REPUBLIC OF RWANDA

MINISTRY OF HEALTH

HUMAN RESOURCES FOR HEALTH STRATEGIC PLAN 2011-2016

March 2011

Foreword

Human Resources for Health (HRH) may be viewed as the most important component of the health system, as HRH consumes the biggest share of the health budget, manages other resources, runs the health services system, as well as being the critical factors to support health service development. The area of HRH thus critically needs continuous attention. The Government of Rwanda is responsible for ensuring the provision of health care that is equitably accessible, effective and efficient, with participative community approaches. To meet these goals, the HRH workforce should be appropriate with regard to number, distribution, skill-mix, competency and motivation to work in order to ensure that people fully participate in health services.

At a time when significant efforts are being made to strengthen the health services of Rwanda, it is imperative to ensure that there is a coordinated approach to developing and managing the staff of the health services. This strategy document on human resources is therefore most timely.

Although the majority of health services are provided by Ministry of Health personnel, other providers are making an increasing contribution. It is therefore important that the human resources strategy covers the whole sector.

It is recognized that at the time of developing this Human Resources Strategic Plan there is some uncertainty about the future. The best data currently available on the staffing situation was used to inform the Strategic Plan. Ongoing efforts are underway to improve this data. It is important that both improved data, and changes in the environment, are closely monitored through the period of this strategic plan. The overall strategy, targets, and selected interventions need to be reviewed and revised on a regular basis in order to ensure that they remain appropriate to the rapidly evolving needs of the health sector.

It is important that planning for human resources is integrated with the planning of service delivery. It is therefore fortuitous that the Health System Strengthening Framework (HSSF) combines a well-funded human resource component with service delivery components.

This document is a good start in the process of strengthening human resources in the health sector. However, it is only the first step. The strategies need to be communicated throughout the health sector, and translated into annual action plans. Additional funds will be needed to support some priority strategies.

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Acronyms and Abbreviations

CHW	Community Health Worker
CPD	Continuing Professional Development
DHSST	District Health Strengthening System Tool
DP	Development Partner
FBO	Faith-based organization
FOSA	Formation Sanitaire (i.e. Health Facility)
HMIS	Health Management Information System
HR	Human Resources
HRSP	Human Resource Strategic Plan
HRD	Human Resource Development
HRH	Human Resource for Health
HRP	Human Resource Plan
HSSP	Health Sector Strategic Plan
IST	In-Service Training
M&E	Monitoring and Evaluation
MA	Medical Assistant
MD	Medical Doctor
MDG	Millennium Development goals
MIFOTRA	Ministry of Labor and Public Service
MINECOFIN	Ministry of Economy and Finance
MINEDUC	Ministry of Education
MINISANTE	Ministry of Health
MOH	Ministry of Health
MPH	Master of Public Health
MTEF	Medium Term Expenditure Framework
NGO	Non Governmental Organization
NISR	National Institute of Statistics of Rwanda
PRSP	Poverty Reduction Strategy Proposal
WHO	World Health Organization

1. Executive Summary

The purpose of this strategy is to guide the planning, management and development of human resources for health in Rwanda for the period 2011 - 2016.

Much progress has been made over the past years in increasing staff numbers in the health sector. Decentralization, Performance Based Financing (PBF), and new initiatives in the HRH area have all positively impacted health services and outcomes.

But there is still much more work to be done to increase the quantity, quality, and overall management/coordination of HRH. There is a general shortage of health professionals, particularly amongst more highly skilled groups. As geographic distribution favors urban areas, there are still health facilities that are under-staffed. There is a major shortage of midwives, exacerbating the high rate of maternal mortality.

The following major areas relating to the planning, management and training of human resources in the health sector in Rwanda need to be addressed:

- coordination across the sector
- the overall number and combination of staff available to provide health services, along with equitable distribution of staff
- the quality and performance of staff
- the capacity of the MOH and others in the sector to plan for, manage and develop appropriate staff to deliver the required health services.

The overall aim of the plan is to increase the number of appropriately skilled, motivated and equitably distributed health service providers for Rwanda. The main strategic objectives of the plan are:

A coordinated approach to planning across the sector based on the best available data

1. HRH research and development
2. Coordination, including Development Partners, with all stakeholders
3. Establishment of an HR Information System
4. Development of M&E systems to track progress of the implementation of HRH plan

Increased number of trained and equitably distributed staff

1. Increasing training output
2. Strengthened in-service training
3. Increasing numbers of skilled health workers in post
4. Improving the deployment and retention of health workers

Improved productivity and performance of health workers

1. Improving the quality of Pre-Service training
2. Improving the quality and cost-effectiveness of In-Service Training
3. Improving performance management capacity and tools
4. Strengthen management and leadership at all levels

Strengthened human resource planning, management and development systems at all levels

1. Develop and implement HR policies, plans and strategies
2. Strengthening the capacity and management of HRM/HRD
3. Support existing professional (regulatory) bodies and the creation of others

The implementation these activities will be time-consuming work needing dedication and focus of HR staff and managers across the health sector. The plan is partially financed, but

the gaps have been identified and additional funding will be needed. A monitoring and evaluation framework is included in the plan.

The plan has been developed on the best available information on the staffing situation and the policy context. This information will undoubtedly change, and the plan will need to be revised accordingly. In order to ensure that the plan remains relevant, this revision exercise should be carried out on an annual basis.

2. Introduction

The Ministry of Health (MOH) is the primary employer of human resources for health (HRH) in Rwanda. There is limited, although important, participation of the private sector, non-governmental organizations (NGOs) and faith-based organizations (FBOs).

The *HRH Strategic Plan* spans a five year period from 2011 to 2016 and is based on certain assumptions which will be reviewed on an annual basis to ensure the plan remains in line with changing priorities and needs in the health sector.

Vision 2020 calls for 10 medical doctors, 20 nurses, and 5 lab assistants for 10,000 inhabitants. A qualified and motivated workforce is required. In addressing health concerns, the Ministry will collaborate with international development partners and with the private sector.

The **Vision** for HRH is laid out by the Rwanda HSS Framework and Consolidated Plan, 2009-2012. This vision is *guaranteed availability of appropriate numbers and combinations of qualified health personnel at all levels of the health system to support the provision of quality health care to the people of Rwanda*.

The HSS Framework lays out **Strategic Goals** to increase the availability and quality of human resources for health by: (1) strengthening the productive capacity of educational institutions for health professionals; (2) improving management capacity; (3) supporting continuous accreditation and professional development; and (4) improving the technical capacity of community health workers. Strategic Goals (1) through (3) are within the scope of this Strategic Plan.

Further, the HSS Framework lays out four **Strategic Objectives**:

(1) A coordinated approach to planning across the sector
(2) Increased number of health workers
(3) Increased performance of staff
(4) Increased capacity to plan for, manage, and develop human resources

Finally, the HSS Framework calls for strategic interventions covering planning, policies, performance management, and training and education. This *Human Resources for Health Strategic Plan* provides elaboration of various strategic interventions, which shall be prioritized through regular operational planning, in order to guide the health sector in the effective planning, development, management and utilization of human resources in Rwanda.

The *HRH Strategic Plan* is ground in an evidence base derived from multiple data sources in including regular monitoring data from: National Institute of Statistics of Rwanda (NISR); the *Rwanda District Health System Strengthening Framework* (best practices for district planning) conducted by the MOH in 2008 and 2010-2011); Seven-year Projection and Plan

for Rwandan Physicians (conducted by CHAI and PIH in 2009); and data from various Rwandan professional councils, associations, and educational institutions.

The purpose of the *Human Resource for Health Strategic Plan* is to guide the health sector in the effective planning, development, management and utilization of human resources in Rwanda. This document contains the following sections*:* a description and analysis of the current HRH situation in Rwanda (section 3), currents successes and initiatives in progress (section 4), the broad strategies for the next five years (section 5), implementation of the strategies (section 6), monitoring and evaluation for the plan (section 7), and budgetary information (section 8). More detailed supporting information, including staffing projections for cadres, is provided in the appendix.

3. Situation analysis

Rwanda suffered from the genocide economically, socially, and from a human resources perspective. The healthcare system is still suffering in its aftermath. To train health workers in this context takes time, in particular to train doctors, medical specialists, and other types of specialists, due to training cycle time, and in a limited-resource environment.

3.1. Socio-economic Profile

With a total population of about 10 million (projected 2009) and fertility rate of 5.5 (IDHS 2007-2008), Rwanda is one of the most densely populated countries in the world. Life expectancy at birth is estimated at 52.7 years (UNDP Human Development Report 2007). Although the ratio of women to men is 1:1, one-third of all households are female headed.

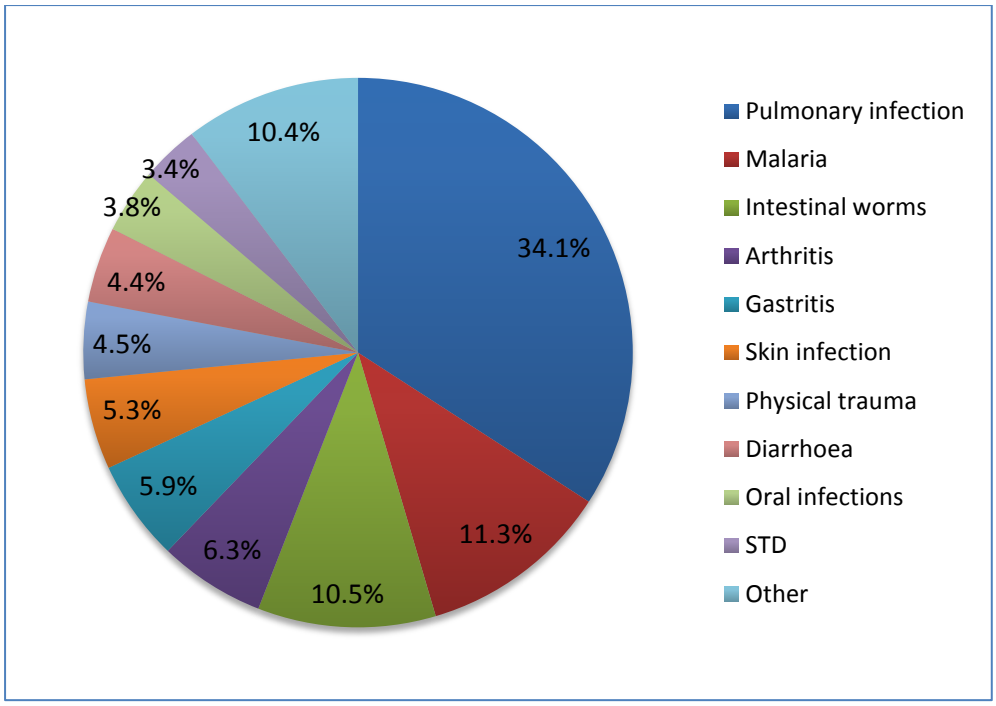
The real GDP per capita of $520 (NISR 2009), though comparable to other countries in the region, still places Rwanda among one the poorest countries in the world (UNDP Human Development Report 2007). Most (85%) of the Rwandan population live and work in rural areas, where poverty is predominant. Poverty also disproportionally affects female-headed households. Of the total population, 60% lives below the poverty line, with 66% of the rural population below the poverty line (NISR 2006). Among this group, 41% lives in extreme poverty. To this end, Rwanda is currently in the process of actively implementing its strategy for poverty reduction and economic growth.

The adoption of the 2009-2012 Health Sector and Strategic Plan (HSSP-II) by the Government of Rwanda in March 2009 occurred jointly with the adoption of specific goals for health sector management. With this, the Government of Rwanda also embraced the global vision "to guarantee the well being of the population by increasing production and reducing poverty within an environment of good governance." Within this context, the mission statement for the health sector is to "ensure and promote the health status of the Rwandese population by providing quality preventative, curative and rehabilitative services within a well performing health system."

3.2. Disease Burden

In 2008, there were over five million new outpatient consultations in Rwanda, with pulmonary infection, malaria, and intestinal worms among the most common causes for consultation (Figure 1). Among the general population, the leading causes of mortality in Rwandan hospitals include HIV/AIDS and related opportunistic infections, severe malaria, and pulmonary infections. Malaria and pulmonary infections also are among the most common causes of mortality in Rwandan hospitals for children under five years. Other common causes of hospital-based mortality among children under five years include diarrhea, malnutrition, and prematurity.

Figure 1: Outpatient consultations 2008, new cases by disease (Total consultations: 5,491,789)



Source: MOH/HMIS Annual Report 2008

3.3. Health Workforce

Physician Workforce

The majority of Rwandan physicians are general practitioners, a term indicating that they did not complete a formal, post-graduate training program in a medical specialty. As of February 2011, there were 470 Rwandan generalist practitioners, 133 Rwandan specialists, and 58 in-patriate specialists working in Rwanda, for a total of 191 specialists (Rwanda Medical Council). With a total of 661 physicians (general practitioners and specialists, public and private, Rwandan and in-patriate), the population ratio is 1 doctor for each 15,306 population (NISR Population Projection, Year 2009).

The majority (more than 70%) of physicians are working in the public sector. The majority (about 80%) of general practitioners are working in the district hospitals. The remainder of the general practitioners and the majority (about 80%) of public sector specialists were working in the four referrals hospitals, which are in the urban locations of Kigali and Butare.

Table 1: Public and Private Sector Physician Distribution

Specialty	Rwandans	In-patriates	Total Current	Norm - adapted*	Overall gap	Gap to be filled via in-country training	Gap to be filled via out-of-country training

Allergy	0	0	0	3	3	0	3
Anesthesiology	8	1	9	80	71	10	61
Cardiology	4	0	4	50	46	0	46
Cardiothoracic surgery		1	1	5	4	0	4
Clinical biochemistry	2	1	3	3	0	0	0
Clinical immunology	0	0	0	3	3	0	3
Clinical microbiology	1	0	1	3	2	0	2
Cytology	0	0	0	3	3	0	3
Dentistry	11	13	24	20	-4	0	-4
Dermatology	4	0	4	10	6	0	6
Disaster medicine	0	0	0	5	5	0	5
Emergency medicine	0	0	0	10	10	0	10
Endocrinology	1	1	2	10	8	0	8
Family and community medicine	0	0	0	40	40	10	30
Gastroenterology	0	0	0	10	10	0	10
General practice	**470**	**0**	**470**	**715**	**245**	**135**	**110**
General surgery	6	6	12	80	68	10	58
Medical genetics	1	0	1	3	2	0	2
Gynecology and Obstetrics	19	9	28	80	52	20	32
Forensic medicine	1	0	1	3	2	0	2
Hematology	0	1	1	3	2	0	2
Hepatology	1	0	1	3	2	0	2
Human anatomy	1	0	1	3	2	0	2
Infectious diseases	3	0	3	10	7	0	7
Intensive care medicine	3	0	3	10	7	0	7
Histopathology	0	2	2	5	3	0	3
Medical Oncology	0	1	1	6	5	0	5
Other Physicians (internists)	12	3	15	80	65	20	45
Military medicine	0	0	0	10	10	0	10
Molecular Biology	0	0	0	3	3	0	3

Nephrology	1	1	2	10	8	0	8
Neurology	2	0	2	5	3	0	3
Neuroscience	0	0	0	2	2	0	2
Neurosurgery	2	0	2	10	8	0	8
Nuclear medicine	0	0	0	3	3	0	3
Ophthalmology	8	2	10	20	10	0	10
Oral and maxillofacial surgery /ENT	0	0	0	10	10	10	0
Orthopedic surgery	7	1	8	30	22	0	22
Otolaryngology	5	4	9	20	11	0	11
Parasitology	0	0	0	3	3	0	3
Pediatrics	14	7	21	80	59	20	39
Pediatric surgery	0	1	1	10	9	0	9
Pediatrics neonatology	1	0	1	10	9	0	9
Pharmacology	0	0	0	0	0	0	0
Physiology	1	0	1	3	2	0	2
Plastic surgery	0	0	0	10	10	0	10
Psychiatry	3	0	3	30	27	0	27
Legal medicine	3	0	3	3	0	0	0
Pulmonology	1	1	2	10	8	0	8
Radiation medicine	0	0	0	3	3	0	3
Radiology	5	1	6	15	9	0	9
Rehabilitation medicine	0	0	0	3	3	0	3
Rheumatology	0	0	0	3	3	0	3
Sports medicine	0	0	0	10	10	0	10
Toxicology	0	0	0	3	3	0	3
Urology	2	1	3	10	7	0	7
Vascular surgery	0	0	0	3	3	0	3
Virology	0	0	0	3	3	0	3
Total	**603**	**58**	**661**	**1591**	**930**	**235**	**695**

Source: Rwanda Medical Council, 2011 and Seven Year Projection Plan for Rwandan Physicians

* Norms from US were utilized for lack of another available source; they were adapted for Rwandan socio-economic factors, disease burden,

Nursing Workforce

Historically, there have been three levels of training for nurses in Rwanda—A2, A1, and A0. A2 level nurses are trained to the secondary school level. A1 nurses possess an advanced certificate in nursing obtained after three years of nursing school. A0 nurses possess a

bachelor's degree. Rwanda's revised nursing norms call for widespread efforts to upgrade A2 nurses to the A1 level.

The overwhelming majority of nurses are A2 (Table 2). Currently, A1 nurses represent less than 10% of the total pool of nurses. A2 nurses are relatively evenly spread throughout the country, though there are still disparities between districts, with a number of under-served districts in the South, West and Northern Provinces. On average there is about 1 nurse for a population of 1,500.

Table 2: Nurses per qualification type and facility

Qualification level	Health Centers	District Hospitals	District Pharmacy	Grand Total
Nurse A0	2	18	0	20
Nurse A1	186	271	0	457
Nurse A2	3935	2175	42	6152
Grand Total	**4123**	**2464**	**42**	**6629**

Source: DHSST, Dec 2009

Health Managers

District health personnel

The District Health Unit is charged with managing health needs and resources at the district level through a person in-charge of health. Of the 30 personnel in-charge of health, only 7 have completed or are in the process of completing a master's degree in public health or health management (Table 3)[1]. The others mostly have degrees in clinical psychology.

Table 3: Number of district personnel in-charge of health and skill level

Province	# of district "in-charge of health" personnel	# with management or public health degree (masters)
North	5	0
South	8	3
East	7	2
West	7	1
Kigali	3	1
Total	**30**	**7**

Source: School of Public Health records, 2010

Hospital Managers/Medical Directors

There are 40 District Hospitals and 5 Reference Hospitals in Rwanda. With the exception of King Faisal Hospital, these hospitals are all headed by a director who is also a medical officer with clinical responsibilities. These medical directors were in most cases appointed because of seniority as clinicians, and they have received little or no training in hospital management.

Other Categories of Employees

[1] Rapid survey done through the School of Public Health and CHAI

To this day the most reliable source for all cadres of health professionals is the DHSST. The data presented and analyzed below come from the latest iteration of this MOH tool, completed in January 2010. Reliable data for Referral Hospitals is more difficult to obtain, as it is out of the scope of the DHSST. In this case, data for this care setting comes from a workshop conducted in 2009 through stakeholder engagement led by the MOH. Population data are not yet released from the 2010 census, hence any population-based comparison should probably be held off until reliable population data is available. In order to assess the number of health professionals per care setting, we used DHSST data for health centers and district hospital, to which an adjustment for referral hospitals was applied based on insights from the 2009 workshop. MOH norms were used to benchmark existing versus required health professionals, but these norms have well-know limitations addressed below.

When observing the number of different cadres of health professionals, important variations can be observed between district and cadres. Total numbers and specific cadre numbers can double, or even triple when comparing districts, which can probably not be explained by a specific need or rationale. The deployment of the workforce lacks a needs-based, service-based, data-driven process, which results in the great variability observed below.

Table 4: Geographical distribution of other professionals

Districts	Dental Tech A1	Hygien A1	Hygien A2	Lab Tech A1	Lab Tech A2	Nutri A1	Nutri A2	Phys. Ther. A1	Total
Bugesera	3	1	3	2	28	1	1	2	41
Burera	2	3	1	3	23	2	1	1	36
Gakenke	4	3	3	6	31	2	0	3	52
Gasabo	6	4	2	6	43	1	1	3	66
Gatsibo	3	3	2	8	29	0	0	3	48
Gicumbi	1	1	1	2	31	0	1	2	39
Gisagara	3	0	4	4	22	1	4	2	40
Huye	1	2	5	2	30	1	2	1	44
Kamonyi	0	2	3	2	19	1	0	2	29
Karongi	3	4	3	3	30	1	6	2	52
Kayonza	3	3	3	5	33	0	1	4	52
Kicukiro	13	3	1	7	30	0	3	6	63
Kirehe	1	2	1	2	28	1	1	1	37
Muhanga	2	3	5	6	26	1	1	2	46
Musanze	0	4	1	4	32	0	1	4	46
Ngoma	1	3	4	2	24	2	0	1	37
Ngororero	3	4	3	4	24	0	3	1	42
Nyabihu	1	3	2	1	27	1	0	1	36
Nyagatare	2	2	1	2	37	1	0	1	46
Nyamagabe	4	1	5	3	24	4	4	1	46
Nyamasheke	4	2	2	5	32	0	3	1	49
Nyanza	2	1	2	2	26	1	0	1	35

Nyarugenge	5	6	5	2	31	0	2	2	53
Nyaruguru	2	2	1	3	14	0	1	1	24
Rubavu	2	2	4	3	26	1	1	1	40
Ruhango	1	1	1	2	22	0	1	1	29
Rulindo	1	3	4	5	24	1	1	1	40
Rusizi	2	1	3	6	24	5	3	2	46
Rutsiro	1	2	3	1	26	1	2	1	37
Rwamagana	2	4	5	5	26	1	0	2	45
Total	**78**	**75**	**83**	**108**	**822**	**30**	**44**	**56**	**1296**

Source: DHSST Dec 2009

Distribution by cadre and targets

The MOH has established norms for health centers (HC) and district hospitals (DH) in which staffing requirement by cadre and care setting is described. These norms are currently the best benchmark available to estimate the appropriateness of staffing in health facilities.

Table 5: Staffing Gaps against Norms for Allied Health Professionals

Type	HC actual	DH actual	**Total actual**	**Norm target**	Gap to norm	**Target incl. RH**	**Overall gap**
Anesthesiology	0	90	**90**	**160**	70	**180**	**80**
Dental techs	1	77	**78**	**80**	2	**90**	**5**
Hygienists	126	34	**160**	**540**	380	**570**	**400**
Lab techs	667	264	**931**	**1280**	349	**1400**	**398**
Mental Health	0	50	**50**	**80**	30	**100**	**40**
Midwives	11	38	**49**	**580**	531	**600**	**550**
Nutritionists	39	35	**74**	**540**	466	**580**	**579**
Ophthalmologists	0	28	**28**	**40**	12	**50**	**16**
Pharmacists	48	63	**111**	**80**	-31	**95**	**-26**
Physical Therapists	0	58	**58**	**80**	22	**100**	**30**
Radiology techs	0	44	**44**	**80**	36	**100**	**45**
Social Workers Total	550	216	**766**	**660**	-106	**700**	**-80**

Source: DHSST, Dec 2009

One complication when looking at health facilities staffing is in understanding exactly how people perceive their main responsibility to be and how they report their title. For example, the pharmacy responsibility in health centers as usually performed by A2 nurses, who might identify themselves as “pharmacist”. In reality they should be identifying themselves as A2 nurses, as this could artificially inflate the number of pharmacists nationwide. Another example is the cadre “nutritionist” or even “hygienist”. At the health center level, these roles are being carried out by A2 nurses, who are supposed to be dedicated to these functions or responsibilities. However, for various reasons (lack of clarity of role, no formal

degree/certification, multitasking, etc.) most nurses do not identify themselves as nutritionists or hygienists but rather as A2 nurses, which is their formal certification.

These examples are provided to illustrate an important point, which permeates through the health system. There is no clear definition of roles or delineations of services per cadre and many services are provided by staff that is not really supposed to provide the specific service, nor qualified or trained to do so. Most services are provided by A2 nurses, which is a degree deemed insufficient by the MOH and currently being phased out. A clear health service delivery plan is needed with specific competencies for each cadre allowed to provide each service for each level of care, so as to clearly differentiate the role/function form the title/position. For each cadre, specific training should be required to perform that field, as well as certification by a competent authority/body. It also bears mentioning that Allied Health Professionals are not yet regulated in Rwanda, and that regulation needs to be drafted and passed.

The Kigali Health Institute seems to have the capacity to train an important number of various professionals every year, which points to a different set of issues (see KHI training tables). This should be further analyzed but either there are not enough students enrolling/graduating, or for some reasons they are not entering the workforce in-country. There are anecdotal reports of students not being able to afford schooling cost-of-living during studies, as some scholarships are no longer available. In addition, there are reports of mental health nurses not being able to find positions in some districts that do not perceive a need in mental health. There needs to be better visibility between the staffing requirements, the training levels, available applicants and deployment. In addition, additional financial support to student should also be considered.

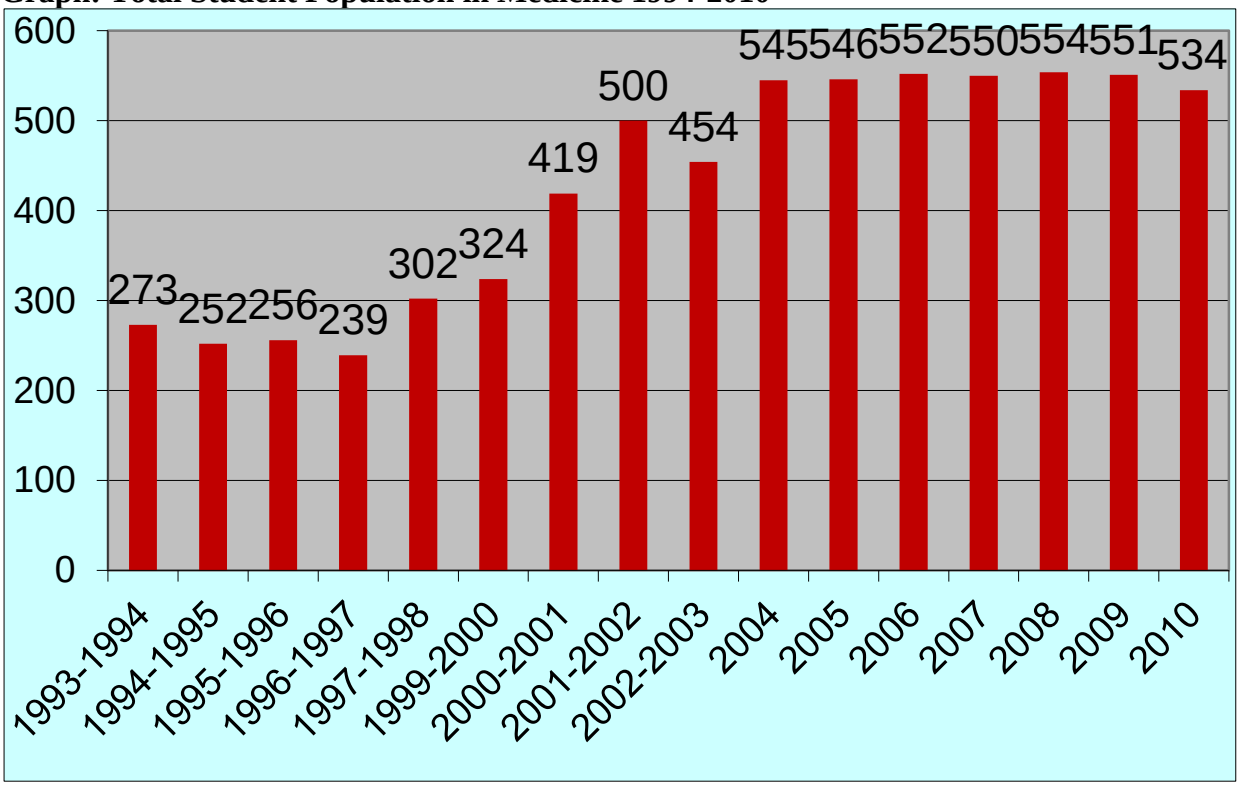
3.4. Training and Development

3.4.1 Pre-Service Training and Production

Medical School

The Faculty of Medicine at the National University of Rwanda (NUR) was established in 1963 and is the only academic institution training physicians in Rwanda. The Faculty trains at both the undergraduate and postgraduate level in Rwanda. The Faculty has three main departments: Medicine (which is comprised of all the clinical and basic sciences sections), Pharmacy and Clinical Psychology. The last two departments are a result of the University restructuring in 2008. Undergraduate education lasts six years and is followed by one clinical internship year. The Medicine department enrolled an average of 25 students per year, and graduated about 15 doctors per year, for the first 25 years. Education for general practitioners lasts six years and is followed by one clinical internship year. The numbers have steadily increased since the reopening of the University in 1997 after the genocide as shown in the graph below.

Graph: Total Student Population in Medicine 1994-2010



Source: Faculty of Medicine NUR

The Department of Pharmacy was created in 1981. Initial training was on a cohort basis and enrollment was done after the graduation of the previous cohort. A full-fledged Department was established in 1986, with a five-year undergraduate program. A Masters program is planned to be launched in 2012. The Department is also responsible for water and drug quality monitoring through its state-of-the-art LADAMET laboratory.

The Department of Clinical Psychology was created in 1998 as a response to the big problem of trauma encountered by the people of Rwanda and others from the great lake region and east African countries, who have experienced various psychosocial problems from wars, massacres and genocide. The Department offers both undergraduate and Masters level programs. The undergraduate program last four years and the masters program lasts two years. The department operates an outpatient mental health clinic in Butare and provides support to various mental health centers country-wide.

The following table shows the number of entrants and graduates from the Faculty of Medicine from 2004-2010. The steady state target is set at 60-70 physicians graduating per year (Dean of Undergraduate Programs, Faculty of Medicine, NUR).

Table 6a: Undergraduate Medical School Entrants and Graduates, 2004-2010

Department	Year	Number entrants			Number of graduates		
		Men	Women	Total	Men	Women	Total
General Medicine	2004	91	19	110	51	6	**57**
	2005	46	7	53	31	12	**43**
	2006	73	9	82	83	27	**110**

	2007	71	16	86	-	-	-
	2008	111	24	135	171	33	**204**
	2009	74	15	89	61	26	**87**
	2010	83	24	107	86	13	**99**
Psychology (Clinical)	2004	53	51	104	-	-	-
	2005	16	9	25	14	10	**24**
	2006	28	15	43	42	20	**62**
	2007	59	53	112	-	-	-
	2008	125	102	227	77	59	**136**
	2009	38	43	81	30	50	**80**
	2010	69	25	94	26	20	**46**
Pharmacy	2004	42	13	55	-	-	-
	2005	23	4	27	8	6	**14**
	2006	32	6	38	9	4	**13**
	2007	25	13	38	-	-	-
	2008	77	29	106	70	22	**92**
	2009	76	32	108	21	3	**24**
	2010	44	10	54	33	4	**37**

Source: Faculty of Medicine NUR

Postgraduate training programs in Medicine were launched in 1997 with Belgian collaboration and students were required to travel to Belgium or France. This program was able to graduate 17 specialists in by 2004. In 2005, an in-country training program was launched. Currently, seven post-graduate training programs are available to physicians in Rwanda: Internal Medicine, Pediatrics, Surgery, Obstetrics & Gynecology, Anesthesia, Family and Community Medicine (FAMCO), and Ear-Nose-Throat (ENT) surgery. The programs aim at an enrollment of 10 residents per year per program, save for Anesthesia and ENT that target 5 residents per year. The total current enrollment is 106. The residence programs are four years each. Training at this level is largely through Ministry of Health sponsorship and requires prospective candidates to have served in a District Hospital for at least two years. This has in itself been a deterrent for many would-be candidates given that those who have spent the required time are less willing to apply for postgraduate training especially in the clinical specialties.

Table 6b: Postgraduate Medical School Entrants 2005-2010

Year	Program Entrants (M/F)							Total
	Internal Medicine	Obstetrics-Gynecology	Pediatrics	Surgery	Anesthesia	FAMCO	ENT	
2005	**6/0**	**8/0**	**9/0**	**3/0**	**2/0**	**-**	**-**	**28**
2006	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
2007	**2/1**	**2/0**	**1/0**	**8/0**	**2/1**	**-**	**-**	**17**
2008	**5/2**	**10/0**	**6/4**	**9/0**	**4/1**	**7/0**	**-**	**48**
2009	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
2010	**6/1**	**6/1**	**6/1**	**3/1**	**3/0**	**5/0**	**3/1**	**34**

Source: Faculty of Medicine NUR

As of February 2011, the Faculty of Medicine reported 67 total faculty. The Faculty of Medicine employs Senior Lecturers and Assistant Lecturers. Their goal is to double the number of faculty, to achieve appropriate faculty-to-student ratios, and to be more in line with the standards in other East African countries. Many faculty members have multiple professional commitments that detract from their teaching time and focus, and thus the number of faculty effectively teaching is somewhat lower than reported numbers.

Nursing Schools

The Nursing School are under the domain of the Ministry of Health. In 2007, in an effort to improve quality, the government reduced the number of nursing schools. Five schools (Byumba, Kabgayi, Kibungo, Nyagatare and Rwamagana) were selected to be responsible for A1 nursing education going forward. Since then, the A2 program has been phased out and replaced with an A1 program that eventually existing A2 nurses will also have to undergo. The A1 level is now the minimal acceptable standard for nurses.[2]

As part of the reform in nursing education, an intense multi-stakeholder revision process led to a new competency-based curriculum defining the roadmap to graduation. The curriculum spans three years and offers a mix of clinical and didactical sessions. In the first year the program is mainly didactic, evolving to extensive clinical mentorship by year three. Nurse lecturers are required to have achieved a A0 level of education; nurse mentors are requires to have achieved a A1 level of education. Both are needed to deliver training programs.

On average, the five nursing schools have 50 entrants per year per school, for an annual intake of 250 students. In delivering a three year program, each school has 150 students in the school at all times. The five schools are relatively small, each having between three and six classrooms and a student maximum capacity between 150–180 persons. Beyond classroom capacity, the schools have insufficient teaching capacity to handle the current student enrollment. It follows therefore that the schools do not have the classroom nor the teaching capacity to expand enrollment to meet national goals of 250 students in the schools at all times. In addition to classroom capacity, across the board, the schools suffer from a host of other deficiencies including inadequate laboratory capacity (one of the schools does not have a laboratory), major lack of equipment and supplies, and nonexistent hygiene facilities.

Table 7: Nursing School Capacity and Gaps

	Kabgayi	**Nyagatare**	**Byumba**	**Rwamagana**	**Kibungo**	**Total**
Number of students – actual	150	150	150	150	150	750
Number of students - target	250	250	250	250	250	1250
Gap	**100**	**100**	**100**	**100**	**100**	**500**
Nurse lecturers -	4	6	4	4	4	22

[2] The A0 degree is obtained at the Kigali Health Institute rather than in one of the nursing schools. There is also a special bachelor degree leading to the A0 degree but these nurses have more administrative and academic responsibility than clinical responsibility

actual						
Nurse lecturers - target	17	17	17	17	17	85
Gap	**13**	**11**	**13**	**13**	**13**	**63**
Nurse mentors – actual	3	1	4	4	3	15
Nurse mentors - target	8	8	8	8	8	40
Gap	**5**	**7**	**4**	**4**	**5**	**25**

Source: Nyagatare Nursing School Head, on behalf of the five nursing schools; and CHAI

School of Public Health

The National University of Rwanda's School of Public Health (SPH) delivers four Masters degree programs: Masters of Public Health (MPH), MSc (Masters of Science) in Epidemiology, MSc in Field Epidemiology, and a distance learning Masters in Health Workforce. The Masters in Health Workforce program is run jointly with Western Cape University School of Public Health in South Africa, Eduardo Mondlane University School of Public Health in Mozambique, and Addis Ababa University School of Public Health in Ethiopia.

Table 8: School of Public Health Production, 2005-2011

Department	Year	Number entrants			Number of graduates		
		Men	Women	Total	Men	Women	Total
Epidemiology	2005	9	2	11	6	2	8
	2006	9	2	11	6	2	8
	2007	8		8			
	2008	2	2	4			
	2009			5			
	2010	2	2				3 (Feb 2011)
	2011 forecast			24; 20 per annum thereafter			5
Public Health	2005	11	12	23	8	10	18
	2006	17	16	33			
	2007	12	2	14			
	2008	19	14	33			
	2009			58		3	3
	2010			36 (Jan 2011)			65* (Oct 2010); 10 (Feb

							2011)
	2011 forecast			15 per annum thereafter			58
Nutrition	2005						
	2006	22	34	56			
	2007						
	2008						
	2009				7	13	20
	2010				10	18	28
Field Epidemiology and Laboratory Training Program	2010	11	3	14			
	2011 forecast			15; 15 per annum thereafter			

* Special graduation that represents pending cases from previous intakes

Source: NUR School of Public Health

If 100% of entrants graduate, then Rwanda will have 139 additional MPH's. Rwanda has set the goal to reach the rate of 1 epidemiologist per 200,000 people. If 100% of entrants graduate, then SPH should have graduated 89 additional MSc Epidemiology, thus achieving 1.78/200,000 people. The expected number of Field Epidemiology graduates by 2015 (excluding 2014 and 2015 intakes for ongoing training) is 59 (at least 1 MSc Field Epidemiology per district). For MSc Health Workforce, there will be 4 students (2010 - 2012), and 2 students (2011 - 2013) before we appropriate the program.

The school is supported by WHO and *Tulane University* and has been supported by *Johns Hopkins* in the past. SPH is working in partnership with Yale University on two curricula: a Certificate in International Health Management (CIHM) and a Master in Health and Hospital Management (MHA) to train managers for the health sector and a mentorship system for Hospital Administrators of referral and teaching hospitals. The MHA is forecasting 20 students *per year*, with expected graduates 2015 to total 60 (by excluding 2004 and 2005 ongoing training). This will produce at least 1 MHA per district apart from holders of CIHM (Certificate in International Health Management).

SPH has started MPhil and PhD trainings in public health with a CDC grant (10 PhD scholarships, one is already in the pipeline, PhD in Forensics Epidemiology with Oregon State University), a Rockefeller Foundation grant (2 PhD in Health financing), and a partnership with Intrahealth/Harvard School of Public through a Duke Doris Foundation funding (10 MPhil and 4 PhD scholarships). By 2015, MPhil in Public Health should have been completed and 16 PhD presentations are awaited by the end of 2015. Accomplishing this will be an enormous challenge.

As for teachers/trainers available, SPH has 1 full professor, 3 associate professors, 1 senior lecturer, 7 lecturers, 6 assistant lecturers, and 1 tutorial assistant. All current staff members should be PhD holders.

Kigali Health Institute (Allied)

Kigali Health Institute (KHI) is a higher learning institution providing university-level training in 10 allied health disciplines. It was founded in 1996. All programs offered by the institution are recognized by the higher education council. Table 9a details entrants and graduates for post-basic (post-secondary school) diplomas over a five year period.

Recently, KHI has made a conscious decision to decrease number of students in order to increase quality of education. The year 2008 was KHI's last intake year for A1-level general nursing, which has been moved to the nursing schools. However, midwifery and mental health training programs continued. Midwifery intake was historically low, but is improving, as KHI has been spending time in the community, at the secondary schools promoting the program.

Table 9a: Post-Basic Diplomas KHI Production, 2007-2011

Department	Year	Number entrants			Number of graduates		
		Men	Women	Total	Men	Women	Total
General Nursing (A1)*	2007	13	44	57	57	217	274
	2008	22	23	45	26	62	88
	2009	29	34	63	10	27	37
	2010	0	0	0	17	23	40
	2011	0	0	0	-	-	-
Midwifery**	2007	1	9	10	2	35	37
	2008	8	22	30	2	11	13
	2009	25	16	41	0	6	6
	2010	16	43	59	8	20	28
	2011	19	22	41	-	-	-
Mental health/ Psychiatric nursing	2007	21	22	43	10	16	26
	2008	8	23	31	9	16	25
	2009	15	10	25	22	22	44
	2010	30	48	78	6	19	25
	2011	12	6	18	-	-	-
Physiotherapy (A1)	2007	0	0	0	12	6	18
	2008	0	0	0	3	1	4
	2009						
	2010						
	2011				-	-	-
Imaging sciences	2007	24	18	42	0	2	2
	2008	29	21	50	9	8	17

	2009	33	17	50	10	8	18
	2010	37	14	51	14	5	19
	2011	34	11	45	-	-	-
Environmental Health sciences (A1)	2007	0	0	0	30	12	42
	2008	0	0	0	20	12	32
	2009						
	2010						
	2011				-	-	-
Dentistry (A1)	2007	9	13	22	14	3	17
	2008	0	0	0	13	8	21
	2009	0	0	0	9	12	21
	2010						
	2011				-	-	-
Biomedical laboratory sciences (A1)	2007	7	9	16	30	23	53
	2008	4	9	13	32	16	48
	2009	0	0	0	4	7	11
	2010						
	2011				-	-	-
Ophthalmology	2007	10	9	19	5	6	11
	2008	7	9	16	5	6	11
	2009	0	0	0	8	9	17
	2010	9	3	12	5	8	13
	2011	7	4	11	-	-	-
Anesthesia	2007	20	4	24	19	14	33
	2008	14	15	29	9	11	20
	2009	23	16	39	6	16	22
	2010	27	15	42	10	12	22
	2011	19	7	26	-	-	-

* entrants include midwives year 1

** enrollment dependent on General Nursing, as nurses and midwives were combined until 2007

Source: KHI

KHI's programs also include Bachelors degrees, post-Bachelors certificates, and Masters degrees. Nurses can upgrade their post-basic diplomas (A1) to a Bachelors (A0). Upgrade programs typically last 18 months, and are part-time (environmental health, biomedical lab, anesthesiology) or full-time (physiotherapy, dentistry). Nurses can also upgrade their A1 to a Bachelors (A0) in Nursing Education in a two year full-time program.

Table 9b: Bachelors degrees KHI Production

Department	Year	Number entrants			Number of graduates		
		Men	Women	Total	Men	Women	Total
General Nursing (A0)*	2007	15	27	42	0	0	0
	2008	13	45	58	0	0	0
	2009	3	37	40	7	15	22
	2010	19	18	37	15	21	36
	2011	26	7	33	-	-	-
Physiotherapy (A0)	2007	19	9	28	0	0	0
	2008	22	4	26	0	0	0
	2009	18	12	30	10	11	21
	2010	16	18	34	22	8	30
	2011	29	8	37	-	-	-
Physiotherapy (A1 to A0 upgrade)	2010	8	5	13	6	5	11
Environmental health (A0)	2007	20	29	49	0	0	0
	2008	23	11	34	0	0	0
	2009	20	12	32	0	0	0
	2010	24	21	45	20	29	49
	2011	86	53	139	-	-	-
Environmental health (A1 to A0 upgrade)	2010	39	14	53	0	0	0
Dentistry (A0)	2008	13	3	16	0	0	0
	2009	23	8	31	0	0	0
	2010	30	15	45	0	0	0
	2011	21	9	30	-	-	-
Dentistry (A1 to A0 upgrade)	2010	9	12	21	4	11	15
Biomedical lab sciences (A0)	2007	31	20	51	0	0	0
	2008	40	17	57	0	0	0
	2009	36	8	44	0	0	0
	2010	28	20	48	24	14	38
	2011	20	14	34	-	-	-
Biomedical lab sciences (A1 to A0 upgrade)	2010	23	16	39	-	-	-
Anesthesia (A1 to A0 upgrade	2010	23	16	39	-	-	-
Nursing Education (A1 to A0 upgrade)	2010	3	22	25	-	-	-
	2011**	-	-	25	-	-	-

* program started in 2006, ** accepted, pending enrollment (Source: KHI)

KHI also offers a Post-Bachelors Certificate offered in Professional Counseling. This is a 6 month program which graduated 20 in its first cohort in 2008, 11 and 10 in its second and third cohorts, respectively. KHI also offers a Masters in Critical Care and Trauma, lasting two years, with its first intake of 8 students currently enrolled. There is a Masters in Healthcare Administration and Management under development that will be a part-time evening program. Curriculum and faculty will be shared with the School of Public Health, whose program will be a full-time day program.

For instructors, KHI has 117 full time lecturers, of which 86 are Rwandan nationals and 31 are foreign nationals. Foreign nationals divide their workload between teaching, research, and clinical responsibilities. KHI also has 53 part-time lecturers, of which 37 are Rwandan nationals and 18 are foreign nationals. KHI strives to maintain a desired instructor:student ratio of 1:10 overall, slightly higher during clinical practice, and slightly lower for classroom teaching of theory.

KHI reports that its space available is too small for the size of the current student population. Furthermore, they are in need of additional equipment and facilities upgrades. Proper teaching hospitals should be designated, and they will need to have proper space and equipment as well. For equipment, upgrades are needed keep pace with technology. Due to space constraints, all first year students study at a separate campus in Kibuye, 200km from Kigali. This necessitates instructors to split their time, traveling back and forth between campuses.

3.4.2 In-Service Training and Continuing Professional Development

Since 2008, the Rwanda Medical and Dental Council has worked with many other stakeholders including MOH, the Rwanda Medical Association, and the Nurses and Midwives Council to contribute to the health systems strengthening through a focus on Continuing Professional Development (CPD) and the promotion of best practices in a bid to raise the standards of care.

Physicians

As of 2011, there are 163 Rwandan physicians enrolled in a post-graduate training program, of which 88 are being trained in-country and 75 are being trained abroad.[3] Physicians have little access to Continuing Medical Education after graduating. The Rwanda Medical Council has developed a CPD plan to address these issues, to promote best practices, and to improve patient care.

Nurses

Within KHI, the Continuing Education Center (CEFOCK) was created in 2001 to offer continuing training for nurses and paramedical staff. Apart from ad hoc 3-5 day trainings after graduating from nursing school, nurses are not offered a program to maintain and develop their skills. The system for ongoing mentoring and supervision of nurses at the workplace is extremely weak and needs to be better-resourced and strengthened.

[3] Data on the location, year of study and area of specialization of these trainees is not tracked currently.

3.5. Recruitment and Retention

Under the current decentralized system, districts have the mandate to identify and fill existing staff vacancies. However, low human resource management capacity has contributed to delays in recruitment, placement, and promotions. In addition, human resource information systems, planning, forecasting, career development and succession planning capacity require significant development. Another major challenge is the poor economic conditions that necessitate setting of budget ceilings on personnel emoluments which limit recruitment of required staff and the replacement of existing vacant posts. There is no mechanism to integrate the private sector into solving issues of staff needs, recruitment, compensation, promotion, retention and pension arrangements.

Salary levels, career growth, and opportunities for further training are key factors contributing to HRH attrition from the public to the private sector. The MOH and the Rwandan professional councils are in the process of establishing career progression structures that will define paths of career growth for all cadres of professionals. This is aimed to encourage retention and continuing professional development (CPD), as it will include salary improvements and monetary and non-monetary incentives, at the different levels in each area of specialization. In addition, the Performance Based Financing (PBF) scheme provides important facility-level incentives that, dependent on the approach used to distribute incentives to individual employees, may be used to serve as motivation and retention vehicles.

3.6. Performance Management and Reward System

Rwanda has adopted Performance Based Financing (PBF), which is a health financing approach that shifts attention from inputs to outputs, and eventually outcomes, in health services. The Rwandan national PBF scheme provides bonus payments to government and faith-based primary care facilities based on the provision of various types of services and the quality of those services. There are 12 maternal and child health indicators and 10 HIV/AIDS indicators, as well as approximately 120 quality indicators across 13 domains. There is evidence that the incentives in the Rwandan PBF program are significantly associated with increased use and quality of a number of high impact maternal and child health care services, including quality of prenatal care, institutional delivery and child preventive care utilization[4].

The PBF indicators measured are at the facility level, and do not link to employee-level performance goals or evaluations. An individual employee evaluation form exists, however the system is not applied consistently, nor utilized as a tool for supervisors to manage individual employee performance. In addition, along with employment contracts, employees receive performance contracts which provide for additional incentive-based pay. Again, there are not clear linkages between PBF and employee performance contracts.

[4] Source: Policy Research Working Paper, "Paying Primary Healthcare Centers for Performance in Rwanda", January 2010

3.7. Conclusions

Primary issues for the Rwandan health care sector for HRH are to increase the quantity of healthcare workers at every level, with particular focus on highly skilled nurses and specialist physicians. While considering the data limitations mentioned, the most striking gaps in Allied Health Professionals (Table 5, above) are for midwifes and laboratory technicians. For example, there are virtually no midwifes in health centers as most of them are found in district hospitals. Even so, there are still a few district hospitals without midwifes, which should be one priority area to be addressed in the coming years. Another important shortage can be observed for laboratory technicians and to a lesser extent other cadres (physical therapists, mental health, radiology or anesthesiology techs), but the gap is not as drastic.

While substantial efforts are still needed to increase the *quantity* of health professionals to meet the new staffing norms, more emphasis needs to be put on *quality* of trained professionals and their distribution throughout the country. Post-graduate training has cross-cutting effects on other levels of training and quality of healthcare delivery, and therefore requires strong support.

Lack of qualified instructors across the training institutions is a key impediment to expanding the quantity of HRH. In reporting the number of instructors, this does not tell the whole story with respect to poor attendance and lack of motivation. Inadequate infrastructure and equipment also needs to be addressed. In teaching, curriculum design and delivery methodology should be examined.

4. Current HRH Initiatives and Accomplishments

Over the past years there has been a substantial improvement in numbers, in quality, and in deployment of staff at health centres and district hospitals. Since 2005, a number of reforms and new initiatives have positively impacted HRH, ranging from decentralization of the management of human resources to the introduction of performance-based incentives. New staffing norms, based on the actual workload at every facility, were agreed in 2008.

Many of the problems outlined above have been recognized and are already being addressed. Highlights include:

- Addition of HRM/HRD staff at the Ministry of Health, and creation of an HR Director position
- Transfer of the domain of healthcare pre-service education from the Ministry of Education to the Ministry of Health
- Support from an increasing number of Development Partners in a broader range of health care issues, as well as improved coordination of the HRH Technical Working Sub-Group
- Increased research studies producing data to inform HRH planning and management
- Overall increase in the number of healthcare workers, as well as an overall increase in the number of healthcare facilities
- Group performance incentive schemes utilized under the PBF program
- Initiative to upgrade nurses from A2 to A1, including the introduction of eLearning. The number of A1 nurses should see the most notable increase over the next few years, as A2 and A3 nurses are no longer trained in Rwanda.

5. Objectives and strategies

The stated goal of HSSP II regarding HRH is *to increase the availability and quality of human resources.* In order to achieve this goal, four HRH strategies have been established. Within each strategy, specific objectives and activities are listed. Prioritization of specific activities will be undertaken during the development of annual implementation plans.

5.1. Ensure a coordinated approach to HRH planning across the sector

5.1.1 Create a framework and environment for human resource research and development

There is a rapid increase of research activities ongoing in the country. Proper coordination and definition of human resource research priorities are required to improve sharing of information and utilization of research results for informed decision making. There is a need to better monitor and understand the underlying causes and pattern of movement of human resources in the health sector. Efforts are needed to capture emerging human resource issues and challenges at all levels.

To ensure better utilization of existing research results, efforts to improve strategic linkages between policy and research would be advocated. The MOH will play a lead role in coordination and utilization of the human resource research and results.

5.1.2 Ensure HR planning is coordinated with all stakeholders, including Development Partners

Partnerships are vital to the Rwandan health sector. In order to tackle the human resource crises, the commitment of leaders from all stakeholders is considered vital. Partnership should include developing financing mechanisms for ensuring sustainability, sharing of existing staff/facilities, joint planning and task shifting. Partnership should be developed with a view to sustainable solutions. In developing partnerships, relationships and roles between the different stakeholders should be clearly defined. This Plan seeks to encourage the harmonization and coordination of relevant activities.

Currently there is not a significant private for-profit health sector providing services in rural areas. Therefore, there is a need to develop mechanism to enhance greater private sector participation in service provision in rural areas.

5.1.3 Establish HR information database, with minimum required functionality, and to maintain accurate and current data

A comprehensive HR information system is an essential pillar of a health system. It enables management to use the resulting data for future planning in addition to its use as a management tool. The complexity of the health system requires that this pillar be developed and managed appropriately to become a standard for good health management.

5.1.4 Develop M&E systems to track progress of the implementation of HR plans

M&E systems are required to track progress of implementation of all HR plans. They are further required to make adjustments/modifications and inform further development of the plan

5.2. Increase the quantity of HRH through increased numbers of trained and equitably distributed staff

5.2.1 Increase training output by expanding the availability of trainers and the number of training institutions

This Plan will promote development of National Training Plan and Guidelines. In addition, efforts are needed to align training programs and trainer qualifications/performance to meet the needs of service providers.

5.2.2 Strengthen In-Service Training system

The National Training Plan and Guidelines, referenced in 5.2.1, will also address continuous professional training and the quality of the programs will be strengthened.

5.2.3 Increase numbers of skilled health workers in post

The design of effective and efficient recruitment and retention mechanisms and strategies is needed at all levels of the health system. Accurate data is necessary on the labor market, as

well as on attrition rates and reasons, in order to design appropriate recruitment and retention programs.

5.2.4 Improve the distribution of HRH

In order to improve geographical distribution of health personnel across the country, again, sound data is needed on labor market trends, including school enrolments. Efforts should be made to analyze the demographics of graduating students, and their individual geographic preferences. Incentive packages for health professionals will be utilized as needed, in particular to increase the number of medical doctors and midwives in remote areas.

5.3. Increase the quality of HRH, including improved productivity and performance of health workers

5.3.1 Improve the quality of Pre-Service Training

Review of the medical teaching curricula and the initiation of an accreditation process of teaching institutions will contribute to simultaneously improve the quality of teaching. To ensure that existing training schools are able to effectively produce qualified and competent health workers, partnerships mechanisms to improve academic staff performance and motivation would be encouraged.

5.3.2 Improve the quality and cost-effectiveness of In-Service Training

To ensure quality in-service training, significant coordination is required across the different programs offered. The numbers and quality of available trainers needs to be addressed. The capacity of regulatory bodies needs to be strengthened such that they can play a leadership role in this area.

5.3.3 Improve performance management capacity and tools

An annual performance evaluation system for all public sector workers exists, recognizing that strengthening staff performance and support is critical to productivity and meeting service delivery targets in the health sector. However, the system does not appear to be working well in practice. There is a lack of evidence to show how the evaluation system held facilities and individuals accountable for the achievement of targeted results.

5.3.4 Strengthen general management and leadership skills at all levels

Due to the historical lack of institutional health management training, the top healthcare leaders need to receive leadership and management training in order to strengthen their own abilities, as well as to lead and manage others. Top healthcare leaders are considered the priority, and include the district health units and the heads of district hospitals. Over time, training to top leaders should be scaled, adapted, and implemented throughout all supervisory levels in the sector.

5.4 Increase capacity to plan, develop, regulate, and manage HRH

5.4.1 Establish mechanisms to develop the human resources for health policy, strategic plans, and operational plans

Upon approval of the HRH Strategic Plan, policies will need to be put in place, and operational plans developed to implement the components of the Strategic Plan.

5.4.2 Improve the capacity and management of HRM/HRD

At the central and district levels, HR posts are funded, but they need to be filled with qualified, capable individuals in order to provide both leadership and support to the ongoing development of plans and policies, and to carry out those plans and policies.

5.4.3 Support existing professional (regulatory) bodies and the creation of others

Specific statutes need to be developed governing health professionals. Laws should be reviewed to strengthen professional bodies. Professional bodies will need support in order to implement Continuing Professional Development (CPD) programs.

6 Implementation of Strategic Objectives

Within each strategic objective, a set of supporting strategic interventions is outlined in the table below. The interventions are to be prioritized and translated into more detailed operational plans. Annual work plans will be in place for each year during the period covered by this Strategic Plan.

Table 10: Strategic objectives and supporting strategic interventions

Strategic objective	Strategic interventions
5.1 Planning and Coordination	
5.1.1 HRH research and development	• Carry out regular analysis of staffing data and revise the staffing projections in the light of regular analysis of staffing data and changing service need • Develop operations research and apply research to implementation of strategies
5.1.2 Coordination with all stakeholders	• Maintain and strengthen the HRH TWsG, in a participatory approach, to support effective coordination across the MOH and its partners • Develop mechanism to enhance private sector services • Link HRH assessment, planning and implementation efforts to the Public Sector Capacity Building Initiative, as well as other international HRD-related initiatives.
5.1.3 Human Resources	• Develop and maintain accurate and up-to-

Strategic objective	Strategic interventions
Information System (HRIS)	date staffing database through the improvement of the HRIS, as an integrated part of Health Management Information System (HMIS) • Utilize the HRIS to better manage and deploy health workers
5.1.4 Monitoring and Evaluation (M&E) for HRH	• Ensure a full HRH M&E system is developed and implemented, to include indicators for implementation of the HRH Strategic Plan • Integrate the HRH M&E system into the HRIS • Utilize HRH TWsG to develop M&E plans and monitor implementation • Disseminate M&E reports, reviews and research findings
5.2 Quantity	
5.2.1 Expanded number of available trainers and training facilities	• Develop training plan to expand training outputs across cadres • Upgrading, construct, renovate and expand physical capacity at training institutions • Increase the number of instructors and mentors at pre-service institutions through upgrading existing staff, recruiting new staff and using non-nationals on a temporary basis in strategic positions • Increase the capacity of post-graduate training • Develop specialized training for nurses • Provide financial and non-financial incentives/scholarships to students, especially cadres with critical shortages (e.g. midwives). • Increase the use of non-traditional forms of training (e.g. distance learning) • As feasible, involve private sector training providers in Pre-Service training • Introduce direct-entry Midwifery • Consider adding a new cadre of Medical Assistants (MA)
5.2.2 In-Service Training (IST)	• Review and implement national IST Coordination Plan • Increase the use of non-traditional forms of IST (e.g. distance learning, e-learning, mentoring, on-site training) • Improve links between IST, Continuing Professional Development (CPD) and career development

Strategic objective	Strategic interventions
	• Monitor links between IST and registration/certification • Operationalize CPD plans for all types of professionals and at all levels
5.2.3 Increase numbers of skilled health workers in post through effective recruitment and retention mechanisms	• Develop and implement effective recruitment mechanisms to increase the quantity of qualified workers at post • Implement mentorship model for specialties • Conduct labor market analysis to identify key challenges in recruitment and retention • Improve recruitment procedures at all levels particularly targeting new graduates, and unemployed health workers • Monitor attrition trends, identifying staff groups that are difficult to retain, and develop affordable and feasible packages to retain target groups • Develop employment/contracting procedures to retain health workers
5.2.4 Improve distribution through effective deployment systems	• Improve terms and conditions for health workers based for those in underserved areas (urban, rural, district, tertiary) and areas of specialization to increase retention • Strengthen deployment procedures to ensure equitable distribution
5.3 Quality	
5.3.1 Improve the quality of Pre-Service Training	• Develop a National Health Services plan to identify services provision, requirements and respective staff qualifications for each level of care • Introduce advanced qualification requirement for nurses and other professionals to certify them for specific services or procedures • Develop new and revise existing curricula in line with service needs. • Examine and improve teaching methodologies. • Improve teaching equipment, materials • Examine teacher motivation and incentives • Define career paths for teaching and research • Develop optimum staffing structures based on epidemiological evidence. • Strengthen institutional management systems including HRM and HRD systems to manage and develop training staff • Develop an equipment and infrastructure

Strategic objective	Strategic interventions
	upgrade plan for training facilities • Establish a research center within the Faculty of Medicine, to enrich research and teaching • Develop a system to ensure that evaluation is built into all Pre-Service Training programs
5.3.2 Improve the quality of In-Service Training	• Upgrade A2 nurses to A1 • Develop a system for coordinating training provided by all the different programs • Develop a system to ensure that the knowledge and skills of trainers are regularly updated in line with service needs • Improve and expand the medical post-graduate training program • Increase the use of on-the-job training to improve providers' skills and knowledge • Increase the use of non-traditional forms of IST (e.g. distance learning, mentoring) • Develop a system to ensure that evaluation is built into all IST programs
5.3.3 Improve staff performance by providing managers with appropriate tools, skills, and knowledge	• Ensure that all staff have up-to-date job descriptions and that these are used in conjunction with the annual performance evaluation system • Develop a system linking facility-level performance management tools to individual staff performance • Develop simple systems with the HRIS for managing staff absence • Conduct regular satisfaction assessments of health staff • Improve staff motivation and job satisfaction through monetary and nonmonetary incentive schemes through the PBF • Inventory equipment and infrastructure for service delivery and evaluate upgrade needs • Strengthen surgery and other specialty practices at the provincial hospitals
5.3.4 Strengthen general management and leadership skills at all levels	• Develop capacity of heads of departments, and managers of service delivery facilities to lead and implement improved performance management systems and processes and effectively utilize information to improve performance • Increase access to management development programs for current and potential managers
5.4 Capacity	
5.4.1 Develop HRH policies, strategic plans, and operational	• Develop, adopt, and implement HRH policy

Strategic objective	Strategic interventions
plans	and strategic plans • Ensure communication and implementation of all human resource related plans and policies throughout the health system • Support the development of annual operational plans for HRH
5.4.2 Improve the capacity and management of HRM/HRD	• Fill HR positions, including an HR Director and HRM/HRD functions at the central level, and district HR managers, with fully qualified and capable staff. • Develop and implement HR Management and Development systems at all levels, including HR operational policies and procedures • Define HRD-related roles and responsibilities at the central and district levels, in the context of decentralization.
5.4.3 Support professional (regulatory) bodies	• Develop specific statutes governing health professionals • Review laws to strengthen professional bodies • Build capacity of professional bodies to run continuing professional development programs and monitor the quality of IST

The Appendix contains detailed data on training additional physicians, a new cadre of medical assistants, nurses, and other cadres of workers. The Appendix included detailed costing information on various approaches.

7 Monitoring and Evaluation of the Plan

A major exercise to follow the adoption of this HRH Strategic Plan will be the development of HR performance indicators (Strategic Objective 5.1.4). This is a complex project that is absolutely necessary for the health system but needs good systematic management of the organizational culture and workforce challenges, and must remain relevant for the health system at all levels. This indicator system, once developed to reliability, will be essential for guiding managers mainly at local health facilities to record, compare and even monitor their own performance. Using HR indicators at district health level as a mechanism to make performance comparisons (using the same indicators, whose data is collected and interpreted using the same format) will assist in developing suitable norms or standards of performance. Development of a national human resource information system (HRIS) is thus a vital cornerstone in the establishment of a human resource performance indicator system.

Assessing the performance of the HRH Strategic Plan cannot be done outside the broader assessment of the national health system. It is therefore linked with the broader performance

of the national health system simply because health service delivery relies very heavily on not only the number of personnel but also on how skilled, competent, distributed and well managed its human resources are. The quality of health services, the financing and overall organization of the health system has as much an impact on human resources as they do on the system's performance. Human capital is therefore a major resource for the health system that must always be monitored in its various formations.

Assessment of this HRH Strategic Plan will go beyond the counting of numbers. It is therefore necessary to consider all other factors in monitoring and evaluating the effectiveness and impact of the plan on the whole health system and its performance. The performance indicators selected for this Plan will need to be refined over time to ensure their appropriateness at the district level.

The Performance Based Financing (PBF) scheme and its related performance evaluation mechanisms are receiving almost undivided attention and support of staff at district hospitals and health centers. In many ways, the elaborate PBF performance evaluation process and the focus on quality and measurable service delivery results is slowly becoming the *de facto* performance evaluation system for the public health sector in Rwanda. Hospital managers knew all the steps and could describe the process in considerable detail. But since the focus is on organizational results, the role of supervisors in the organization and their relationship with their supervisees seem to be lost in the mix. For example, there is no evidence that an individual had the opportunity to learn about their skills and competencies and discuss future plans with his/her supervisor as a result of PBF performance assessments. Even with the apparent success of PBF, addressing wider determinants of productivity will require additional approaches and techniques.

The MoH is currently defining a core set of health sector indicators to be tracked. This work is being developed by the TWG on e-health, and provides the main indicators to be used across all domains, including HRH. The full list of indicators has not been finalized and approved yet, but Table 11 is the most recent version of the HRH-related indicators for illustration purposes. The final list should be obtained directly from the respective official document. This list is not intended to be an exhaustive list of indicators, but it provides the basic set of indicators that will be tracked and inform on the progress on the HRH front.

Table 11: HRH Indicators

Indicators	Service detail	Type	Definition[Calculation methodology]	Data source	Collection method	Responsible
% of health care workers who successfully completed an in-service training program	IST	Output	The numerator is number of health professional (doctors, nurses, pharmacist, lab technicians, midwives) who attended at least one MoH certified CPD course in the last year and the denominator is the total number of health professionals	Training database	routine	GOR-professional councils

Ratio of new health care professionals who graduated from pre-service training institutions per 10,000 inhabitants (by type: doctor, nurses, midwives, lab technicians,…)	PST	Input	the total number of new graduates from all accredited health training institutions (Faculty of Medicine, KHI, nursing and midwifery schools,…) and the denominator is the year total population (per 10,000 inhabitants).	Graduation Booklet and other sources from academic institutions	mini-survey	MoH/HRD
Ratio of medical doctor to 10,000 inhabitants	Staffing	Input	The number of Medical doctors as numerator and the total population (per 10,000 inhabitants) as denominator	HRIS	mini-survey	MoH/HR
Ratio of qualified nurses (5,000 inhabitants)	Staffing	Input	The number of qualified nurses as numerator and the total population (per 10,000 inhabitants) as denominator	HRIS	mini-survey	MoH/HR
% of health facilities with a midwife 3,000 inhabitants)	Staffing	Input	the numerator is the number of health facilities with midwife post filled and the denominator is the total number of health facilities that provide the service	HRIS	mini-survey	MoH/HR
Ratio of pharmacists to 15,000 inhabitants	Staffing	Input	The number of pharmacists as numerator and total population (per 15,000 inhabitants) as denominator	HRIS	mini-survey	MoH/ Pharmacy
% of health staff outside Kigali	Staffing	Input	doctors, pharmacists, nurses, ancillary (lab, admin, cleaners?)	HRIS	mini-survey	MoH/HR
% health workers trained to deliver the basic package of services	Staffing	Input	Health professionals	Training Database		

8 Budget

A detailed costing will be part of the action plans to be developed for each component of the Strategic Plan.

Table 12: Summary cost of all interventions (US$000)

Strategic Objective	Type	2012	2013	2014	2015	2016	2017	2018	Total
5.1	**Planning and coordination**	**1,120**	**570**	**220**	**220**	**220**	**220**	**220**	**2,790**
5.1.1	*HRH research and development*	*40*	*40*	*40*	*40*	*40*	*40*	*40*	*280*
5.1.2	*HRH coordination with stakeholder*	*10*	*10*	*10*	*10*	*10*	*10*	*10*	*70*
5.1.3	*HRIS*	*1,000*	*450*	*150*	*150*	*150*	*150*	*150*	*2,200*
5.1.4	*M&E for HRH (capacity building)*	*50*	*50*	*-*	*-*	*-*	*-*	*-*	*100*
	M&E local salary	*20*	*20*	*20*	*20*	*20*	*20*	*20*	*140*
5.2	**Quantity of HRH**	**16,723**	**21,303**	**28,512**	**27,032**	**19,520**	**12,160**	**10,260**	**135,511**
5.2.1	***Expanded number of available trainers and training facilities***	*15,448*	*19,578*	*26,237*	*24,507*	*16,795*	*9,385*	*7,435*	*119,386*
	RUHMS - SOM	*3,449*	*3,412*	*3,486*	*3,561*	*1,635*	*1,710*	*1,784*	*19,037*
	Residency	*5,163*	*5,973*	*8,323*	*6,433*	*4,380*	*1,880*	*1,780*	*33,934*
	KHI - Nursing Program	*1,311*	*1,350*	*1,421*	*1,527*	*1,632*	*768*	*803*	*8,811*
	KHI - Physician Assistant Program	*873*	*226*	*370*	*450*	*530*	*530*	*530*	*3,510*
	Health Management Program (SPH)	*159*	*240*	*340*	*240*	*240*	*40*	*40*	*1,300*
	Central Coordinating Body	*573*	*537*	*$537*	*$537*	*$537*	*$537*	*$537*	*$3,795*
	Sending residents abroad	*3,920*	*7,840*	*11,760*	*11,760*	*7,840*	*3,920*	*1,960*	*49,000*
5.2.2	*In service training*	*725*	*1,125*	*1,625*	*1,825*	*2,025*	*2,025*	*2,025*	*11,375*
	CPD doctors	*425*	*425*	*425*	*425*	*425*	*425*	*425*	*2,975*
	CPD nurses and midwives	*150*	*500*	*800*	*1,000*	*1,000*	*1,000*	*1,000*	*5,450*
	CPD allied	*150*	*200*	*400*	*400*	*600*	*600*	*600*	*2,950*

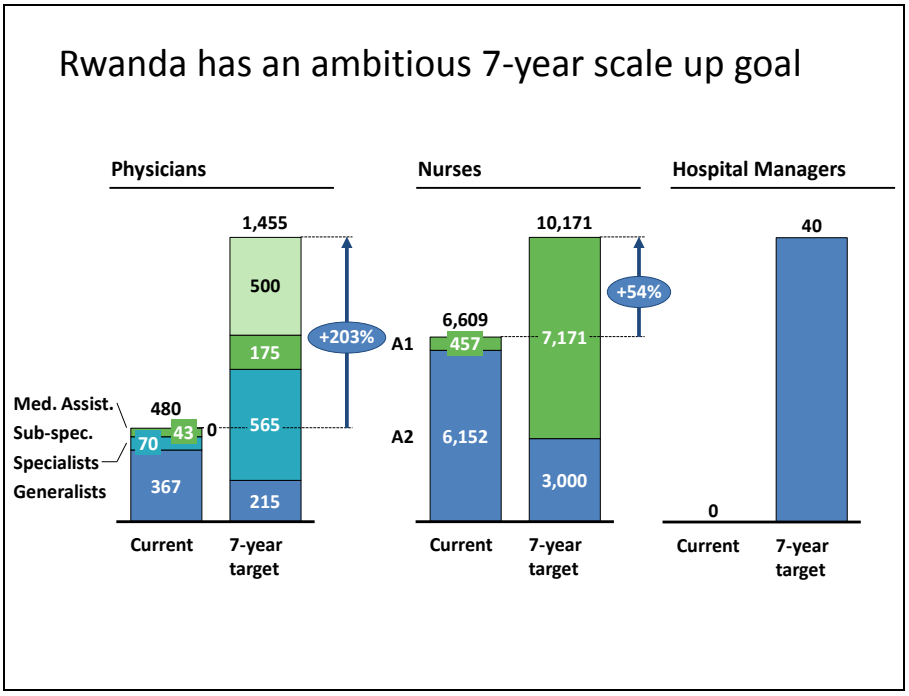
5.2.3	*Recruitment and Retention system (PBF incentives)*	*500*	*550*	*600*	*650*	*650*	*700*	*750*	*4,400*
	Labor market evaluations	*10*	*-*	*10*	*-*	*10*	*-*	*10*	*40*
5.2.4	*HR Deployment system*	*50*	*50*	*50*	*50*	*50*	*50*	*50*	*350*
5.3	**Quality of HRH**	**15,695**	**20,351**	**17,391**	**11,217**	**10,629**	**10,045**	**9,468**	**94,796**
5.3.1	*National health service plan*	*150*	*150*	*20*	*20*	*20*	*20*	*20*	*400*
	Performance management system deployment	*-*	*1,500*	*350*	*350*	*350*	*350*	*350*	*3,250*
	Quality assessment of curriculum IST	*20*	*10*						*30*
	District Hospitals	*1,016*	*343*	*3,701*	*746*	*756*	*770*	*790*	*8,123*
	Provincial Hospitals	*3,327*	*5,869*	*3,209*	*1,292*	*1,292*	*1,292*	*1,292*	*17,574*
	Referral Hospitals	*2,989*	*3,345*	*813*	*813*	*813*	*813*	*813*	*10,398*
5.3.2	*Nursing upgrade*	*7,643*	*8,124*	*8,298*	*7,496*	*7,197*	*6,800*	*6,203*	*51,761*
5.3.3	*Individual Performance managements ystem*	*50*	*10*	*-*	*-*	*-*	*-*	*-*	*60*
5.3.4	*DHU mentorship*	*500*	*1,000*	*1,000*	*500*	*200*	*-*	*-*	*3,200*
5.4	**Capacity of HRH**	**180**	**140**	**90**	**90**	**100**	**100**	**100**	**800**
5.4.1	*Finalization and operational plans*	*70*	*20*	*-*	*-*	*-*	*-*	*-*	*90*
5.4.2	*HRH and HRD staff*	*30*	*40*	*40*	*40*	*50*	*50*	*50*	*300*
5.4.2	*Develop HR procedures manual*	*50*	*50*	*50*	*50*	*50*	*50*	*50*	*350*
5.4.3	*Support regulatory bodies*	*30*	*30*	*-*	*-*	*-*	*-*	*-*	*60*
	Total	**33,718**	**42,364**	**46,213**	**38,559**	**30,469**	**22,525**	**20,048**	**233,897**

APPENDIX
Increasing the Quantity and Quality of HRH (Strategic Objectives 5.2 and 5.3)

A.1 Physicians and Medical Assistants

The main gap regarding physicians in Rwanda relates to specialists, in particular at the secondary level (District Hospitals), as well as the presence of qualified medical assistants at the primary care level. In order to fill the current gap, it is important to consider both in-country capacity for training and requirements to send physicians abroad. For core specialties, the goal is to build enough in-country capacity and strengthen the quality of the teaching to be able to respond to the country's needs. For some specialties and sub-specialties it is however not cost-effective to train in-country and options abroad need to be considered. The total estimated cost to fill the gap over the next 7 years is US$115 million, or about US$16 million a year.

Increase capacity of initial production, post-graduate and In-Service Training



Physicians
The number and type of physicians that Rwanda has to generate to improve quality of care for its population is closely linked to our vision for the 'ideal' number of physicians per health facility. This takes into account the minimum packages of services at different levels of the system. It addresses not only the number of physician, but also the skills mix required between different specialties and at different levels of the health system.

Referral and district hospitals should be staffed entirely by specialists. Referral hospitals offer a larger variety of clinical services and the number of specialists and sub-specialists offering services there, although not detailed in this document, should already reflect this. The major change from the present situation is at district hospital level, where currently the overwhelming majority of physicians are GPs.

The number and combination of specialists will depend on the epidemiological needs and burden of disease in each district. However, as a general rule, it would be desirable to have in each hospital if possible 2 graduates from each of the following specialties: Internal Medicine, Family Medicine, Pediatrics, Obstetrics and Gynecology, Surgery and Anesthesia.

The Family Medicine specialists in particular will work very closely with nurses in health centers and with Community Health Workers (CHWs) in the community to ensure a dynamic and close interaction among all the levels of care delivery in districts. For this reason they would probably be the most suited of all specialists to fill the role of Medical Director of the district hospitals[5].

Based on this staffing model Rwanda is currently experiencing a gap of 495 physicians in the six main specialties[6] taught in-country, and a gap of 132 physicians in the other specialties and subspecialties not taught in-country. As the table shows, the number of General Practitioners exceeds the desired needs – some GPs would therefore need to specialize.

Furthermore, a new cadre of health care workers is also envisioned as part of this model. These are the Medical Assistants (MA). There should be at least one in every Health Center in the country. MA's would function in a similar way as physicians assistants (PAs) in the United States and would be allowed to see patients and provide care under strict guidelines and the supervision of a physician. In addition, they would to some extent progressively replace doctors without specialty training (GPs) and take over many of the basic services they provide today.

TABLE A-1 – Targets for physicians by physician type

Physician gap	Current	Desired	Gap
Medical Assistant	0	500	(500)
General	367	215	152
Specialists	70	565	(495)
Sub-specialists	43	175	(132)
TOTAL	**480**	**1,455**	**(975)**

In-country Resident Program

Training specialists in-country has many advantages: it encourages the creation of centers of learning in Rwanda; the development of team-spirit and a common vision among physicians; a push for innovation; a major contribution to improvement of the health system; teaching and learning that are context-specific to Rwanda; infrastructure improvement of teaching hospitals; and ultimately cost-effectiveness. Currently, however, the quality needs to be strengthened. This strategy proposes to hire full-time expatriate clinicians who would serve as faculty members in the medical school and teaching hospitals and provide mentorship and supervision to Rwandan post-graduate trainees. The presence of a critical mass of highly skilled physician specialists would strengthen existing clinical programs and foster development of innovative clinical programs around areas of medicine neglected in the Global Health discourse and still under-represented in the health care system of Rwanda and other developing countries. Stronger clinical programs will in turn allow for better training and provide a platform for clinical research.

[5] It is envisioned that a new position of Hospital Administator be created at each of the District Hospitals to allow Medical Directors to focus on clinical services and not be pulled into administrative duties.
[6] Surgery, Pediatrics, Internal Medicine, Anesthesia, Obstetrics & Gynecology and Family Medicine.

The cornerstone of the scale up plan is the development of six residency programs (Family Medicine, Internal Medicine, Pediatrics, Obstetrics and Gynecology, Surgery and Anesthesiology). Currently, the Family Medicine residency is the most advanced thanks to the support from the USG through the *University of Colorado*. A full curriculum has been developed. For illustrative purposes and as a basis to estimate the overall costs of such residency programs, we have extrapolated from the actual costs of the Family Residency program for one year and adapted it to match the target of the national plan for 1 year (1 full time mentor with several visiting part-time mentors). The total for one residency for one year is approximately US$ 144,000.

TABLE A-2– Requirements for expatriate support to one residency for one year

Cost items	Description	Total US$
Staff		***76,000***
Core Academic Staff	1 Doctor residing for 12 months in-country	58,000
Short Term Professors	6 Doctors providing specific curriculum support throughout the year for short periods	10,000
Program Coordinator	1 part-time coordinator for the residency	6,000
Teaching and Office Equipment	Includes textbooks, access to journals. IT equipment, administrative equipment, etc.	***16,000***
Consumables	Includes operational expenses such as connectivity charges, visitors housing, student field work costs, etc.	***15,000***
Air travel	Plane tickets for visiting professors	***12,000***
Transportation	Hiring of vehicles for mentors throughout year	***14,000***
Total Actual Costs		**131,000**
Overhead Costs (10%)		***13,100***
Grand Total		**144,100**

The full costing for this specific strategy reflects this estimated unit cost for one Resident/Mentor. A total of 6 residencies are planned in year 1, which would total about US$ 865,000 for year 1. The costing for the following years uses a similar logic, projecting the unit cost relative to the number of mentors/residencies required.

TABLE A-3 – Number of expatriate mentors per year and per specialty[7]

Mentors	2010	2011	2012	2013	2014	2015	2016	Total
Int. Med.	2	6	6	6	6	4	2	
Pediatrics	2	6	6	6	6	4	2	
Surgery	2	6	6	6	6	4	2	
Ob-Gyn	2	6	6	6	6	4	2	
Anesthesia	2	3	3	3	3	2	2	
Fam Med.	2	3	3	3	3	2	2	

[7] We have not discounted the resources estimated to take into account the existing Family Medicine training capacity from University of Colorado for two reasons. First, the current capacity is not sufficient to meet national goals. It could provide capacity for year 1, but would be insufficient as of year 2. The second reason is there is no certainty this support would continue beyond this year. Therefore we opted to leave all costs in the table to have the full picture of the real cost for the full scale up.

Cost (US$ 000)	**$864**	**$2,160**	**$2,160**	**$2,160**	**$2,160**	**$1,440**	**$864**	**$11,808**

The table below provides the breakdown of faculty time required to provide the yearly training in all the different rotations of each curricula. A good model would combine at least 1 full time faculty to teach general topics with several visiting faculty to teach specific subspecialty areas. There will likely be synergies and cross-teaching between specialties, but these are difficult to exactly quantify at this stage. In addition, the curriculum would obvious vary for each year of training, but these are probably too detailed to be described here. The table below represents an averaged estimate.

TABLE A-4 – Number of faculty needed per curriculum rotation per year and per specialty (2010 example) [8]

Residencies and rotations	Faculty time (months)	Total number of residents	Residents per faculty	Faculty needed per calendar year
Anesthesiology (Subtotal)	**12**	**12**	**6**	**2**
General Anesthesiology	*4*	*12*	*6*	*0.7*
Critical Care Medicine	*1*	*12*	*6*	*0.2*
PACU	*0.5*	*12*	*6*	*0.1*
Pain Management	*0.5*	*12*	*6*	*0.1*
Preoperative Care	*0.5*	*12*	*6*	*0.1*
Obstetric Anesthesia	*2*	*12*	*6*	*0.3*
Cardiovascular Anesthesia	*1*	*12*	*6*	*0.2*
Neuroanesthesia	*0.5*	*12*	*6*	*0.1*
Trauma Anesthesia	*1*	*12*	*6*	*0.2*
Pediatric Anesthesia	*1*	*12*	*6*	*0.2*
Family Medicine (Subtotal)	**12**	**12**	**6**	**2**
Internal Medicine	*2*	*12*	*6*	*0.3*
Pediatrics	*2*	*12*	*6*	*0.3*
General surgery	*2*	*12*	*6*	*0.3*
Emergency Medicine	*0.5*	*12*	*6*	*0.1*
Community Medicine	*0.5*	*12*	*6*	*0.1*
Obstetrics / Gynecology	*3*	*12*	*6*	*0.5*
ENT	*0.5*	*12*	*6*	*0.1*
HIV/AIDS and Infectious Diseases	*0.5*	*12*	*6*	*0.1*
Medical Imaging	*0.25*	*12*	*6*	*0.05*
Dermatology	*0.25*	*12*	*6*	*0.05*
Ophthalmology	*0.25*	*12*	*6*	*0.05*
Psychiatry	*0.25*	*12*	*6*	*0.05*
Internal Medicine (Subtotal)	**12**	**12**	**6**	**2**

[8] It should be noted that the exact number of residents to be trained each year in each specialty will depend on the results of epidemiological evaluations and the burden of disease analysis. The numbers presented here are illustrative, not definitive.

Residencies and rotations	Faculty time (months)	Total number of residents	Residents per faculty	Faculty needed per calendar year
Internal Medicine	*4*	*12*	*6*	*0.7*
Cardiology	*1*	*12*	*6*	*0.2*
Oncology	*1*	*12*	*6*	*0.2*
Intensive Care	*2*	*12*	*6*	*0.3*
Nephrology	*1*	*12*	*6*	*0.2*
Emergency Medicine	*2*	*12*	*6*	*0.3*
HIV/AIDS and Infectious Diseases	*1*	*12*	*6*	*0.2*
Obstetrics / Gynecology (Subtotal)	**12**	**12**	**6**	**2**
Obstetrics	*4*	*12*	*6*	*0.7*
Gynecology	*3*	*12*	*6*	*0.5*
Critical Care	*1*	*12*	*6*	*0.2*
Emergency medicine	*1*	*12*	*6*	*0.2*
Gynecology Oncology	*0.5*	*12*	*6*	*0.1*
Urogynecology	*0.5*	*12*	*6*	*0.1*
Maternal Fetal Medicine	*0.5*	*12*	*6*	*0.1*
Reproductive Endocrinology	*0.5*	*12*	*6*	*0.1*
Ambulatory Care	*1*	*12*	*6*	*0.2*
Pediatrics (Subtotal)	**12**	**12**	**6**	**2**
Newborn Intensive Care (NICU)	*2*	*12*	*6*	*0.3*
Pediatric ICU	*1*	*12*	*6*	*0.2*
Emergency Medicine	*1*	*12*	*6*	*0.2*
Newborn Nursery	*2*	*12*	*6*	*0.3*
General Pediatrics	*3*	*12*	*6*	*0.5*
Gastroenterology	*1*	*12*	*6*	*0.2*
Adolescent Medicine	*1*	*12*	*6*	*0.2*
Endocrinology	*1*	*12*	*6*	*0.2*
Surgery (Subtotal)	**12**	**12**	**6**	**2**
Acute Care Surgery	*2*	*12*	*6*	*0.3*
General Surgery	*4*	*12*	*6*	*0.7*
Surgical Oncology	*1*	*12*	*6*	*0.2*
Trauma and Surgical Critical Care	*1*	*12*	*6*	*0.2*
Vascular Surgery	*1*	*12*	*6*	*0.2*
Thoracic Surgery	*1*	*12*	*6*	*0.2*
Colorectal Surgery	*1*	*12*	*6*	*0.2*
Plastic and Reconstructive Surgery	*1*	*12*	*6*	*0.2*
Total		72		**12**

While using their skills to strengthen clinical programs and mentor Rwandan post-graduate trainees, expatriate clinicians would undergo their own process of career development and learn the 'art' of Global Health implementation. It is envisioned that collaboration with foreign medical institution would also lead to progressive improvement in infrastructure, diagnostic and therapeutic tools, which would further improve quality of care and therefore of training in teaching referral hospitals and selected teaching health districts. This latter consideration is however beyond the scope of this document and was not taken into account in projections presented here. Adequately staffed and equipped health facilities in Rwanda would be better served to receive post-graduate trainees from the aforementioned foreign academic institution and further enhance mutual learning among all parties involved through cross-pollination and functional interactions during patient care.

Existing twinning programs and partnerships such as those mentioned in Chapter 3 should serve as an interesting starting point to further define the role of foreign institutions in strengthening the education and training of health care providers. E-learning tools could complement the work of expatriate clinicians, particularly if their number remains too low to ensure the desired level of mentoring and supervision for Rwandan post-graduate trainees and if teaching facilities lack the infrastructure for proper learning in specific areas of medicine (i.e. Radiology or Pathology).

After a preliminary phase of significant investment by foreign academic institutions, by 2017, Rwandan specialist would be able to take over the training duties and foreigners would be progressively phased out.

It is estimated that 300 specialists would be trained over 7 years under the expatriate mentorship program. This is however not sufficient to fill the country's gap, which will call for sending physicians abroad for training.

Sending Physician Trainees Abroad

To rapidly meet the staffing goals outlined above, it will be necessary to send physicians abroad both for the six specialty trainings available in Rwanda and for the remaining specialty and sub-specialty trainings that are not now available in country. Training abroad is clearly more expensive but bears several advantages as well. Among these are opportunities to learn in and be exposed to a different medical setting, the potential for international exchanges of knowledge and experiences, and the creation of fruitful and long-standing relationships with foreign academic institutions.

Roughly 195 specialists and 132 sub-specialists would need to be trained abroad under this program. Together with the in-country residency program, this would fill the gap outlined in Table 3 above. Altogether 627 specialists and sub-specialists would be trained in-country and abroad over the 7 year period[9].

Our cost projections are general and further analysis of costs will be needed depending on the duration of each post-graduate training program and the host countries where trainees will be sent. The implementation of this strategy to fill the specialty and subspecialty gap in Rwanda through post-graduate training abroad will require a more detailed investigation of bursaries, scholarships, and possible partnership agreements between RUHMS and foreign academic institutions.

[9] 300 specialists trained in-country + 195 specialists trained abroad + 132 sub-specialists trained abroad.

The figures below were calculated based on existing arrangement with foreign medical school (e.g. South Africa) where Rwandan students are entitled to pay the same tuition as local residents ($3'500 per year). It is likely that all residents would not be able to benefit from these agreements and would have to pay full tuition in other countries. The figures below represent an average of both scenarios. It is important to note that this strategy assumes students will be sent to institutions within the region, not in Europe or the US. It was felt that this would be too costly, and may delay the process due to complicated administrative and legal hurdles.

TABLE A-5 – Aggregate cost of sending trainees abroad[10](US$ 000)

	2010	2011	2012	2013	2014	2015	2016	Total
Specialties	$2,600	$5,200	$7,800	$7,800	$5,200	$2,600	$1,300	**$32,500**
Sub-specialties	$1,320	$2,640	$3,960	$3,960	$2,640	$1,320	$660	**$16,500**
Total	**$3,920**	**$7,840**	**$11,760**	**$11,760**	**$7,840**	**$3,920**	**$1,960**	**$49,000**

Introduction of "Medical Assistants" in Health Centers

In addition to referral and district hospitals, the issue of how to staff health centers is central to Rwanda's health system strengthening effort. In addition to increasing the quantity and quality of nurses, health centers may be better served by the additional presence of other types of health care providers such as a newly graduated physician waiting to enter specialty training or a medical assistant (MA).

Medical Assistants represent a rapid and cost-effective way to supplement the insufficient number of physicians at the primary health care level. The country is however not committed to have MAs be a long-term solution and will therefore not invest in building training capacity in-country. The longer term vision is to have certified Family Medicine physicians staffing health centers and progressively replacing MAs being phased out or retrained in other areas (e.g. technicians, nurses, allied professions, etc.).

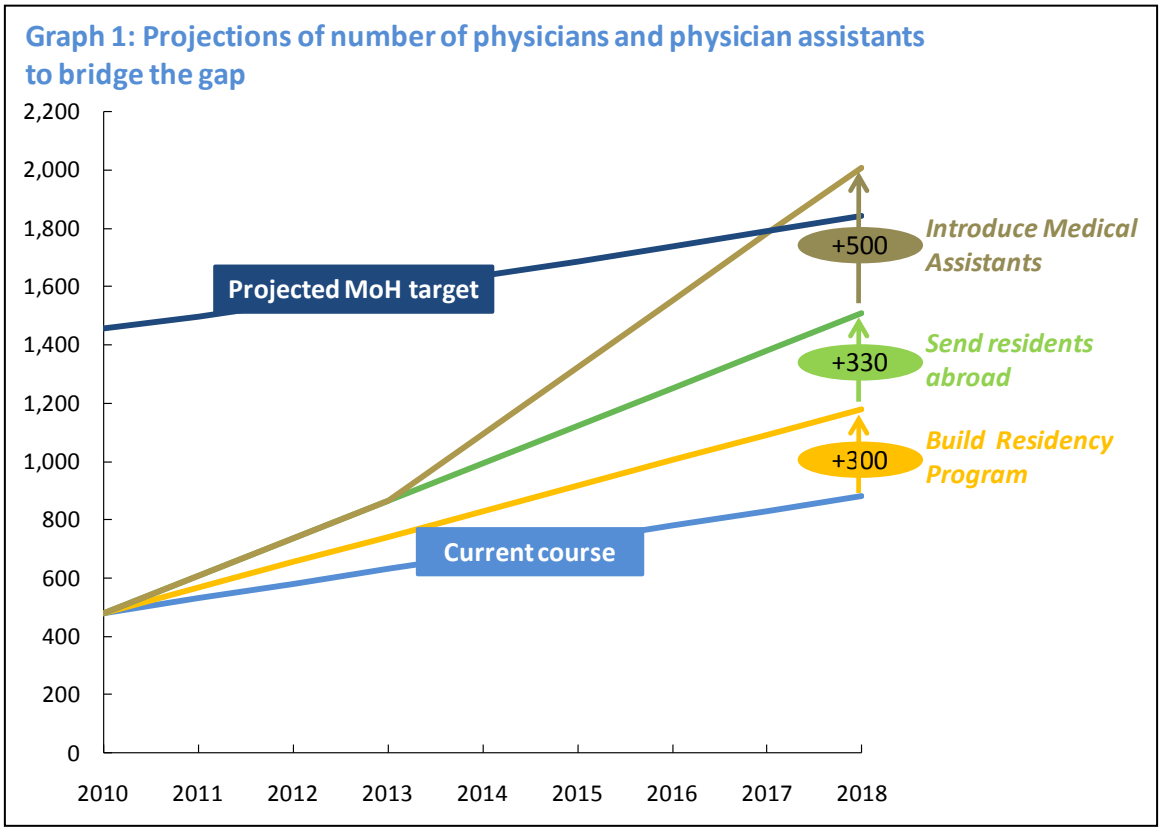
Training of MAs would present many of the same challenges met with physicians. There is currently no formal training program for MAs in-country and therefore Rwanda will have to send trainees abroad to neighboring countries such as Uganda, Kenya, and Tanzania, where MAs are a recognized part of the health workforce and programs for their education exist. Training is typically over three years and the following table assumes an intake if 125 students per year. It is estimated that 500 medical assistants could be trained in a 7 year period at an average cost per student per annum of $10,000 or a total cost of $30'000 per student for the full three year program. After training the initial group of 500 to create a critical mass of MAs, a small number would continue to be trained yearly to replace losses due to attrition.

[10] The fully loaded cost of sending trainees abroad, both for specialists and sub-specialists has been estimated at $40,000 per year per trainee. Initial investigations in conjunction with the Ministry of Health and the Student Financing Agency of Rwanda have shown that in the specific case of South Africa, with whom the GoR has an agreement for receiving Rwandan students, the fully-loaded cost might be substantially lower. The higher figure has been retained however as not all students will be able to study in South Africa, nor may this be desirable. However, at this time it is not envisioned Rwandan students would be able to go to US-based institutions, because of several important hurdles (immigration, malpractice concerns, licensing, recognition of Rwandan medical school by ECFMG, USMLE examination requirements, residency program requirements-ERAS/NRMP)

TABLE A-6 – Cost of training medical assistants in Uganda, Kenya or Tanzania

Training Abroad	2010	2011	2012	2013	2014	2015	2016	Total
MAs # per year	125	250	375	375	250	125	25	525
Cost (US$000)	**$1,250**	**$2,500**	**$3,750**	**$3,750**	**$2,500**	**$1,250**	**$250**	**$15,250**

The following graph summarizes the impact of these strategies over time in order to meet Rwanda's full physician and medical assistant's staffing needs[11].



Summary of costing for Physicians and Medical Assistants

In addition to the costs associated to each strategy, the financial projection must take into account the increase in salaried personnel. In addition, as the skill-mix of physician would be of a higher qualification level, salaries per person will be higher as well. This projection however does not include any potential future increase in salary over and above the currently prevailing amounts paid to physicians in Rwanda. Even at these salary levels, the increase in quantity and quality of physicians will impact the on-going financial commitments that will need to be met.

TABLE A-7– Assumed salary figures in this projection

Salaries	Monthly net salary (RWF)	Monthly net salary (USD)
Medical Assistant	231,500	406

[11] MOH targets were projected to grow according to population growth, or nearly 3% per annum according to the National Institute of Statistics, 2010 target is 1455.

General Practitioner	313,500	550
Specialists	679,250	1,192
Sub-specialists	771,875	1,354

In summary, if fully implemented, these strategies will result in the training of 627 specialists and subspecialists over seven years. 495 physicians will specialize in one specialty among the "big 6": Internal Medicine (93), Pediatrics (90), Surgery (94), Obstetrics and Gynecology (90), Anesthesia (85), and Family Medicine (43) with the exact distribution of among the specialties dependent on the national burden of disease and epidemiological need. 300 of the 495 will be trained in country and 195 will be trained abroad. An additional 132 physicians will be trained abroad in other specialties (i.e. not one of the "big six") and subspecialties. And a new cadre of 500 Medical Assistants will have been created.

The total cost of the scale-up envisioned in this projection inclusive of additional salaries for newly graduated doctors over seven years will be $115 million (RWF 65 billion). From this total cost could potentially be deducted the already funded Family Medicine program ($144'000 per year), however it is included in the table below for comprehensiveness and because there is no guarantee this program will continue over time or scale up to meet the needs.

We expect the additional HR capacity and salaries could be fully financed by the government budget by the time this scale-up plan comes to an end – within the next 7-10 years. Indeed, the country's GDP has been growing by 8% in the last few years. Even under conservative scenarios, we expect it to continue to grow by at least 4-6% per year, thus allowing for continued year-on-year growth of the government's budget. It is further anticipated that the share of the national budget that is dedicated to health will increase from 10% to 15% within that same timeframe. And within the health sector budget, the share dedicated to cover essential human resources for health salaries is also expected to increase, following past trends. Therefore we expect salaries, including the increases due to higher skills, to be entirely financed from government resources faster than the rest of the health system[12].

TABLE A-8 – Costs for all proposed interventions for Physicians (US$ 000)

Total Cost	2010	2011	2012	2013	2014	2015	2016	Total
In-country residency program	$864	$2,160	$2,160	$2,160	$2,160	$1,440	$864	**$11,808**
Sending residents abroad	$3,920	$7,840	$11,760	$11,760	$7,840	$3,920	$1,960	**$49,000**
Medical Assistants training	$1,250	$2,500	$3,750	$3,750	$2,500	$1,250	$250	**$15,250**
Additional salaries	$92	$273	$409	$2,836	$7,397	$11,957	$16,396	**$39,360**
Total	**$6,126**	**$12,773**	**$18,079**	**$20,506**	**$19,897**	**$19,287**	**$18,556**	**$115,418**

[12] A recent analysis performed with the assistance of the Clinton Health Access Initiative showed that Rwanda's health system could be self-financed within the next 15-20 years. This was based on the Health Sector Strategic Plan costing; assumptions about macro-economic growth; national budget projections; and from Rwanda's Health Sector Joint Annual Work Plan that compiles all sources of available funding for the health sector. According to these projections, salaries for all human resources for health as per the scale-up plan would make up slightly less than 50% of the overall health sector national budget.

A.2 Nurses

Overcoming the shortage of nurses in Rwanda requires radically re-thinking the current approaches to nursing education. Nursing schools need to find alternative methods of upgrading A2 nurses in addition to conventional training, including e-learning methods as tried successfully in Kenya[13]. E-learning alone would not be sufficient due to limited capacity of nursing schools to absorb a large additional number of students. Indeed, despite the fact that e-learning format requires significantly less time of physical presence, physical presence is still required. Therefore, additional training centers also need to be considered to increase the capacity of student intake per year in order to meet the national objectives.

In the longer-term, post-A1 graduation training and/or specialization in advanced competencies in a number of domains as well as ongoing mentoring and supervision at the workplace will be required. Nurses would be able to attend defined trainings in order to be able to qualify for positions that require specific skills or knowledge. This could be considered as a second phase to this HRH strengthening strategy, and is not included here.

E-learning

TABLE A-9 – Operational cost for e-learning program in one nursing school, steady-state (US$)

	Quantity	Unit cost*	Total
HR			**464,871**
A0	*3*	*16,170*	*48,511*
A1	*5*	*11,355*	*56,774*
M&E Researcher	*0.5*	*13,643*	*6,822*
Accountant	*1*	*16,402*	*16,402*
IT support	*1*	*13,381*	*13,381*
Manager	*1*	*16,874*	*16,874*
Drivers	*2*	*6,793*	*13,585*
Examiners	*n/a*	*n/a*	*1,410*
Replacements	*50*	*5,822*	*291,112*
Equipment			**62,193**
Laptops	*50*	*528*	*26,385*
Internet	*7*	*1,346*	*9,423*
Accessories	*50*	*132*	*6,596*
Other equipment	*50*	*132*	*6,596*
Vehicle maint. and fuel	*2*	*6,596*	*13,192*
Operations			**72,935**
Per diems (mission fees)	15	*1,282*	*19,223*
Transport	*15*	*1,696*	*25,443*
Room and board	*50*	*565*	*28,270*
Total			**600,000**

*salaries include benefits, performance-related bonuses etc.

Nursing schools have developed e-learning lectures based on the standard curriculum, which is organized as a part-time distance learning program, allowing nurses to remain at their usual place of work for

[13] AMREF program in Kenya (e-learning nurse curriculum.).

most of the time, thus avoiding creating a critical shortage in active nurses. The program would therefore be extended to three years, compared to two for the full time schedule and combine face-to-face time (40%) and distance learning or e-learning (60%). Face-to-face time includes interactive sessions, skill training and direct bedside mentoring and teaching, whereas distance learning consists mainly of readings and assignments to be submitted electronically from the workplace

The lectures have been designed to require minimal equipment and infrastructure upgrades, taking into account the technological limitations in the country. Lectures are currently mainly in an off-line format, online time being used mainly for submitting assignments and communicating with teachers by email. Additionally, if power cuts are a major problem in some areas, lectures can also be printed, allowing nurses that work in particularly remote areas to benefit from the program as well. It is envisioned to develop e-lectures in a more interactive format as electricity and internet become widely and reliably available over the coming years.

Table14 provides an example of the breakdown of requirements, including teachers/mentors (A0 and A1 nurses) for all teaching centers to roll out e-learning across all facilities. This budget represents the yearly operational costs at steady state (after year 3) for one school, based on estimates provided by the nurse council and the nursing schools. The yearly operational cost for one school is approximately US$ 600,000.

In the table below, we have provided an overview of the operational costs and investments required for nursing school to be able to launch the e-learning program in the five existing nursing schools. At this point, significant investment is required as these schools do not have the capacity to accept more students with their current infrastructure. Roughly US$1.2 million is needed per school to cover infrastructure and technological upgrades.

TABLE A-10 – 7-year e-learning costing overview (5 existing nursing schools)

E-learning	2010	2011	2012	2013	2014	2015	2016	Total
# graduates e-learning	0	0	250	250	250	250	250	1,250
Operations (US$ 000)	$1,800	$2,400	$3,000	$3,000	$3,000	$3,000	$3,000	$19,200
Investment (US$ 000)	$ 2,500	$ 2,000	$ 1,000	$ 500				$ 6,000
Total	**$4,300**	**$4,400**	**$4,000**	**$3,500**	**$3,000**	**$3,000**	**$3,000**	**$25,200**

According to the preliminary projections of the nursing schools, e-learning could add another 50 nurses per school, or 250 nurses total upgraded every year, which would be in addition to the 100 nurses upgraded through conventional teaching methods. This would accelerate the process but still miss the target, as it would take about 25 years to complete the upgrading process.

New facilities/Additional training centers

As mentioned above, the upgrade process should be accelerated, but capacity of nursing schools to accept more students is limited. Ideally it would be preferable to avoid investing heavily in new infrastructure as the upgrading process is limited in time and it could lead to at least two negative consequences: firstly, additional infrastructure might not have a useful purpose after the nurse upgrade is completed and secondly, building up the facilities would delay the process significantly. These reasons are behind the idea of using existing training

facilities[14] at two or three District Hospitals. These facilities already have sufficient training space and accommodation to accept one class of 50 nurses per year.

Nursing schools have recently been grouped under the umbrella of the MOH and will be administered and coordinated centrally by the national nursing task force, even if each school retains its local governance structure. The additional training centers would therefore merely represent an off-site location of nursing schools and no parallel structure will be created.

Training centers would follow the e-learning model and host rotating teachers from nursing schools. Training centers are located within District Hospitals, allowing for easy access to patients and bedside mentoring. In the current vision, training centers would become operational rapidly and would serve as pilot sites for all e-learning facilities. The costing takes into account travel and accommodation requirements for nurses and teachers, as well as all other costs included in the e-learning model.

In the table below, we have provided an overview of the operational costs and investments required to start training in 2 additional training centers. Investments required is much lower than for nursing schools, as these centers already have adequate infrastructure and accommodation for nurses.

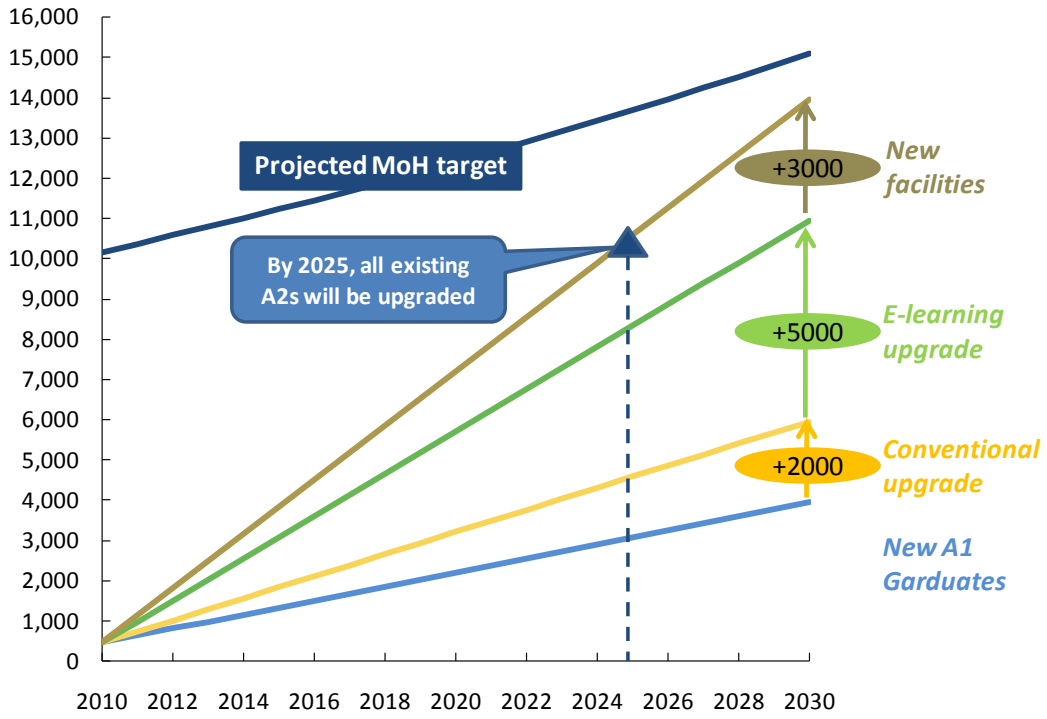
TABLE A-11 – 7-year training centers costing overview (2 new training centers)

Training type	2010	2011	2012	2013	2014	2015	2016	Total
# graduates	0	0	150	150	150	150	150	750
Operations (US$ 000)	$ 800	$ 1,000	$ 1,200	$ 1,200	$ 1,200	$ 1,200	$ 1,200	$ 7,800
Investments (US$ 000)	$ 500							$ 500
Total	***$1,300***	***$1,00***	***$1,200***	***$1,200***	***$1,200***	***$1,200***	***$1,200***	***$8,300***

The addition of three new training centers would also raise the total number of nurses being upgraded per year to 400[15], thus allowing the country to reach the MOH target of upgrading all A2 nurses within 15 years. Further efforts will be required to meet the longer term overall need of nurses.

[14] Suitable training facilities are found in Rwinkwavu, Kirehe and Butaro (as of June 2010) hospitals.
[15] 50 nurses per site (50 for the five nursing schools and three training centers)

Graph 2: Projections of number of nurses to bridge the gap



Summary of costing for nursing education

The overall financial implications of the above strategies need to take into account an increase in salaried personnel. In addition, as the qualification level will be higher, average salaries per nurse will be higher.

TABLE A-12 – Assumed base salary figures for nurses

Salaries	Monthly net salary (RWF)	Monthly net salary (US$)
A0 nurse	201,615	354
A1 nurse	144,818	254
A2 nurse	92,315	162

As the table shows, salary cost would increase by 50% per nurse upgraded from A2 to A1. For example, for nearly 2000 nurses graduating over the first 7 years, this would translate into about $20m of cumulative salaries, which is a major cost driver to be included in long-term budgeting. The figures in table 16 do not include additional costs, such as taxes and health insurance, but these are already factored into the table below, which summarizes all costs for the nursing upgrade strategy. As the figures show, there is a ramp up phase in the first two years. The full training potential of the schools and associated training centers reaches steady state as of the third year. By then, all seven e-learning facilities would jointly upgrade 400 A1 nurses per year at a cost of $4.2m per year or about $ 10’000 per nurse.

TABLE A-13 – 7-year nursing upgrade costing overview (US$000)

Training type	2010	2011	2012	2013	2014	2015	2016	Total
E-learning in 5 existing sites	$1’800	$2’400	$3’000	$3’000	$3’000	$3’000	$3’000	$19’200

Two new training centers	$800	$1'000	$1'200	$1'200	$1'200	$1'200	$1'200	$7'800
Increased salaries	0	0	$1'383	$2'776	$4'150	$5'533	$6'916	$20'758
Infrastructure upgrade across 7 sites	$3'000	$2'000	$1'000	$500	0	0	0	$6'500
Total cost	**$5'600**	**$5'400**	**$6'583**	**$7'476**	**$8'350**	**$9'733**	**$11'116**	**$54'258**

Continuing education

Not included in the costing of this plan is a more long-term strategy that would require further evaluation in a later phase of the program. This model envisions a close relationship and synergy between the teaching centers for physicians and for nurses. Ideally, both professions would benefit from close collaboration with foreign medical institutions to develop centers with high quality levels of clinical teaching. This would allow the leveraging of scarce teaching resources within dedicated teaching facilities in some districts. Dedicated district hospitals[16] which still need to be indentified could serve as training centers for nurses in a first phase, but could also develop into full scale teaching health districts for both physicians and nurses.

In the envisioned model, these hospitals would train nurses beyond the core nursing fields[17]. They would provide specialized training around specific cluster of diseases and also support nurses working as supervisors for clinical programs addressing those key priority areas:

- Acute care
  - Integrated Management of Acute Care (IMAI)
  - Integrated Management of Childhood Illness (IMCI)
  - Malaria
  - Inpatient medicine
- Chronic care
  - Non-communicable diseases (NCD)
  - Infectious diseases (HIV and TB)
  - Neuropsychiatry
- Women's health
  - Pre-natal care (PCN)
  - Maternity
  - Family Planning (FP)
- Community health
  - Vaccination
  - Nutrition
  - School health
  - Community health

[16] At this time these could include Musanze (Ruhengeri Hospital), Muhanga (Kabgaye Hospital), Ngoma (Kibungo Hospital), Nygatare (Nyagatare Hospital), and Gicumbi (Byumba Hospital). Other hospitals like Southern Kayonza (Rwinkwavu Hospital), Burera (Butaro Hospital), and Kirehe (Kirehe Hospital) could also be selected for this function.

[17] Adult medicine, Pediatrics, Maternity, Post-surgical nursing

These specially trained nurses would serve as supervisors[18] in their area of expertise and would themselves be responsible for providing decentralized In-Service Training, mentoring, and supervision to nurses working at health centers. This component will be refined in the nurse strategic plan being developed by the nursing task force.

A.3 Health managers

At the District Hospital level, there should be one manager (Hospital Administrator) per hospital to share leadership with the Medical Director. This translates into 40 Hospital Administrators at the district level, and 4 for the reference hospital level. As for District Health Managers, while there are no gaps in the actual positions, the quality of these personnel needs to be significantly improved[19].

Create a new cadre of Hospital Administrator

A new cadre of Hospital Administrator could be trained over a 2-3 year period. A lot of work has already been done by the School of Public Health to plan for this training, and this program should build on that work. Ideal candidates for Hospital Administrator should not be drawn from the pool of existing Medical Directors, but should bring a set of non-clinical management skills to complement the Medical Directors, who should focus on clinical issues. Hospital leadership would therefore be divided between clinical and management aspects, fostering efficient and effective healthcare delivery. The program combines a set of management, budgeting and public health skills that would be best taught through the School of Public Health, in partnership with the school of medicine in parallel to other similar classes currently offered (e.g. Masters in Public Health).

This program will involve partnering with foreign universities, exchange and mentoring programs as well as ongoing support to hospital and district level managers. The new hospital position was included in the costing using a salary assumption based on current professional salaries. The master degree is a two-year program and therefore salaries would start being incurred after two-years. The costs involved include tuition, mentorship, transport and accommodation, and are summarized in the table below.

TABLE A-14 – Introduction of Hospital Administrators (Masters level) (US$000)

	2010	2011	2012	2013	2014	2015	2016	Total
Students #	*22*	*44*	*22*	*2*	*2*	*2*	*2*	
Education Cost	$ 253	$ 506	$ 253	$ 23	$ 23	$ 23	$ 23	$ 1’104
Salaries	$ 0	$ 0	$ 283	$ 566	$ 566	$ 566	$ 566	$ 2’547
Mentoring support	$ 0	$ 0	$ 1’100	$ 2’200	$ 1’100	$ 800	$ 500	$ 5’700
Total	**$ 253**	**$ 506**	**$ 1’636**	**$ 2’789**	**$ 1’689**	**$ 1389**	**$ 1089**	**$ 9’351**

Note: the master degree is a two-year program; students in 2013 and beyond are to replace those lost to attrition

Strengthen Management capacity of District Health Managers

[18] Supervisors already exist in the MOH structure, but are still new and few in numbers

[19] This strategy is still in relative flux as Rwanda presses further ahead on its overall decentralization policy. The role of these managers may have to be further adapted.

For district health personnel, training needs are divided based on current skills and competencies. First, all district health personnel would be required to obtain a masters degree, as required by their position. Secondly, those already holding a master degree would have to take a competency test to determine if they are a fit for their positions. If they do not pass the test, they would be required to go back to study disciplines with weak grades and obtain a certificate degree from the School of Public Health.

In addition to the degrees obtained by managers in the districts, the program would most likely require technical assistance to help put newly acquired knowledge into practice and institutionalize these skills. Based on experiences in other districts this mentoring support would cost around $50'000 per district per year. The following model assumes 10 districts mentored per year for a period of two year each, but this could be phased over a longer period.

In the following model, we assumed that everyone not currently holding a masters degree (i.e. 23 people) would be required to complete one. For the other (7 people) we assumed they would all need to follow the certificate. Mentoring at the district level should also be provided and has been factored in as well.

TABLE A-15 – Training of district health personnel (US$000)

Type	2010	2011	2012	2013	2014	2015	2016	Total
# Masters	*12*	*23*	*11*	*1*	*1*	*1*	*1*	
# Certificate	*4*	*3*	*1*	*1*	*1*	*1*	*1*	
DH (masters)	$ 138	$ 264	$ 126	$ 12	$ 12	$ 12	$ 12	$ 576
DH (certif.)	$ 24	$ 18	$ 6	$ 6	$ 6	$ 6	$ 6	$ 72
Mentoring support	$ 500	$ 1'000	$ 1'000	$ 500	$ 100	$ 100	$ 100	$ 3'300
Total	**$ 662**	**$ 1'282**	**$ 1'132**	**$ 518**	**$ 118**	**$ 118**	**$ 118**	**$ 3'948**

Note: the master degree is a two-year program: Years 2012-2013 and beyond include replacements due to attrition

For district health professionals no new positions will be created therefore salaries have not been included in the model. The cost of tuition, including foreign mentors is estimated by the School of Public Health around USD 5'000 per year. For a full two-year program, including tuition, mentorship, lodging and food, this cost would be around USD 23'000 per student (11'500 per year). For the certificate a conservative estimate of USD 6'000 per student for 6 months was used.

Additionally, another initiative to bolster district management capacity is currently being evaluated and will be submitted in a separate report. This initiative will consider the creation of a new district management team under the supervision of a district medical officer within the MOH. This proposal will follow WHO recommended standards for district management and provide country examples of successful implementation. This initiative could come in addition to the approaches proposed in this document.

A.4 Implementation and financing arrangements

The implementation of these interventions will have tremendous operational implications and involve a massive scale up of human resources and very close coordination and oversight by

the MOH. The process will involve multiple stakeholders, including local and foreign universities, professional schools, implementing partners with international donors, all of which will require a strong project management to keep plans on track. The MOH will thus require a formal focal point through the HRH unit to be able to manage this project. We are in the process of appointing the lead of the new unit, but the latter will require additional capacity building efforts with the support of partners. Ensuring the successful implementation of these strategies will also require long term support - technical and financial – from development partners.

A.5 Potential medical institution partners and modes of engagement

As mentioned above, translating this ambitious scale-up plan requires additional technical capacity and support, mainly from international university partners. These must be selected carefully, ensuring they have the necessary skills required, a long-term commitment and that they share Rwanda's vision. As this proposed strategy moves towards actual implementation, it will be critical that the Ministry of Health and Rwanda's educational institutions have the ultimate say in terms of which organizations to partner with. This section highlights some potential partners; it lays out a few guiding principles of any future partnership; and discusses different modes of practical engagement.

Some potential partners that are already engaged in Rwanda and that could be considered include:

- **Yale University** is currently exploring opportunities to support the MOH in Rwanda. They already have a significant international presence and have for example helped establish the hospital management initiative in Ethiopia. They recently visited Rwanda with a multidisciplinary team and have expressed strong interest in building up health education capacity in this country.
- **Harvard** has been particularly represented through the involvement of Partners in Health (PIH). PIH has been very active in developing health services and infrastructure in three districts in Rwanda. They will most certainly take on a more important role in nurse and physician education going forward and they are actively engaging in those discussions.
- **Tulane University** has been present tin Rwanda for almost ten years and has developed strong relationships with the MOH at the school of public health. They are very keen on exploring any potential way to expand this commitment to Rwanda.
- **University of Colorado, Denver (UCD)** has been working with the Faculty of Medicine (FOM) to support the Family Medicine program and to strengthen the overall quality of medical education provided at the FOM.
- **University of Western Ontario (UWO)**, Rebuilding Health in Rwanda Project. UWO began working with the nursing school at Kigali Health Institute (KHI) in Rwanda in 2005 to train more nurses and high-quality nursing educators.

There are many additional universities in the United States or Canada that have a strong interest in global health and health education, such as **Brown University, Duke University** and **Dartmouth**. Several universities are already actively involved, but the Government of Rwanda would warmly welcome additional institutions for extended partnerships.

In order to meet the full needs of Rwanda's scale-up plan, a consortium of international academic institutions will be required, working in a coordinated and complementary fashion,

and encompassing different types of health-related graduate schools: medical schools, nursing schools, schools of public health.

It is very important to clearly define the general principles of such potential partnerships before going into the details of what it would entail for each stakeholder. Valuable lessons in this regard can be learned by some of the pre-existing partnerships such as the Academic Model Providing Access to Healthcare (AMPATH) consortium in Kenya as well by PIH's experience in Rwanda.

TABLE A-16 – Proposed Guiding Principles for the International Medical Academic Consortium for Rwanda

Guiding Principles
1. All international academic institutions joining the consortium should commit to building a long-term partnership with Rwanda's Ministry of Health and health-related graduate schools
2. Such institutions should support the MOH' s vision and HRH national strategy by providing both material and intellectual resources to strengthen existing programs and drive innovation in still undeveloped areas
3. The foundation of the partnership should rest in the presence of a comprehensive array of strong clinical programs ("lead by care"). Apart from the ethical imperative of responding to patient needs, strong clinical programs in fact represent the ideal foundation for training and research. This process would include investments in infrastructures, therapeutic and diagnostic tools, and both In-Service and Pre-Service Training of health workers
4. All the stakeholders involved should benefit equally from the partnership. • **Patients** will benefit from improved quality of care at all the levels of the health care system (from referral hospitals all the way the community), • **The Ministry of Health** will benefit from the increased number of highly-skilled health care workers, • **Local health-related graduate schools** will benefit from the creation robust training programs and ongoing research collaborations and exchange programs with the US, and • **International academic institutions** will benefit from the presence of overseas teaching facilities driving innovation and research in Global Health and ensuring training in Global Health for their own students
5. The roles and responsibilities of each stakeholder should change over time as the number of highly-skilled Rwandan health workers increases as a result of the partnership (capacity-building and transfer)
6. While developed specifically to meet Rwanda's HRH needs, the general framework of trans-national partnership could readily be applied to other developing countries facing similar challenges and even to areas of development different from health.

On a more practical level, international academic institutions could be engaged in Rwanda in several ways, which are not mutually exclusive. Each one carries advantages and disadvantages. For example, they could:

- Address training of a particular cadre of health care workers
- Address training in a particular field of medicine or public health
- Focus in a specific geographical area of the country and provide comprehensive care and training

Supporting the training of a specific type of health care worker or training in a specific field of medicine or public health would allow international academic institution to focus and become highly proficient on a single important component of HRH training. However, it would also limit their engagement to a single graduate school and a few selected academic departments leaving out other interested parties and preventing the development of comprehensive Global Health expertise within its staff. Furthermore, it could prove to be beyond the capacity of a single academic institution, particularly if the training intervention needs to be scaled up to the whole country. This modality however could help strengthen a particular department at the referral hospital level or graduate school level.

Commitment on the part of an international academic institution to support the Ministry of Health in a specific geographical area by refurbishing health facilities, staffing them with enough qualified clinical mentors, and covering some of the operational expenses, would allow the creation of several model health districts (probably one or two per province). Such health districts would provide high-quality clinical services and also serve as centers of clinical innovation, research, and training for both Rwandans and trainees from the partnering institution. The engagement of the institution would be "holistic" and involve different graduate schools and departments, thus creating true comprehensive Global Health expertise. Furthermore, the creation of what is in effect a twinning program would facilitate exchange programs for Rwandans and the launching of research projects driven by an initially mostly expatriate, but later increasingly local, faculty. Overall, this modality is more in line with the general principles of partnership outlined above compared to a more vertical type of engagement. However, it is also associated with higher costs and with a much broader number of stakeholders, which may complicate things in the short run.