 2016, show that cumulatively about 22% left the country for various reasons. On the other hand, by 2014, 33% of doctors working in Rwanda are non-Rwandan nationals while only 1.7% of nurses are non-Rwandan nationals. The proportion of Non-Rwandan doctors is much higher in rural districts. For example, 13 of the 30 districts, foreign doctors make up more than 50% of all doctors available and four districts have more than 70% foreign doctors.

3.12 Community Health Workers

The MOH has been implementing the Community Health Workers' programme since 1995 aimed at strengthening the communities' knowledge and improve their attitudes towards the prevention, primary management and referral of patients with illnesses and/or disabilities to the health facilities or other relevant agencies for management. A recent evaluation report showed that the CHW program has played a key role in contributing to improved health outcomes in Rwanda, notably, the attainment of some of millennium development goals. The program which began with 12,000 CHWs was later increased to about 60,000 CHWs to be able to cope with increasing demand for their services. Presently, each village is assigned four

³² Ministry of Health MoH, *health resource tracking tool - 2013/2014* (ministry of health, Rwanda, 2015); Ministry of Health MoH, *health resource tracking tool - 2014/2015* (ministry of health, Rwanda, 2016); Ministry of Health MoH, *mid-term review of the Rwanda third health sector strategic plan (HSSP 3)* (Ministry of Health, Rwanda, 2015) <http://www.moh.gov.rw/fileadmin/templates/docs/hssp_iii_mtr_final_report.pdf>.

(04) CHWs with clearly defined roles and responsibilities to cater for approximately 100–150 households.

A costing report³³ (2016) for CHWs program showed that training CHWs for different interventions (2014) costed the \$1,565,038, while financial incentives costed \$3,093,883. At end of 2018, the MOH, planned and expanded the scope of the CHW program by adding Early Childhood Development (ECD) and Non-Communicable Disease (NCD). Consequently, the number of CHWs in Rwanda increased from 45,000 to 60,000. However, a number of bottlenecks continue to linger as the training of CHWs is less standardised and their remuneration is dependent on the availability of donor funding.

The CHWs are not on government payroll for regular salary but are given some financial incentives through the performance-based financing (PBF) scheme, determined by the number of essential health services provided, where 30% of the total PBF funds is shared among individual CHW members while 70% is deposited in the collective funds of CHW cooperatives. Within each district there are Health Centre Committees that provide oversight to CHWs activities, such as supervision, accountability, and financial control. Upon discussion with MOH senior policy persons, it was advised that since CHWs are primarily volunteers — only benefiting from financing incentives based on the volume of services delivered, they should not be part of this Health Labour Market Analysis as no established standard or academic qualifications is required to satisfy legal requirements in order to be on government wage bill (payroll).

Box 3: Summary of issues - current and anticipated in future

- Limited coordination of planning health workforce education
- Quality of training and curriculum challenges
- Regulatory challenges
- Prevalence of dual practice
- Limited support form of mentorship
- Inequitable rural-urban distribution
- Inappropriate skill mix
- Skilled but unemployed health workers (6.6% for nurses; 46% for allied health workers; 3.3% for pharmacists)
- Significant turnover rates in public rural institutions (8.7%)
- Declining proportion of external support (estimated at 2-4% annually)
- Unstandardized CHW training curriculum

33 RBC, Rwanda Biomedical Centre, Report of Costing of Rwanda's Community Health Workers' Integrated Services (Rwanda Biomedical Centre, December 2016)

CHAPTER FOUR

HEALTH LABOUR MARKET PROJECTIONS

4.1 Introduction

There has been previous exercise in 2014 which some forecast about the future health workforce and demand for Rwanda were conducted³⁴. However, a single year forecast was done for only demand-side and compared with staff employed in the public sector. Also, the 7-year HRH Program also estimated requirements for specialists in Rwanda up to 2017 as the basis for the program focus. There is also a Workload Indicator of Staffing Need (WISN) study that has not yet been concluded. Thus, a long-term forecast has not been conducted to quantify the supply of, and demand for the health workforce. For this analysis, projections using two different scenarios (based on the advice of the MOH) have been conducted to facilitate policy discussion. First, a fixed facility staffing norm which is the approved structure of health facilities was used to make annual projections with adjustments for planned infrastructural expansion and population growth. Second, the health workforce targets in the MOH's Fourth Health Sector Strategic Plan (HSSP4) which ends in 2024 was simulated in the second scenario.

4.2 Health Workforce Supply Projections (selected categories based on data availability)

Based on the average enrolment rate for various health professionals and on the advice of the key stakeholders whereby a success rate of 95% was assumed, it is estimated that the size of the health workforce would increase by 34% by the year 2024 and by 63% by 2030. In particular, General Practitioners are expected to increase by 42% and 79% by 2024 and 2030 respectively whilst midwives are expected to increase by 32% and 60% by 2024 and 2030 respectively. The most dramatic increase is likely to be recorded among Medical Specialists whose numbers are expected to jump from 534 in 2018 to 972 by 2024 and 1,355 by 2030. This represents 82% and 154% improvement for 2024 and 2030 respectively (See Table 12 for details). The expected stock of the health workforce has been compared with the projected demand in the subsequent sections which suggests production inadequacies for most categories of staff in the labour market whilst over-production is also apparent in some cases.

³⁴ MOH, *Master Facility List Report (2018)*

Table 12: Projected Supply of Selected Health Workforce based on current trends

CATEGORY OF STAFF	Baseline stock (2018)	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Doctor - Specialist	534	611	686	760	832	903	972	1,040	1,106	1,172	1,236	1,298	1,355
GP	1,114	1,196	1,277	1,356	1,433	1,509	1,583	1,656	1,728	1,797	1,866	1,933	1,994
Nurse (A2, A1 & A0)	10,990	11,404	11,809	12,207	12,596	12,978	13,352	13,719	14,078	14,430	14,775	15,113	15,413
Midwife	1,990	2,102	2,212	2,320	2,426	2,529	2,630	2,730	2,827	2,923	3,016	3,108	3,190
Mental Health Nurse	268	276	284	292	300	309	318	327	337	347	357	367	378
Laboratory Tech (A1 & A0)	1,415	1,501	1,585	1,667	1,748	1,827	1,904	1,980	2,054	2,127	2,199	2,269	2,332
Physiotherapist	225	240	254	268	281	295	308	321	333	346	358	369	380
Anaesthetist	291	318	345	372	397	423	448	472	496	519	542	564	585
Pharmacist	886	952	1,016	1,080	1,142	1,202	1,262	1,320	1,378	1,434	1,489	1,542	1,591
Dentist (Dental Surgeon)	236	245	253	261	269	277	285	293	300	307	314	321	328
Nutritionist	224	253	281	309	336	362	388	414	439	463	487	511	532
Environ Health Officer	201	230	259	287	314	341	368	394	419	444	468	492	514
Clinical Officer	119	136	152	168	184	199	214	229	243	257	271	285	297
Ophthalmic Clinical Officer	90	112	133	155	175	195	215	235	254	272	291	309	325
Clinical Psychologist	310	334	358	381	404	426	448	470	491	511	531	551	569
TOTAL	18,893	20,020	21,124	22,207	23,269	24,310	25,330	26,331	27,312	28,273	29,216	30,141	30,973

4.3 Scenario 1: Health Workforce Requirements based on MOH Structure

In the first projection scenario, the approved health facilities structure of 2016 was assumed as the staffing norm and adjusted annually based on trends of workload changes observed in health service utilization and planned infrastructural expansion³⁵.

The projection shows that in 2018, the size of the need-based demand for health workforce under this scenario was about 28,075 made up of 40% Nurses, 10% Midwives and 4% Doctors, among others. This would translate into 1.64 Doctors, Nurses and Midwives per 1,000 population which is still far below the international benchmark of 2.3 per 1,000 used in the MDG era and 4.45 per 1,000 threshold simulated in the Global Strategy for Human Resources for Health (GSHRH).

Maintaining these staffing standards and adjusting for infrastructure expansion, population growth and increased utilization, the size of the health workforce demand would increase by 64% by the year 2024 and more than double by the year 2030 for both the public and private sectors. With this, it is expected that there will be 3.15 doctors, nurses and midwives per 1,000 population by 2030 which represents 71% of the benchmark used in the Global Strategy on Human Resources for Health (HRH).

Compared with current and anticipated health workforce supply levels, there is a net shortfall of 7,380 health workers mostly the allied health professionals who are ironically the highest unemployment rate. At the same time some cadres such as clinical psychologist, physiotherapist and pharmacists are supplied above the requirements for the MOH structure (see Table 14). Accordingly, 48.9% of clinical psychologists, 28% of physiotherapists and 3% of pharmacist are unemployed.































³⁵ [3]Health facilities structures 2016

Table 13: Projection Scenario 1 - Health Workforce Requirements based on MOH Structure

STAFF TYPE	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
GP	1,099	1,335	1,553	1,758	1,957	2,153	2,350	2,552	2,762	2,983	3,218	3,468	3,736
Doctor - Specialist	823	966	1,103	1,235	1,366	1,498	1,633	1,773	1,920	2,074	2,239	2,415	2,603
Nurse (A2, A1 &A0)	13,422	14,769	16,116	17,487	18,902	20,380	21,938	23,590	25,350	27,230	29,242	31,396	33,704
Midwife	3,407	3,728	4,047	4,370	4,705	5,055	5,424	5,817	6,237	6,686	7,167	7,684	8,237
Mental Health Nurse	1,005	1,046	1,093	1,148	1,209	1,277	1,353	1,436	1,527	1,625	1,731	1,844	1,966
Laboratory Technologist (A1 & A0)	2,784	2,948	3,126	3,321	3,535	3,768	4,022	4,298	4,597	4,920	5,268	5,641	6,042
Physiotherapist	173	198	222	246	270	295	321	348	377	408	440	475	512
Anaesthetist	441	520	595	666	736	806	876	949	1,026	1,106	1,192	1,283	1,380
Pharmacist	149	164	179	194	210	226	243	262	281	302	325	349	375
Dentist (Dental Surgeon)	960	1,010	1,066	1,129	1,199	1,277	1,362	1,456	1,557	1,667	1,785	1,912	2,048
Nutritionist	801	833	872	917	968	1,025	1,089	1,159	1,236	1,320	1,410	1,508	1,612
Environmental Health Officer	789	816	850	890	937	990	1,051	1,118	1,191	1,271	1,358	1,451	1,551
Clinical Officer	721	742	770	803	843	889	942	1,000	1,064	1,135	1,211	1,293	1,382
Ophthalmic Clinical Officer	1,369	1,667	1,967	2,268	2,570	2,874	3,179	3,486	3,796	4,107	4,421	4,740	5,066
Clinical Psychologist	132	144	156	168	181	194	208	223	239	256	274	294	315
Rwanda	28,075	30,886	33,714	36,601	39,587	42,707	45,991	49,467	53,158	57,089	61,280	65,753	70,528
<i>Density of Doctor, Nurse & Midwife Per 1,000 Population</i>	<i>1.64</i>	<i>1.77</i>	<i>1.90</i>	<i>2.02</i>	<i>2.14</i>	<i>2.26</i>	<i>2.38</i>	<i>2.50</i>	<i>2.63</i>	<i>2.77</i>	<i>2.89</i>	<i>3.02</i>	<i>3.15</i>

**Note: The projected annual requirements represent the total need for the various workforce categories. These are the cumulative figures rather than incremental.*

Table 14: Labour Market Gaps based on MOH Approved Structure

CATEGORY OF STAFF	BASELINE STOCK (2018)	BASELINE REQUIREMENT (2018)	BASELINE GAPS (2018)	BASELINE STAFF AVAILABILITY RATIO (2018)	ANTICIPATED STAFF AVAILABILITY RATIO (2024)	ANTICIPATED STAFF AVAILABILITY RATIO (2030)	
Ophthalmic Clinical Officer	90	1,369	-1,279		7%		6%
Clinical Officer	119	721	-602		16%		21%
Dentist (Dental Surgeon)	236	960	-724		25%		16%
Environmental Health Officer	201	789	-588		25%		33%
Mental Health Nurse	268	1,005	-737		27%		11%
Nutritionist	224	801	-577		28%		33%
Laboratory Technologist (A1 & A0)	1,415	2,784	-1,369		51%		39%
Midwife	1,990	3,407	-1,417		58%		39%
Doctor - Specialist	534	823	-289		65%		52%
Anaesthetist	291	441	-150		66%		42%
Nurse (A2, A1 & A0)	12,792	13,422	-630		95%		50%
General Practitioner	1,114	1,099	15		101%		53%
Physiotherapist	225	173	52		130%		74%
Clinical Psychologist	310	132	178		236%		181%
Pharmacist	886	149	737		595%		425%
Rwanda	20,695	28,075	(7,380)				

4.5 Scenario 2: Health Workforce Requirements based on HSSP4 Targets

In the second projection scenario, workforce targets of the MOH's Fourth Health Sector Strategic Plan (HSSP4) was used. The targets in the HSSP4 which are also contained in the National Strategy for Transformation (NST) are expressed in terms of health worker to population ratio for the mid-term (2020) and at the end of the plan (2024). Projection of need-based requirements for health workers using the HSSP 4 scenario shows that a total of 23,973 health professionals were required in Rwanda as of 2018. This projection is expected to increase to 27,386 by 2024 and to 31,722 by 2030 to match population growth (see Table 15).

In terms of density of Doctors, Nurses and Midwives per 1,000 population, the HSSP 4 target would yield 1.79 per 1,00 population in 2018 and 2.09 per 1,000 population by 2024, the year when the HSSP 4 is due to be revised. When simulated up to 2030, the HSSP 4 target yields Doctors, Nurses and Midwives density of 2.37 per 1000 population which only meets the threshold used by the World Health Organisation for need-based estimates during the MDGs era but falls short of the 4.45 per 1,000 population threshold used in the global strategy for Human Resources for Health (GSHRH)³⁶.

The gap analysis also reveals that, under the current trajectory of workforce production, the HSSP 4 targets would be largely met or surpassed by 2024 except that of midwives which will be only 49% of the target by 2024. Additional 3,394 midwives need to be trained between 2019 and 2024 in order to meet the HSSP4 target. This observation is fairly consistent with that of the Master Facility List Report 2018.

³⁶ WHO, Global Strategy on Human Resources for Health.

Table 15: Projection Scenario 2: Health Workforce Requirements based on the HSSP4 targets

Category of Staff	HSSP4 Target (Per 1,000 Population)	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Doctors (GPs & Specialist)	0.143	1,722	1,761	1,801	1,842	1,883	1,925	1,967	2,010	2,052	2,096	2,155	2,216	2,278
Nurse	1.25	15,051	15,396	15,747	16,102	16,462	16,827	17,194	17,566	17,940	18,318	18,835	19,368	19,916
Midwife	0.4	4,816	4,927	5,039	5,153	5,268	5,384	5,502	5,621	5,741	5,862	6,027	6,198	6,373
Pharmacist	0.065	783	801	819	837	856	875	894	913	933	953	979	1,007	1,036
Laboratory Technologist	0.133	1,601	1,638	1,675	1,713	1,752	1,790	1,829	1,869	1,909	1,949	2,004	2,061	2,119
Total		23,973	24,523	25,081	25,647	26,221	26,801	27,386	27,979	28,575	29,178	30,000	30,850	31,722
Doctor, Nurse & Midwife Per 1,000 Population		1.79	1.83	1.88	1.92	1.96	2.00	2.05	2.09	2.14	2.18	2.24	2.31	2.37

Table 16: Labour Market Gaps based on HSSP4 Targets

CATEGORY OF STAFF	BASELINE STOCK (2018)	BASELINE REQUIREMENT (2018)	BASELINE GAPS (2018)	BASELINE STAFF AVAILABILITY RATIO (2018)	ANTICIPATED REQUIREMENT (2024)	ANTICIPATED SUPPLY (2024)	ANTICIPATED STAFF AVAILABILITY RATIO (2024)
Laboratory Technologist	1,415	1,601	(186)	88%	1,829	1,904	104%
Midwife	1,990	4,816	(2,826)	41%	5,502	2,630	48%
Nurse	12,792	15,051	(2,259)	85%	17,194	13,352	78%
Doctors (General Practitioner & Specialists)	1,648	1,722	(74)	96%	1,967	2,555	130%
Pharmacist	886	783	103	113%	894	1,262	141%
Rwanda	18,731	23,973	(5,242)				

4.6 Cost projections for the estimated supply of and various requirement scenarios

For both scenarios, the costing took a very conservative view where the continued use of the current salary scale (which includes allowances) with a 3% annual adjustment as per public service policy of Rwanda was assumed. The costs of pre-service education were not taken into account as the main focus was to analyse the affordability and sustainability of the health sector wage bill.

The cost of wages for the projected HRH requirement based on the MOH structure is estimated at Rwf 130.47 billion in 2018, which is expected to increase steadily to about Rwf 220.28 billion by 2024 and Rwf 339.74 billion by 2030. As compared to the HSSP4 targets, the MOH structure is quite ambitious as the HSSP4 targets yield a cost of Rwf 105.86 billion in 2018, Rwf 124.56 and Rwf 144.28 billion in 2024 and 2030 respectively. Thus, on average, the MOH structure is 19% more costly than the HSSP4 targets. It is, however, worth noting that the HSSP4 target for Pharmacist is more ambitious than that of the MOH structure. Therefore, while the MOH structure scenario reveals massive oversupply of Pharmacists, the HSSP4 scenario points to a marginal oversupply. The HSSP4 target for Pharmacist is about 88% higher than the provision made in the MOH structure for their employment, possibly accounting for a vast majority of Pharmacists in Rwanda working in the booming private sector. See Table 19 for details.

Table 17: Cost estimates for various scenarios of the projection

NO.	TYPE OF STAFF	ESTIMATED COST IN BILLION RWF								
		Cost of estimated Supply			Cost HRH Requirement based on MOH Structure			Cost of HSSP4 Targets		
		2018	2024	2030	2018	2024	2030	2018	2024	2030
1	GP	10.88	15.46	19.47	10.73	22.94	36.48	16.32	19.21	22.25
2	Doctor - Specialist	8.56	15.58	21.74	13.19	26.19	41.74	0.00*	0.00*	0.00*
3	Nurse	51.78	60.51	68.12	54.33	88.81	136.44	59.15	69.61	80.63
4	Midwife	8.08	10.67	12.95	13.83	22.01	33.43	18.98	22.33	25.86
5	Mental Health Nurse	1.09	0.96	0.85	4.08	5.49	7.98	0.00**	0.00**	0.00**
6	Laboratory Technologist	5.73	7.71	9.44	11.27	16.28	24.46	6.29	7.41	8.58
7	Physiotherapist	0.91	1.25	1.54	0.70	1.30	2.07	0.00**	0.00**	0.00**
8	Anaesthetist	1.18	1.81	2.37	1.78	3.55	5.59	0.00**	0.00**	0.00**
9	Pharmacist	5.96	8.49	10.70	1.00	1.64	2.52	5.11	6.01	6.97
10	Dentist (Dental Surgeon)	0.96	1.15	1.33	3.89	5.52	8.29	0.00**	0.00**	0.00**
11	Nutritionist	0.91	1.57	2.15	3.24	4.41	6.53	0.00**	0.00**	0.00**
12	Environmental Health Officer	0.81	1.49	2.08	3.20	4.25	6.28	0.00**	0.00**	0.00**
13	Clinical Officer	0.48	0.87	1.20	2.92	3.81	5.59	0.00**	0.00**	0.00**
14	Ophthalmic Clinical Officer	0.36	0.87	1.32	5.54	12.87	20.51	0.00**	0.00**	0.00**
15	Clinical Psychologist	1.81	2.62	3.33	0.77	1.22	1.84	0.00**	0.00**	0.00**
Rwanda		99.50	131.02	158.57	130.47	220.28	339.74	105.86	124.56	144.28

*Values combined in the General Practitioner calculation since HSSP4 targeted doctor to population ratio than separating GPs and Specialists.

**Targets for these categories of health workers not defined in the HSSP4.

4.7 Health Labour Market Equilibrium Analysis (Economic Feasibility Analysis)

Against the backdrop of a growing health workforce stock, the main challenge is adequately addressing population and health system needs for health workers in the context of economic capacity of the country to purchase health services which in turn drives the demand for health workers both in the public or private sectors. Whereas public sector demand for health workers is largely influenced by political decisions about the investment levels and composition of Government general expenditure on health, private sector demand tends to mostly reflect the population demand for health services and the ability of the population to pay for the same. Using established framework and assumptions described in the methodology section, cost estimates of the various HRH projection scenarios have been compared to a forecasted economic demand in order to assess the financial feasibility of meeting the projected need for the health workers under the two different scenarios discussed above.

4.8 Interpretation of the Economic Feasibility Analysis

As shown in Table 20, the public sector in 2018 potentially had fiscal space of Rwf 123.5 billion for health workforce employment while the private sector potentially demanded employments worth Rwf 44.47 billion. Thus, both the public and the private sectors cumulatively had about Rwf 168 billion demand for health workers in 2018. On the back of rapid economic growth, this demand, all things being equal, could increase by 73% to about Rwf 290 billion by 2024 and Rwf 458 billion by 2030. On the other hand, however, the cost of the health workforce that would be in the labour market is conservatively estimated to be about 41% below the economic demand. Thus, if the prevailing trend of HRH production is not improved, and given the positive macroeconomic outlook, economic shortage of skilled health workers could persist. It is worth noting that, domestic government funded public sector economic demand³⁷ for health worker (Rwf 69.18 billion) is about 44% below the public sector economic demand for health workers (Rwf 123.53 billion) which is currently being financed through external sources. However, with the proportion of external support declining at the rate of 2% annually, it is anticipated that, all things being equal, the Government will fill the void to be created by gradually increasing its expenditure on the health workforce. Indeed, a 7% annual increment was envisaged in various financial projections of the MOH.

³⁷ Publicly funded demand for health workers calculated as the proportion of domestic Government contribution to the wage bill and adjusted annually for external funding transition (estimated at 2% in Rwanda).

Table 18: Estimates of Economic Demand for Health Workers and various projection scenarios

Variable	Estimate in Billion Rwf		
	2018	2024	2030
Public sector Economic Demand for HRH/Fiscal Space for HRH	123.53	213.92	337.26
Domestically Funded Public Sector Economic Demand for HRH/Fiscal Space for HRH	69.18	145.46	269.81
Private Sector Economic Demand for HRH (36% of Public)	44.47	77.01	121.41
Cumulative Fiscal Space (Economic Demand) for HRH	168.00	290.93	458.67
Wage Bill for Available HRH Stock/Supply	99.50	131.02	158.57
Cost of MOH approved Structure (2016)	130.47	220.28	339.74
Cost of HSSP4 Wage Bill	105.86	124.56	144.28

Also, as demonstrated in Figure 11, the cost of wages for the level of health workforce supply is initially higher than the anticipated domestic government funding for public sector demand for health by about 30%. However, the level of supply is well below the cumulative economic demand for health workers which suggests a significant demand-based shortage of health workers in Rwanda.

Using the HSSP4 targets as the need-based requirement, it is above the level of supply (in terms of cost) but significantly within the economic demand. Thus, there is an apparent need-based shortage of some health workers based on the HSSP4 targets which in itself can be considered affordable or within the economic capacity of the country. Indeed, by 2023, the public sector economic capacity alone may be sufficient to afford the HSSP4 targets. It is worth noting that, the Master Facility List report also accentuated the feasibility of attaining the HSSP4 targets, indicating that some of the targets were or could be achieved two years in advance³⁸. During key informant interview, one participant indicated that the health workforce target set in the HSSP4 were population-based targets through a deliberative process with stakeholders from various technical working groups. Thus, there is possibly a need to re-examine the HSSP4 targets in the light of emerging evidence to reflect the ambitiousness of the Government's vision 2050.

Simulating with the MOH structure (as shown in Figure 10) suggests that need-based requirement is largely aligned with that of the economic demand. The feasibility of this scenario, which is much more ambitious than the HSSP4 scenario, is largely contingent on continuous external support for HRH at current levels or higher; and the private sector continuing to boom at current levels or higher. Moreover, the cost of wages associated with the MOH structure is also way above that of supply which reinforces the evidence of a need-based shortage highlighted earlier.

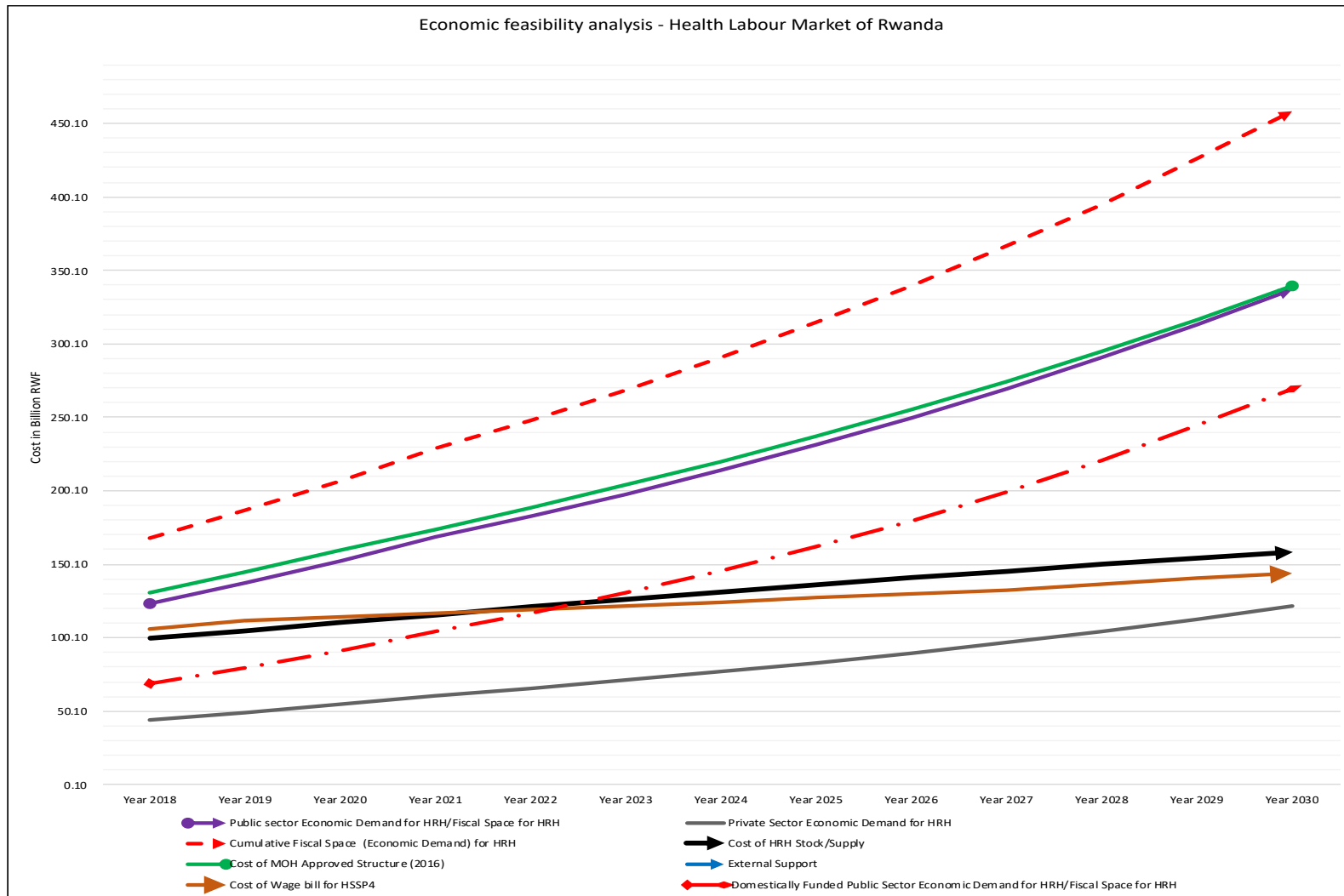
³⁸ MFL Report 2018

From the foregoing, under the two different scenarios, there is evidence of a coexistence of both demand-based and need-based shortage of health workers even though oversupply and unemployment of some cadres also exists. As envisaged on page 16 section 3.3.3 of HSSP4, the situation presents an opportunity for the health sector *“to create more jobs and employment opportunities given the projected increase in the number and complexity of health services, hence, requiring increase in number and skills of human resources for health³⁹”*. Since the economy is growing at an even faster rate, it is expected to be able to accommodate the increased health sector wage bill if adequate advocacy and policy dialogue is undertaken. Nevertheless, there is still a significant portion from external funding for payment of wages which must be taken into account in formulating policy actions that would be sustainable.

Although there appears to be adequate fiscal capacity within the public and private health sectors to employ health workers, there are still a number of health workers especially the allied health professionals, nurses and midwives who are unemployed. Some officials have associated this phenomenon with limited coordination between training institutions and the MOH at the planning level culminating in the training of some categories of health workers without the MOH’s plan and preparedness to employ them.

³⁹ MOH, ‘Fourth Health Sector Strategic Plan (HSSP4), 2018 - 2024’, p. 16.

Figure 11: Economic feasibility analysis under different projection scenarios



4.9 Conclusion and emerging issues from HLMA

Overall, the analysis shows that there is a structural shortage of the health workforce because the expected level of production is and will be inadequate to cater for the projected level of needs under the two scenarios (although a few categories of health workers appear to have been overproduced). Importantly, there is economic demand-based shortage of most categories of health workers which means there is a growing fiscal space to create jobs as envisaged in HSSP4 and Vision 2050.

It could be sustainable to meet the HSSP4 targets with largely domestic resources. It is, however, more appropriate to scale-up production levels of health workers to match the estimated needs based on the MOH structure which could be affordable if donor support for HRH is continued at current levels or higher since it is shown to be more ambitious than the HSSP4 targets in terms of meeting population health needs. Additionally, the present gap in needs can be narrowed if additional investments are made in the private sector to increase from the current levels (36%) to reduce the gap observed in the MoH approved structure.

4.10 Policy options for addressing labour market imbalances

The following may be worth considering in the ensuing policy discussions:

1. Engage all relevant stakeholders to plan and rationalize the training of health workers in line with the projected needs with particular attention on areas of considerable shortages including specialists training.
2. Make an investment case for additional budgetary allocation to facilitate the employment of the needed but unemployed health professionals especially the allied health professionals. This is not only a matter of the health needs of the population but also an employment creation opportunity for the Government which is necessary in stimulating economic growth.
3. Improve and scale-up the WISN study with the view of using the results to provide the basis to review the staffing norms.

4.11 Limitations

The main limitation of this exercise relates to data and methodological assumptions. There were significant challenges with respect to the availability of the health workforce data while some datasets had incomplete information. Some data collected from the Health Professionals Councils had to be matched and triangulated with data from other sources to ensure consistency.

Also, the goodness or predictive value of the projections is largely dependent on the validity of some of the assumptions adopted. For instance, in the absence of a staffing norm and

salary scales for the private sector, it was assumed that the private sector would staff their facilities and pay their workers similar to the public ones or higher. This hard assumption could be at variance with the reality and would impact on the projections.

Finally, it is inherently assumed that as the economy expands, the Government will, all things being equal, increase its investment in health and for that matter HRH. However, the level of investment in health may not entirely depend on economic growth but also countries priorities.

CHAPTER FIVE

RECOMMENDATIONS FOR POLICY ACTION

Based on the situation analysis and labour market assessment, it is recommended that MOH and its main stakeholders take a number of policy actions to address current and emerging challenges of the health labour market and also respond to the population health needs in line with the strategic direction of the Government of Rwanda as well as international commitments such as the: Universal Health Coverage and Sustainable Development Goals. A menu of policy recommendations arising from the analysis and the interpretation of the background information have been grouped into four broad areas for consideration:

1. Use evidence to align health workforce production with needs and demand Optimise health workforce distribution, retention and utilisation for Universal Health Coverage
2. Optimise health workforce distribution, retention and utilisation for Universal Health Coverage
3. Address cross-cutting health workforce issues to improve health system performance
4. Increase investment in health workforce information, evidence generation and use to support decision-making process.

5.1 Use evidence to align health workforce production with needs and demand

1. Validate the labour market projections and use it to develop and implement a comprehensive and costed national HRH operational plan towards the attainment of various national and international aspirations.
2. Review the HRH targets in the HSSP4 during the mid-term review to reflect economic demand and make an investment case to advocate for increased domestic investment in health workforce towards the attainment of financial sustainability for HRH aspirations.
3. Institute an annual multi-stakeholder HRH forum with training institutions and other relevant stakeholders to plan the numbers and priority areas for student intake based on the projected needs and economic capacity of the health sector.
4. Collaborate with academic/training institutions through the Ministry of Education to scale-up the training of health workers in short supply (as shown in the projections) to be able to respond to the epidemiological and demographical transition of the country. Issues of high quality of training should be emphasised while improving quantity.
5. Recognise, employ and deploy health professionals who have been trained but are not on the Government approved structures (public and private).

5.2 Optimise health workforce distribution, retention and utilisation for Universal Health Coverage

1. Comprehensively review the staffing norms, making use of appropriate evidence such as the Workload Indicators of Staffing Need (WISN) to dynamically accommodate future

changes in workload and emerging population needs. In this regard, there should be a defined adjustment formula for the staffing of health care facilities which takes into account population, distance and workload.

2. Conduct annual facility-by-facility health workforce gap analysis using the agreed norms and use results as evidence for recruitment and deployment planning.
3. Collaborate with pre-service training institutions (especially University of Rwanda—the largest public University) to reserve dedicated enrolment slots for candidates willing to accept and sign a service bond to identified/defined rural and underserved areas.
4. Strengthen the enforcement of retention contract by possibly linking it to the issuance of a final practice license which should be enforced by various health professionals' councils.
5. Develop a task-sharing/shifting policy to guide the use of task sharing for increased service delivery coverage, particularly, privileging general practitioners perform some interventions beyond the qualification based on experience.
6. Engage relevant stakeholders to institute a preferential promotion concession for those in rural and hardship areas.
7. Adopt an acceptable metric for routine monitoring of equity in the HRH distribution across districts and provinces.
8. Improve private health sector engagement to invest in both production and recruitment of HRH
9. Strengthen the Community Health Workers Programme through standardised and regular refresher training to improve the quality of their services which could, in turn, reduce the demand for highly skilled health professionals

5.3 Address cross-cutting health workforce issues to improve health system performance

1. Align HRH functions within the MOH to improve HRH stewardship and coordination.
2. Strengthen the HRH-related stakeholder dialogue through HRH TWG to consistently discuss HRH priority actions and monitor its policy implementation.
3. Create an enabling environment for gender mainstreaming at all levels of the health sector especially, increasing the number of females entering the medical school (as only 19% of doctors are females against an African average of 28%).
4. Strengthen institutional leadership and governance capacities, including HRH management units at regional and district plus health facilities.

5.4 Increase investment in health workforce information, evidence generation and use for decision-making

1. Urgently address the bottlenecks affecting the operationalisation of the Human Resource Information System to make it fit-for-purpose to address the HRH information needs of the Ministry and also track the deployment of the health workforce.

2. Build the capacity of Human Resource Managers in HRH data management, evidence generation and use for decision-making at the decentralised levels.
3. Progressively implement the National Health Workforce Account (NHWA) and use the indicators for measuring the progress of HRH interventions.
4. Conduct regular HRH surveys (at least every five years) to update the labour market analysis.

REFERENCES

- Asamani, James Avoka, Margaret M. Chebere, Pelham M. Barton, Selassi Amah D’Almeida, Emmanuel Ankrah Odame, and Raymond Oppong, ‘Forecast of Healthcare Facilities and Health Workforce Requirements for the Public Sector in Ghana, 2016–2026’, *International Journal of Health Policy and Management*, 0 (2018) <http://www.ijhpm.com/article_3525.html> [accessed 7 December 2018]
- Liu, Jenny X., Yevgeniy Goryakin, Akiko Maeda, Tim Bruckner, and Richard M. Scheffler, ‘Global Health Workforce Labour Market Projections for 2030’, *World Bank Policy Research Working Paper*, 2016 <http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2836537> [accessed 7 December 2018]
- Lopes, Mário Amorim, Álvaro Santos Almeida, and Bernardo Almada-Lobo, ‘Handling Healthcare Workforce Planning with Care: Where Do We Stand?’, *Human Resources for Health*, 13 (2015) <<https://doi.org/10.1186/s12960-015-0028-0>>
- Malaria and Other Parasitic Diseases Division of the Rwanda Biomedical Centre, *Malaria Indicator Survey* (Kigali: Malaria and Other Parasitic Diseases Division of the Rwanda Biomedical Centre - Ministry of Health, 2017) <<https://www.dhsprogram.com/pubs/pdf/MIS30/MIS30.pdf>> [accessed 27 January 2019]
- McPake, Barbara, Anthony Scott, and Ijeoma Edoke, *Analysing Markets for Health Workers: Insights from Labour and Health Economics* (The World Bank, 2014) <<http://elibrary.worldbank.org/doi/book/10.1596/978-1-4648-0224-9>> [accessed 11 January 2019]
- Ministry of Public Service and Labour, *Presidential Order Determining Modalities for Recruitment Appointment and Nomination of Public Servants - 2017* (Ministry of Public Service and Labour, 2017) <https://www.mifotra.gov.rw/fileadmin/user_upload/Presidential%20Orders/Presidential_Order__determining_modalities_for_recruitment__appointment_and_nomination_of_Public_Servants%202017.pdf>
- , *Prime Minister’s Instructions Determining Organizational Structure, Salaries and Fringe Benefits for Employees of Referral Hospitals, Provincial Hospitals, District Hospitals, Ndera Neuro-Psychiatric Hospital and Health Centres* (Ministry of Public Service and Labour, 2016) <https://www.mifotra.gov.rw/fileadmin/user_upload/Presidential%20Orders/Presidential_Order__determining_modalities_for_recruitment__appointment_and_nomination_of_Public_Servants%202017.pdf>
- , *Prime Minister’s Order Determining Organizational Structure, Salaries and Fringe Benefits for Employees of University Teaching Hospital (CHU)* (Ministry of Public Service and Labour, 2016) <https://www.mifotra.gov.rw/fileadmin/user_upload/Presidential%20Orders/Presidential_Order__determining_modalities_for_recruitment__appointment_and_nomination_of_Public_Servants%202017.pdf>

ential_Order__determining_modalities_for_recruitment__appointment_and_nomin
ation_of_Public_Servants%202017.pdf>

MOH, Ministry of Health, *A Report of the Development of Rwanda Master Facility List (Final Draft)* (Ministry of Health, Rwanda, October 2018)

———, *Annual Report - 2015/2016* (Ministry of Health, Rwanda, 2017)

———, 'Fourth Health Sector Strategic Plan (HSSP4), 2018 - 2024' (Ministry of Health, Rwanda, 2018)

———, *Health Resource Tracking Tool - 2013/2014* (Ministry of Health, Rwanda, 2015)

———, *Health Resource Tracking Tool - 2014/2015* (Ministry of Health, Rwanda, 2016)

———, *MID TERM REVIEW OF THE RWANDA THIRD HEALTH SECTOR STRATEGIC PLAN (HSSP III)* (Ministry of Health, Rwanda, 2015)
<http://www.moh.gov.rw/fileadmin/templates/Docs/HSSP_III_MTR_final_report.pdf>

———, *National Human Resource for Health Policy* (Ministry of Health, Rwanda, October 2014)
<http://moh.gov.rw/fileadmin/templates/policies/Human_Ressource_for_Health_Policy.pdf>

———, *Rapid Analysis of Staff Turnover in Health Facilities and Proposal of Retention Strategies (Draft)* (Ministry of Health, Rwanda, September 2016)

National Institute of Statistics Rwanda, 'Life Expectancy at Birth'
<<http://www.statistics.gov.rw/publication/life-expectancy-birth>> [accessed 27 January 2019]

NISR, National Institute of Statistics of Rwanda, *Fourth Population and Housing Census - 2012* (National Institute of Statistics of Rwanda, January 2014)
<<http://www.statistics.gov.rw/publication/rphc4-population-projections>>

———, *GDP National Accounts, 2017-18 Fiscal Year* (National Institute of Statistics of Rwanda, September 2018) <<http://www.statistics.gov.rw/>>

———, *Rwanda Demographic and Health Survey - 2014/2015* (National Institute of Statistics of Rwanda, June 2015) <<http://www.statistics.gov.rw/>>

———, *Rwanda Poverty Profile Report 2016/17* (National Institute of Statistics of Rwanda, 2018) <<http://www.statistics.gov.rw/publication/eicv-5-rwanda-poverty-profile-report-201617>>

'Rwanda | Data' <<https://data.worldbank.org/country/rwanda>> [accessed 27 January 2019]

RBC, Rwanda Biomedical Centre, Report of Costing of Rwanda's Community Health Workers' Integrated Services (Rwanda Biomedical Centre, December 2016)

Scheffler, Richard M., Christopher H. Herbst, Christophe Lemièrè, and Jim Campbell, eds., *Health Labour Market Analyses in Low- and Middle-Income Countries: An Evidence-Based Approach* (The World Bank, 2016) <<https://doi.org/10.1596/978-1-4648-0931-6>>

Srisuphan, R. N. Wichit, and Nichakorn Sirikanokwilai, 'Supply and Requirement Projection of Professional Nurses in Thailand over the Next Two Decades (1995-2015 AD)', 1995 <http://www.who.int/entity/hrh/en/HRDJ_2_3_05.pdf?ua=1> [accessed 7 December 2018]

WHO, 'Equitable Access to Functional Health Workforce and Community Health Workers in the Africa Region' (presented at the WHO Regional Forum on Strengthening Health Systems for the SDGs and UHC, Windhoek, Namibia, 2016)

———, 'Global Strategy on Human Resources for Health: Workforce 2030', 2016

WHO, World Health, ed., *Health Systems Financing: The Path to Universal Coverage*, The World Health Report, 2010 (Geneva, 2010)

APPENDICES

Appendix 1: Assumptions for modelling the need-based health workforce requirements using staffing norms.

To overcome the limitations of using facility-based fixed staffing norms for workforce projections which tend to yield status quo projections, a decision analytic modelling using Markovian assumptions was adopted. Rwanda operates a multi-level healthcare system and the MOH HSSP4 anticipates the upgrading/expansion of existing facilities in addition to new ones that may be built depending on increasing population health needs (Appendix 2). In applying a standard Markov assumption, each of the existing facilities was deemed to have a probability of expansion/upgrading to cope with increasing workload as has been observed in previous years (see Appendix 3 and Appendix 4). This probability of expansion/upgrading is termed as the 'transition probability' in the decision analytic modelling which was used to adjust the expected number of health facilities year on year to allow an adjustment on the aggregate staffing requirements See Box 4).

Box 4: Formula for estimating the development of health facilities

No. Projected HFs_{i,j} = HF_{i,j} + (HF_{i,j-1} * Transition Probability_{i-1 to i}) - (HF_{i+1} * Transition Probability_{i to i+1}) + Newly constructed HF_i Equation 1

Where:

- 1) HF_{ij} represents type i in year, j.
- 2) HF_{i,j-1} represents Health Facility type i in year the previous year from year j.
- 3) Transition Probability_{i-1 to i} represents the probability of expansion from a previous lower level facility type/service scope, i-1 to present facility type/range of service, i.
- 4) Transition Probability_{i to i+1} represents the probability of expansion from the present facility type/range of services to the next higher facility type/range of services, i+1.

Following the above formula which yield 'expected or future' number of health facilities, the established staffing norms of the MOH was then applied to generate the staffing need projections by simply multiplying the stipulated staff establishment with the number of health facilities (see Box 5).

Box 5: Formula for Translating Staffing Norms into Aggregate HRH Requirements

$$HRH_{kij} = \sum [(HP_{ij} * SSk_{HP}) + (HC_{ij} * SSk_{HC}) + (DH_{ij} * SSk_{DH}) + (Prov. Hosp_{ij} * SSk_{PH}) + (Ref. Hosp_{ij} * SSk_{RH}) + (NRH_{ij} * SSk_{NRH}) + (Private Sector)]$$

Where:

- *HRH_{kij}* represents the base HRH requirement for a particular type of staff, *k* in administrative region *i* at year *j*.
- *SSk_{HP}* represents the stipulated staffing standard for staff type *k* at the Health Post (similar notations apply to the other categories of healthcare facilities)
- *HP_{ij}* represents total number of Health Post in region *i* at year *j* (similar notation applies to the other categories of health facilities)

A previous work⁴⁰ based on similar approach has yielded realistic estimates where policy makers feels that their established norms have been made use of while at the same time allowing for adjustments in the staffing requirements based on observed trends of health facilities' changes and workload in the country. Other inherent assumptions in this regard are that, Government's commitment to the health sector will not dwindle in order to improve health infrastructure in response to demographic and epidemiologic transitions which translates into workload and demand for health facilities.

In implementing the aforesaid assumptions, purpose-built excel-based model was developed with the set of formulae described which produces a year-by-year HRH requirements (see the accompanying model in excel workbook).

Appendix 2: Planned expansion/upgrading of health facilities based on HSSP4 targets

OUTPUT Indicators HSSP 4	Baseline 2016	Targets 2020	Targets 2024
Number of sectors without a health center	17	8	0
Number of health posts constructed/rehabilitated in a cell with no health post	473	593	623
Number of specialized training facilities (to reduce the abroad referrals)	4	6	8
Surgical procedures per 100,000 population	971	1500	3000

Source: Excerpts of HSSP4, page 43

Appendix 3: Estimated Transition probability

Facility Type	Estimated Rate of Expansion (Transition probability)	Remarks
Health Post	2.5%	Extrapolated from observed data and validated by MOH

⁴⁰ [4]

Health centre	1%	Extrapolated from observed data and validated by MOH
District Hospital	5%	Extrapolated from observed data and validated by MOH
Provincial Hospital	4%	Extrapolated from observed data and validated by MOH
National Referral Hospitals	17%	Extrapolated from observed data and validated by MOH

Appendix 4: Trend of health infrastructural expansion, 2010 – 2015

Year	2010	2011	2012	2013	2014	2014	2015
National Referral Hospitals	4	4	5	5	8	8	8
Provincial Hospital					4	4	4
District Hospitals	40	40	41	42	35	35	35
Police Hospital	1	1	1	1	1	1	1
Health Centers	436	442	451	465	478	478	495
Prison Dispensaries	18	13	16	15	15	15	15
Health Posts	45	60	60	252	380	380	406
Private Dispensaries	35	95	114	137	113	113	123
Private Clinics			60	84	91	91	95
Community-owned health facility				15	15	15	13
VCT center				20	21	21	26
Total	579	655	748	1036	1161	1161	1221

Source: Statistical Year Book – 2017, p.31

Appendix 5: Economic and health spending data used for demand estimation

Variable	Value	Data Source and Year
Gross domestic Product (GDP) Per Capita (Constant 2010 Values)	Rwf 622,311.82	National Account for 2017 Fiscal Year, NISR
GDP Nominal (Constant 2010 Values)	Rwf 7,898,000,000,000	National Account for 2017 Fiscal Year, NISR
Projected GDP Growth rate	7.45%	World Bank, 2018
Current Health Expenditure as % of GDP	10.04%	MOH, HRTT, 2015; World Bank, 2019
Total Health Expenditure	Rwf 792,959,200,000	MOH, HRTT
Gov't Health expenditure as % of Total Health Expenditure	50%	MOH, HRTT, 2015; World Bank, 2019
% of MTEF Allocation to Health	8%	Extrapolated from MOH, HRTT, 2015; World Bank, 2019
Total Gov't Expenditure on Health	Rwf 79,613,103,680	MOH, HRTT
Percentage (%) allocation of GGHE to HRH	30%	Extrapolated from MOH HRTT and Annual Report, 2016

Appendix 6: Status of Rwandan Medical Specialists trained between 2000 and 2018 based on information provided by MOH-DGPHFIS.

Status/Sector of employment	Graduated 2006 or earlier		Graduated between 2007 and 2011		Graduated between 2012 and 2017		Graduated from 2018		Grand Total	
	No.	Percent (%)	No.	Percent (%)	No.	Percent (%)	No.	Percent (%)	No.	Percent (%)
Died	6	7%	1	1%	2	1%		0%	9	2%
NGO	3	3%	1	1%	2	1%	0	0%	6	1%
Out of country	8	9%	14	19%	44	15%	1	1%	67	13%
Private Sector	43	47%	21	29%	34	12%		0%	98	19%
Public Sector	21	23%	35	50%	204	71%	67	99%	328	63%
Retired	7	8%		0%		0%		0%	7	1%
Others*	3	3%	0	0%	0	0%	0	0%	3	1%
Grand Total	91	100%	72	100%	286	100%	68	100%	518	100%

*Policy, insurance, academia

Appendix 7: Number of Nurses trained in various specialty areas (UR-CMHS 2018)

Master of Science in Nursing – Specialties	Number	Percent (%)
Critical care and Trauma	16	14%
Education, leadership and management	14	13%
Medical surgical	18	16%
Neonatal	14	13%
Nephrology	7	6%
Oncology	9	8%
Pediatrics	20	18%
Peri operative	13	12%
Grand Total	111	100%