Kenya Health Workforce Report:

The Status of Healthcare Professionals in Kenya, 2015

Collaborating Institutions

Kenya Ministry of Health (MOH)
Medical Practitioners and Dentist Board (MPDB)
Nursing Council of Kenya (NCK)
Clinical Officers Council (COC)
Pharmacy and Poisons Board (PPB)
Kenya Medical Laboratory Technicians and Technologists Board (KMLTTB)
Kenya Nutritionists and Dieticians Institute (KNDI)
Radiation Protection Board (RPB)
Society of Radiographers of Kenya (SORK)
Public Health Officers and Technicians Council (PHOTC)
Kenya Health Workforce Project (KHWP)
Emory University
U.S. Centers for Disease Control and Prevention (CDC)

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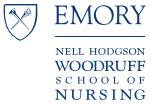




Acknowledgement

In Kenya, health professional regulatory agencies play a significant role towards ensuring excellence in examining the health workforce based on four characteristics namely Availability, Accessibility, Acceptability and Quality. Data collected by health regulatory agencies are crucial in measuring how a country is performing in these areas, determining the scope and nature of gaps, guiding how interventions can improve health workforce regulation, and measuring success of these interventions. Kenya, supported by the US President's Emergency Plan for AIDS Relief (PEPFAR) and the US Centers for Disease Control and Prevention (CDC), developed electronic databases at these regulatory agencies that can provide information to assist in moving towards universal healthcare for all.

These databases, referred to as regulatory human resource information systems (rHRIS), serve as the basis of the data in this National Report on the Status of the Health Workforce in Kenya. The availability, distribution, and accessibility of the health workforce with the relevant skills at a particular period strongly influence the ability of health systems to meet the constitutional requirement of providing quality health services to every citizen. In addition, the aspiration of universal health coverage in the Sustainable Development Goals (SDGs) is largely dependent on a health workforce that is responsive to the ever-evolving needs of health systems.

Factors that influence the demand for health services have a role in shaping the requirements of a health workforce. Changes in population demographics, epidemiological profiles of communities, morbidity and mortality dynamics, and policies, among other factors, influence the demand and supply of health workers. Therefore, strengthening the health workforce through policy, adequate financing, planning, recruitment, training, deployment, and retention is paramount to ensuring everyone has access to a qualified health worker, thus improving the ability of health systems to achieve global and national health goals as prioritized in the new SDG targets.

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- Kenya Ministry of Health (MOH)
- Medical Practitioners and Dentist Board (MPDB)
- Nursing Council of Kenya (NCK)
- Clinical Officers Council (COC)
- Pharmacy and Poisons Board (PPB)
- Kenya Medical Laboratory Technicians and Technologists Board (KMLTTB)
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Abbreviations and acronyms

AIDS	Acquired Immunodeficiency Syndrome
AMR	Adult Male Mortality Rate
BSC	Bachelor in Science
CDC	US Centers for Disease Control and Prevention
CDR	Crude Death Rate
COC	Clinical Officers Council
CPD	Continuing Professional Development
CTMR	Computed Tomography and Magnetic Resonance
GDP	Gross Domestic Product
GOK	Government of Kenya
HIV	Human Immunodeficiency Virus
HSSF	Health Sector Services Fund
IMF	International Monetary Fund
IMR	Live Infant Mortality Rate
IPPD	Integrated Personnel and Payroll Database
JKUAT	Jomo Kenyatta University of Agriculture and Technology
KEMRI	Kenya Medical Research Institute
KEMSA	Kenya Medical Supplies Agency
KES	Kenya shilling
KHHEUS	Kenya Household Health Expenditure Utilization Survey
KHPF	Kenya Health Policy Framework
KMLTTB	Kenya Medical Laboratory Technicians and Technologists Board
KNDI	Kenya Nutritionists and Dieticians Institute
KTB	Kenya Tourism Board
MER	Monitoring, Evaluation, and Reporting
MMR	Maternal Mortality Ratio
MPDB	Medical Practitioners and Dentist Board
NCK	Nursing Council of Kenya
NHA	Kenya National Health Accounts
NHIF	National Health Insurance Fund
NMR	Neonatal Mortality Rate
PACORI	Pan African Congress of Radiology and Imaging
PDERC	Professional Development, Education and Research Committee
PEPFAR	U.S. President's Emergency Plan for AIDS Relief
PHOTC	Public Health Officers and Technicians Council
PPB	Pharmacy and Poisons Board
RPB	Radiation Protection Board
SDGs	Sustainable Development Goals
SORK	Society of Radiography in Kenya
TB	Tuberculosis
TSO	Technical Service Organization
U5MR	Under-Five Mortality Rate
WHO	World Health Organization

Executive summary

This report presents the first-ever comprehensive analysis of the health workforce situation in Kenya based on data collected by the nation's health professional regulatory boards and councils. Health regulatory agencies are government agencies responsible for regulating the training and practice of various health professionals in Kenya. There are eight health regulatory agencies established through acts of Parliament. They include, Nursing Council of Kenya (NCK), Medical Practitioners and Dentist Board (MPDB), Clinical Officers Council (COC), Kenya Medical Laboratory Technicians and Technologists Board (KMLTTB), Pharmacy and Poisons Board (PPB), Public Health Officers and Technicians Council (PHOTC), Radiation Protection Board (RPB), and Kenya Nutritionists and Dieticians Institute (KNDI). Society of Radiographers of Kenya (SORK) is the only professional agency that represents radiographers in any professional forum. SORK vets radiographers for professional regulation in training and practice.

All health professionals are required to be trained in an approved training institution and licensed to practice by their respective regulatory agency, regardless of whether or not they are employed in the public, private or faith-based health sectors. Thus, data from regulatory agency databases provide the most complete picture of the entire health professional workforce.

Regulating the health workforce begins with the accreditation of training institutions, allocating index numbers to all students admitted to undertake a health professional course of study, recommending internships, administering licensing examinations, and recording licensed professionals in the national registry. Regulatory agencies oversee licensure renewal and compliance with the mandatory continuous professional development training requirements, disciplinary actions, and the immigration and out-migration of health professionals. Thus, regulatory agencies provide data not only on the training and entry of new healthcare professionals, but also on the quality and quantity of the actual practicing (active) professional workforce. These data are critical for use in improving workforce management and health program planning.

The regulatory agencies use the regulatory Human Resource Information System (rHRIS) to monitor and collect data on the health workforce. This family of information systems was developed beginning in 2002 for nurses, and 2007 for five other major professions (doctors, dentists, clinical officers, laboratory technicians and technologists, and pharmacists and pharmaceutical technologists). Since systems from the three other regulatory agencies (KNDI, RPB/SORK, and PHOTC) are still under development, only minimal data are reported at this time.

Health training institutions

The majority of Kenya's health professional training institutions are concentrated in major cities such as Nairobi, Kiambu, Mombasa and Kisumu. Of the 47 counties, 36 have at least 1 health training institution. The eleven counties without any health training institution are Busia, Elgeyo-Marakwet, Isiolo, Kajiado, Laikipia, Lamu, Marsabit, Mandera, Taita Taveta, Tana River, and Wajir Counties. The government of Kenya is the major sponsor of health training institutions in Kenya with control of 49.3%, while faith-based institutions comprise 24.3% and private sponsored institutions comprise 26.4% of health training institutions in Kenya. As of 2015, Kenya had numerous public, private and faith-based

institutions and programs accredited to train health workers, including 102 for nurses, 36 for clinical officers, 10 for doctors, 2 for dentists, 42 for laboratory technologists and technicians, and 32 for pharmacists and pharmaceutical technologists.

Indexing of students entering training schools

Three of Kenya health professionals' regulatory agencies (i.e. NCK, COC and KMLTB) index new students, or track their entry into pre-service education as health professional students. Other regulatory agencies have just begun to index new students. In the last ten years, 30,993 nursing students were indexed after admission in various nursing programs. In 2015, 280 certificate-level nursing students were indexed, 3,944 diploma-level, and 604 degree-level nursing students were indexed. There has been a rise in nurse indexing figures, likely due to the establishment of new nurse training programs and institutions.

The COC reports a declining trend on indexing of students undertaking diploma in clinical medicine partly because of more stringent regulation of training institutions; however, there is a rising trend in indexing of degree-level clinical medicine students as new programs are being opened. However, the total number of indexed clinical officers has declined for the last five years from a high of 1,833 in 2011 to a low of 1,254 in 2015.

The KMLTTB reports a twofold increase in the number of indexed medical laboratory professionals within the last 3 years. There were 8,095 students enrolled into medical laboratory and technologists (MLTs) training institutions at pre-service in Kenya during the period 2010 - 2015. Of these, 4,653(57.5%) were enrolled into diploma program, 2,124 (26.2%) in a certificate, and 1,318 (16.3% %) in a degree program.

The Pharmacy and Poisons Board (PPB) indexes students admitted to training institutions but has experienced challenges in tracking the numbers. To estimate the training capacity, the number of pharmacists and pharmaceutical technologists that graduated in each of the 3 years for which data were available indicates that 827 pharmaceutical technologists graduated in 2013, 793 in 2014 and 825 in 2015. In 2013, 253 pharmacists graduated, 175 in 2014, and 219 in 2015.

Although the MPDB has only recently begun indexing, new students entering training can be estimated by the number of students graduating each year. The number of medical doctors graduating almost doubled from 287 in 2006 to 501 in 2015, giving an average output of 466 doctors per year. The number of dentists graduating in a year averages 43 dentists annually with a high of 60 in 2013. This increase in medical and dental graduates is likely due to the increase in number of medical and dental training schools in Kenya from 2 in 2006 to 10 in 2015.

Internships

Only bachelor's trained nurses (BScNs), doctors, dentists, clinical officers (diplomas and BSC), nutritionists and pharmacists are required to complete a 1-year internship following graduation. All other professionals enter the labor market immediately after graduation, but their clinical or other practical experience/internship is part of their training curricula. At least 40 of the 47 counties in Kenya have an approved internship center for at least one profession, but only 10 (21.3%) counties have internship centers for all 6 professions. Foreign-trained medical students applying for licensure in Kenya are also required to complete an internship. Application for internship by foreign-trained medical students is on the decline. The increase in number of medical institutions in Kenya may reduce the demand for Kenyans to train outside the country.

Licensing examinations

The NCK, COC, PPB, and KMLTTB require all qualified students (i.e. new graduates that completed internship, where required) to pass a national licensing examination to receive a license for clinical practice. This means all nurses, clinical officers, pharmacists, pharmacy technicians, laboratory technologists, and laboratory technicians take nationally standardized licensure exams, enabling them to practice. MPBD only requires licensing exams for foreign-trained medical students. Kenyan-trained medical doctors and dentists are not currently required to take entry-to-practice exams prior to licensure. Regulatory agencies experienced an increase in the number of applications for qualifying examination, given the increase in health professional students.

Newly registered

There is an increasing trend in the registration of health professionals, except for pharmacists, whose numbers have fluctuated. From 2006–2015, 19,994 newly qualified nurses were registered with NCK to practice in Kenya. The annual number of newly qualified nurses entering the labour force increased by 68.5% from 1,745 in 2006 to 2,941 in 2015; the annual number of newly qualified doctors entering the workforce doubled from 2[illegible]n 2006 to 611 in 2015. A similar rise was seen among dentists, with 52 dentists registered in 2015 compared to 25 dentists in 2006. The annual number of new qualified clinical officers entering the labour force increased by 45.9%, from 751 in 2011 to 1,395 in 2015. However, the number of newly registered pharmaceutical technologists has been fluctuating between the year 2011 and 2015 from a high of 994 in 2011 to a low 399 in 2013. In 2015, 857 pharmaceutical technologists were registered. However, the number of newly registered pharmacists maintained a steady rise over the period. The proportion of medical laboratory technologists entering the workforce has been increasing over the years, from 531 in 2011 to 1,344 in 2015.

Ever-registered

The majority of ever-registered health professionals in Kenya are nurses. There are a total of 51, 649 nurses below 60 years of age who have been ever registered compared with ever-registered medical doctors (9,497), dentists (1,066), clinical officers (13,913), medical laboratory technologists (6,626) and medical laboratory technicians (4,445), pharmacists (2,377), and pharmaceutical technologists (7,243) in Kenya.

Retention/currently practicing

The retention of health professionals represents the active health workforce. Retention is based on the renewal period established by each regulatory agency. For example, nurses renew their licenses every 3 years. From 2012 to 2014, NCK issued 31,896 renewal licenses for nurses practicing in Kenya. The ratio of currently practicing nurses to population in Kenya is 8.3 nurses per 10,000 population compared with the WHO recommendation of 25 nurses per 10,000. By 2015, Kenya had 5,660 doctors and 603 dentists retained in the country which translated to approximately 1.5 doctors and 0.2 dentists to 10,000 population, against the WHO recommended minimum staffing level of 36 doctors per 10,000 population.

There were 10,562 clinical officers retained in 2015; 1,616 pharmacists and 4,671 pharmaceutical technologists from non-governmental facilities, and 5,203 medical

laboratory technologists and 3,213 medical laboratory technicians. This translates to 2.7 clinical officers and 2.2 medical laboratory officers per 10,000 population. The ratio of pharmacists and pharmaceutical technologists to population could not be fully determined using retention data since only those from non-governmental facilities are required to renew. Data from Integrated Personnel and Payroll Database (IPPD) was added to the PPB retention data to calculate active pharmacists practicing in the country. Based on this, the pharmacists to population ratio in Kenya is 0.5 per 10,000 while that of pharmaceutical technologist is 1.2 per 10,000 population.

Deployment by county

There is large disparity in health workforce distribution across the country, which is influenced by demographics, number of health care facilities and epidemiological profile of individual counties. For example, the five counties with the highest ratio of nurses below age 60 to 10,000 population working in all sectors are Nairobi (9.7), Uasin Gishu (8.5), Tharaka Nithi (7.9), Isiolo (5.2), and TaitaTaveta (5.0); while the bottom five counties with the fewest nurses per 10,000 population include Mandera (0.1), Wajir (0.2), Tana River (0.2), Nandi (0.4), Samburu (0.5), Narok (0.8), Turkana (0.9) and Busia (0.9). Homa Bay County has not attained the WHO 2030 estimates requirement of nurse-to-population ratio of 25 per 10,000 population, despite increased deployment of nurses to that county to respond to the HIV epidemic.

Most doctors are in Nairobi and other urban areas, yet most Kenyans live in rural areas. For instance, with only 8% of the population, Nairobi has 32 % of the doctors whereas Nyanza region with 14 % of the population with only has 9% of the doctors. Nairobi was leading with 9.5 doctors and 1.1 dentists per 10,000, followed by Machakos, Mombasa, Kiambu, and Uasin Gishu. The five counties with the highest ratio of clinical officers below 60 years of age per 10,000 population are Nyeri (7.3), Kisii (6.9), Baringo (6.7), Elgeyo Marakwet (5.2), and Busia(4.4), while the bottom five counties with few clinical officers per population include: Turkana (0.3), Mandera (0.6), Garissa (0.6), Wajir (0.6), and Tharaka Nithi (0.7).

The top five counties with the highest ratio of pharmacists from non-government sector per 10,000 population are Nairobi (1.9), Laikipia (1.3), Mombasa (1.0), Lamu (0.7), Kisumu, and Embu (0.6). Fifteen counties do not have any pharmacists. Nairobi has the highest ratio of pharmaceutical technologists to its population, i.e. 3.6 technologists per 10,000, followed by Mombasa (3.0), Uasin Gishu (2.8), Kiambu (3.9), and Kajiado (2.5). Of the 3,800 medical laboratory technologists, and 1,977 medical laboratory technicians whose home county is indicated, Nyandarua County contributes the highest number of medical laboratory technologists (762) as well as technicians (348), with a ratio of 12.8 technologists and a ratio of 5.8 technicians. Nyandarua is followed by Laikipia with 5.2 and 1.7 technologists and technicians per 10,000 population respectively.

Homa Bay County has the highest prevalence of HIV in the adult population of 27.1% (2014) yet has a ratio of 9.3 health professionals per 10,000 population, while, Lamu and Nyeri counties with prevalence of 4.1% and 4.4% have a ratio of 23.5 and 19.5 health professionals per 10,000 population respectively. Of the 8 counties targeted by PEPFAR for scale-up towards saturation by the end of FY17, 4 (50%) have HCW density of less than 10 health professionals per 10,000 population.

Attrition

Attrition is not well-tracked within the regulatory agencies—a problem revealed by this report. The causes of attrition among health professionals in the workforce include disciplinary actions, out-migration, resignations, retirement, and deaths. Information on attrition of health professionals on these major causes of attrition was not available in detail in rHRIS during the preparation of this report. However, the report considered data sourced from a related database belonging to Afya Sacco (Afya Cooperative Savings and Credit Society)[1] which captures information on demographics of its members who retire and also tracks those who die, retire, or out-migrate. These data were used to complement the information that was provided by the regulatory agencies on intent to out-migrate for nurses and pharmacists, and deaths reported for clinical officers as permanent attrition.

Between 2004 and 2015, 482 nurses had intended to work in other countries. The top five preferred countries were USA (54.4%), followed by Namibia (16.2%), Australia (11.4%), Canada (3.8%) and UK (2.9%). The Clinical Officers Council had captured 108 cases of permanent attrition by death. From 2008 to 2015, the PPB found that a total of 107 pharmacists intended to out-migrate. The top five leading destination countries were Canada (24), UK (22), Australia (13), USA (12), Namibia (10) and South Africa (10).

In summary, the findings noted an increase in training outputs and productions of health workers in the country across all six cadres analyzed; except for pharmacists. This observed increase in training output for healthcare professionals probably explains the relatively young workforce within most cadres. Although previously, outmigration was a factor in nursing workforce attrition, outmigration no longer appears to be a significant contributor to HCW shortage.

Implications for HRH planning and investments

Findings from this report indicate that Kenya has taken great strides in the past five years to increase the supply of licensed and active health professionals. However, the number of health professionals is still far below what is recommended in the Workforce 2030 report, which specifies the current WHO recommendations. Workforce 2030 provides new recommendations for ratios of healthcare professionals per population, based on the health workforce requirements for universal health coverage. Using a Strategic Development Goals (SDGs) index, which includes coverage for non-communicable diseases, WHO estimates that 44.5 physicians, nurses, and midwives per 10,000 population will be needed to meet the SDGs by 2030. Using this same indicator and including clinical officers as well as doctors, nurses and midwives, Kenya's ratio is only 13.8 per 10,000 population.

Achievement of universal access to health, an aspiration of SDGs, will be possible when health professionals' density is increased to meet the health demands of the fast-growing population. As of 2015, Kenya had a population of approximately 46 million with a growth rate of 2.7%. The fertility rate in Kenya is 4.32 with a crude birth rate of 34.9 per 1,000 population and rising life expectancy of 61.71 years (UNICEF, 2015). The health workforce will need to grow in proportion to the growing population.

To address future health workforce needs, the Ministry of Health launched the Devolved Human Resource Management Policy on Human Resources for Health (2015). Although this policy does not outline a strategy on health workforce education, it provides guidelines on recruitment, deployment, tracking, and retention of health professionals. This report, when produced on an annual basis, can be used to benchmark the country's progress towards meeting its health workforce goals.

1. Introduction

1.1 Importance of the health workforce

In its 2013 report *A Universal Truth: No Health without a Workforce*, WHO established that 44.6% of 186 countries with available data did not meet a minimum threshold of 22.8 skilled health professionals (midwives, nurses and doctors) per 10,000 population as recommended by *2006 Word Health Report*[1]. Of countries that did not reach the minimum, 70% were from Africa. Sub-Saharan Africa has only 3% of global health workforce, despite being home to 11% of world's global population, and 24% of the global disease burden in the year 2007[2]. In addition, 57% of countries in which fewer than 80% of births were attended by skilled birth attendants were also from Africa[1]. Kenya is among those African countries that did not meet either minimum threshold.

However, Africa is leading with the exponential growth rate in numbers and density of skilled health workers, which, if supported with long-term sustainable plans, political commitment, the establishment of essential data, and adequate investments, will ensure universal access to skillful, motivated health workers in strong healthcare systems[1]. Hence, countries should review education, registration, monitoring, and management of their health workforce in light of epidemiological and population growth trends. The pressing health needs of health care cannot be addressed without establishing a reliable workforce for today and the future[3].

The 2013 WHO Report offers a useful framework for examining the health workforce based on four characteristics:

1. **Availability:** an adequate number of competent health professionals, distributed according to the needs of the population.
2. **Accessibility:** equitable distribution of health professionals and facilities in terms of travel time, hours of operation, direct and indirect costs of services, and disability-friendly infrastructure.
3. **Acceptability:** a professional workforce that is respectful, flexible, and trustworthy.
4. **Quality:** a workforce that is adequately trained, has provisions for continuous training, and is perceived as competent by the population it serves.

In Kenya, health professional regulatory agencies play a significant role towards ensuring excellence in these four areas. Data collected by health regulatory agencies are crucial in measuring how a country is performing in these areas, determining the scope and nature of gaps, guiding how interventions can improve health workforce regulation, and measuring success of these interventions. Kenya, supported by the US President's Emergency Plan for AIDS Relief (PEPFAR) and the US Centers for Disease Control and Prevention (CDC), is fortunate to have made an investment in creating electronic databases at these regulatory agencies that can provide information to assist in moving towards universal healthcare for all.

These databases, referred to as regulatory human resource information systems (rHRIS), serve as the basis of the data in this National Report on the Status of the Health Workforce in Kenya.

Health services are largely labor-intensive, and an increase in density of health workers results in a reduction of human suffering and death[2]. The health workforce represents a significant share of the labour force in all countries and is central to the provision of quality

health services in any country. The availability, distribution, and accessibility of the health workforce with the relevant skills at a particular period strongly influence the ability of health systems to meet the constitutional requirement of providing quality health services to every citizen[1] .In addition, the aspiration of universal health coverage in the Sustainable Development Goals (SDGs) is largely dependent on a health workforce that is responsive to the ever-evolving needs of health systems[4]. Furthermore, establishment of the rHRIS data system and data analysis represented in this report are crucial to achieving many of PEPFAR's Monitoring, Evaluation and Reporting (MER) Indicators. Most of the key interventions for preventing HIV and caring for those with HIV require a strong and competent health workforce, distributed in high HIV impact facilities and counties, and with the necessary skills in HIV care. The data provided in this report are available for ongoing analysis to strengthen and manage the health workforce in order to achieve country and PEPFAR goals, which are crucial for designing and planning sustainable interventions for HIV control.

Factors that influence the demand for health services have a role in shaping the requirements of a health workforce. Changes in population demographics, epidemiological profiles of communities, morbidity and mortality dynamics, and policies, among other factors, influence the demand and supply of health workers[5]. Therefore, strengthening the health workforce through policy, adequate financing, planning, recruitment, training, deployment, and retention is paramount to ensuring everyone has access to a qualified health worker[6-10], thus improving the ability of health systems to achieve global and national health goals as prioritized in the new SDG targets[11].

1.2 Significance of a national health workforce report

Technological developments in all fields of health service provision provide dramatic improvements in the care and quality of health services as well as reducing strain on health workers[12]. However, communicable diseases, like HIV/AIDS, TB, malaria and respiratory infections, continue to wreak havoc. In sub-Saharan Africa (SSA), nearly 1 in 25 adults is living with HIV, and SSA accounts for 70% of people living with HIV worldwide[13,14] Kenya has 1.5 million people living with HIV/AIDS[15]. The threat of emerging and re-emerging infections, such as Ebola, is devastating.

The world also faces the increased burden of non-communicable diseases ranging from cancer to cardiovascular diseases[16]. Hence, it is imperative for every country to evaluate its resources and particular, their health workforce, to address the current and future health needs.

Moreover, the health workforce poses a major challenge to achievement of MDGs due to critical shortages, uneven distribution, inadequate skill mix, and lack of basic data on the health workforce[1,2,17,18]. This health workforce report provides key information for rational workforce planning and financing in the midst of competing demands of commodity supply, and infrastructure among others. This workforce report is necessary to identify the strengths and weaknesses in regulation of workforce, distribution, and underutilization of trained personnel.

Health workforce reports, such as this one, can inform the development, implementation and evaluation of health workforce strategies, management, quality improvement, and policies to improve the national health system[19].

Decisions related to scaling up training and recruitment of a particular health vocation depends on a reliable market analysis that informs policy makers on the immediate status of production, recruitment, retention, retirement and outmigration of the workforce[1].

1.3 Relevance and utilization of a national health workforce report

Kenya needs accurate and timely data on the health workforce to provide a reliable, county-level situational assessment of its health workforce in all counties. For example, media reports describe migration of health workers from public sector to private sector and from counties considered hardship areas after the health management was devolved to counties[20]. This report explores the Kenyan situation on health workers training, registration and practice. It aims to inform stakeholders of the current situation in order to develop human resource strategies and policies that guarantee equitable health services, irrespective of the geographical location of every citizen.

The report identifies health workforce dynamics to inform health sector planning and improves information accessibility and transparency to Kenyans in all counties to ensure greater accountability in health service delivery. It generates reliable information on the health workforce situation in Kenya for policy makers, regulators, researchers, donors, and funders. As mentioned above, this report provides crucial data for health workforce management to achieve the goals of HIV prevention, care, and treatment. Investors in private health services and training institutions can use this report to evaluate market dynamics to inform their plans and investments. Health professional agencies can use this report to identify regulatory opportunities and use them to advance objectives relevant to individual professions.

"This report explores the Kenyan situation on health professionals training, registration and practice. It aims to inform stakeholders of the current situation in order to develop human resource strategies and policies that guarantee equitable health services, irrespective of the geographical location of every citizen."

Lastly, effective governance and regulation depend on a reliable situational analysis. The government is a key beneficiary of this health workforce analysis. This report can be used to evaluate the effectiveness of current regulations, need for regulatory advancements, and financing gaps, and investment opportunities.

Moreover, this report can be used to develop strategic plans, goals, vision, and a manifesto that responds to the real needs of its people and that is data-driven. A health workforce situational analysis enables the leaders to project and plan for the future.

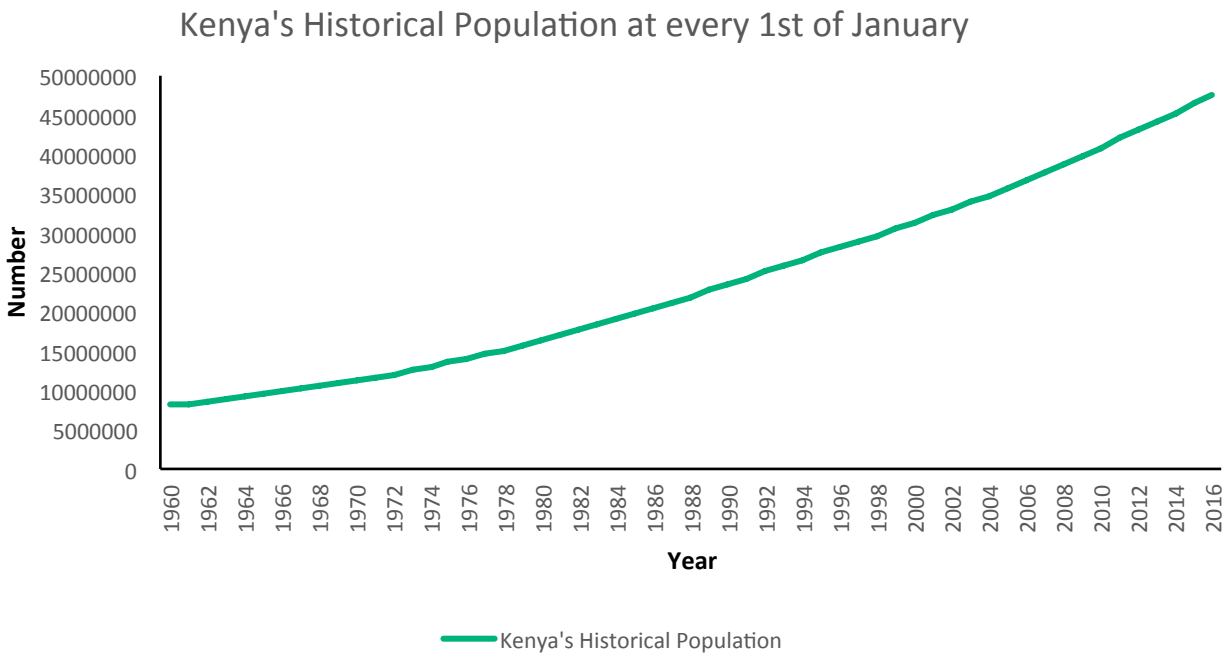
2. Kenyan context

2.1 Geography and demography

Kenya is located along the equator in East Africa. Its geographical coordinates are 1°00'N38°00'E. The country is multi-ethnic with majority Bantu subgroups, Nilotic subgroups, and minority Cushitic subgroups. Its total area is 583,650km^2 comprised of 569,140 Km^2 land and 11, 227Km^2 of water. Its Indian Ocean coast covers a coastline of 536 km. Kenya borders Somalia in the east with a border length of 684 Km, and Uganda on the west with a border length of 814 Km. Ethiopia (867 km border length) and south Sudan (317 km border length) border Kenya on the north and north west respectively. Kenya's southern border with Tanzania has a borderline length of 775 Km[21].

Kenya had a population of 47,681,779 as of end of January 2016. The male population accounted for 49.9 %. The sex ratio stands at 998 males per 1000 females, which is lower than the global sex ratio of 1016 males to 1000 females. It is projected that an average of 4,373 live births will occur per day in 2016 against an average of 1164 deaths per day during the same year. Therefore, the population in Kenya will increase by 3, 209 persons per day in the year 2016. This rise in population will most likely lower health workforce density and increase demands on the health workforce, thereby negating universal health coverage efforts[9]. According to 2009 census, the population density was 66 persons per sq.km[22]. In 2013, the overall life expectancy in Kenya was 61.71 years at a fertility rate of 4.32 per woman and crude birth rate of 34.9 per 1,000 population[23].

Figure 2.1: Kenya's population trajectory 1960-2014



2.2 Governance

Following inauguration of the new Constitution of Kenya in 2010, the system of governance changed from purely central governance to a combination of national government and devolved county governments. The central government retained the traditional three arms: legislature, judiciary, and executive. However, the legislative arm of the central government is vested in two houses—the Senate and the National Assembly[24].

The devolved county government – comprised of the county assembly and the county executive headed by the Governor – allows better supervision and engagement of people in governance. Kenya has 47 county governments (figure 2.2) that serve the interest of Kenyans at the local level[24]. The county governments have a mandate to regulate health facilities, pharmacies, and ambulance services; to promote primary healthcare; license public food vendors; and issue burial permits[25]. Each county is equipped with at least one referral hospital to provide intensive health services. Each hospital has a board or facility management committee that includes members of the public in the locality of the health facility. The management team for each facility is meant to oversee provision of efficient, affordable, quality health services that address the needs of its catchment area[24].

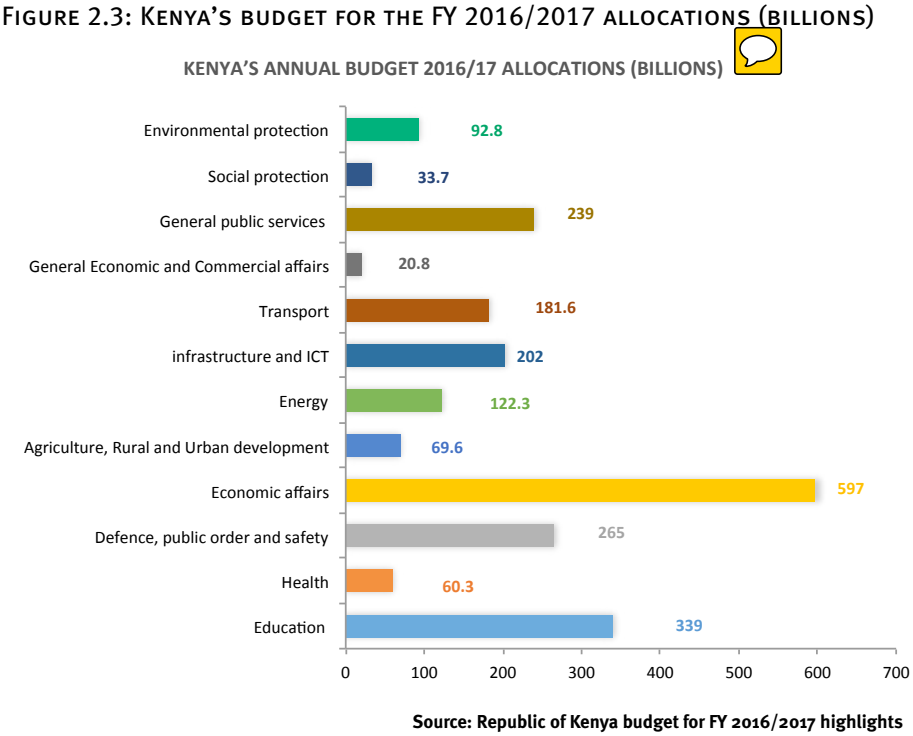
Having regular reliable data on the health workforce will greatly help the county governments make human resource decisions that will improve access to quality healthcare. The county governments will be able to plan for recruitment, transfer, and retirement of staff to ensure their citizens have access to qualified health workers all year long without interruption. Moreover, having reliable data will enable the county government to utilize its human resources efficiently and minimise possible wastage of resources through irregular payments of nonexisting workers (ghost workers), as had happened with the national government[26].

Figure 2.2: Map of Kenya showing the 47 County governments

2.3 Economic context

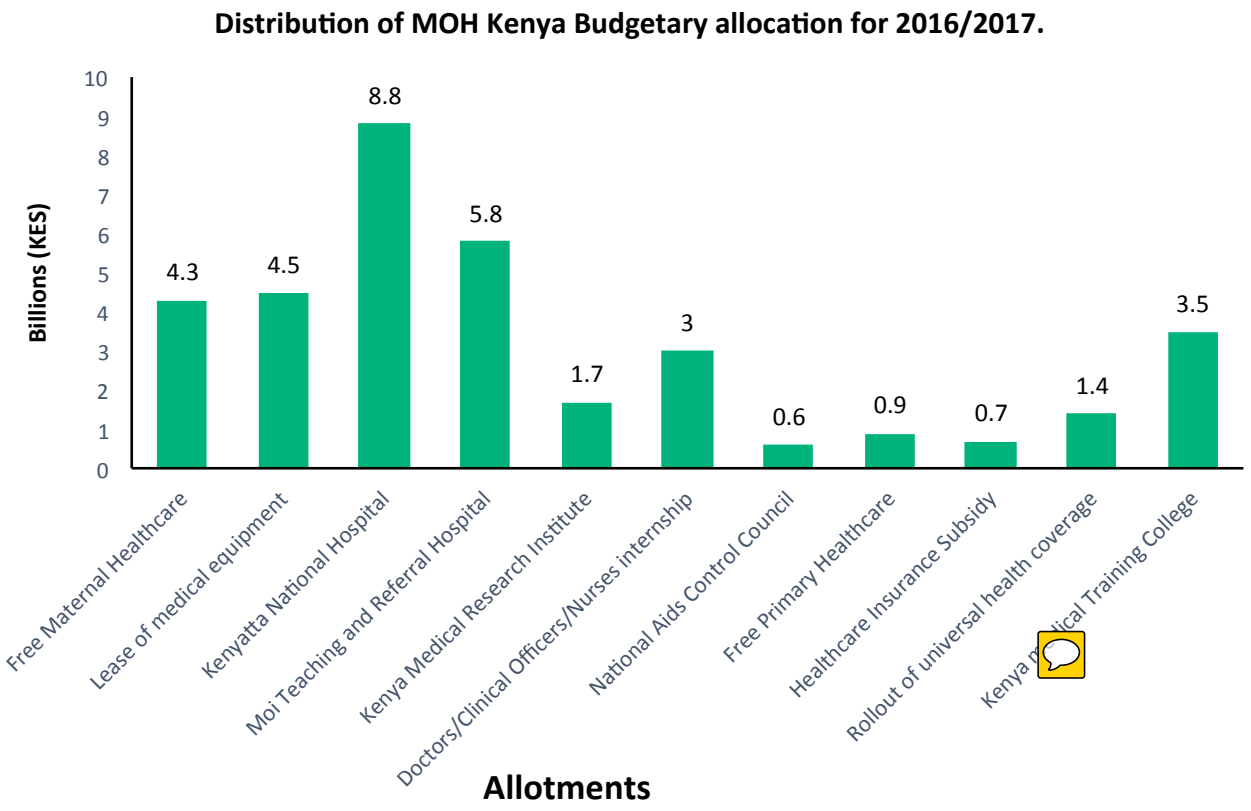
According to the International Monetary Fund (IMF) (2015), Kenya's Gross Domestic Product (GDP) was KES 6,224, 369.9 million in the year 2015,[27] and was expected to be KES 6,470,000 in the year 2016, including KES 73.67 billion in the last quarter of the year 2016.[28] The Kenya budget estimates for the fiscal year 2016/2017, according to a statement delivered by cabinet secretary to Parliament on 8th June 2016, projected a total expenditure of KES 2,264.8 billion, of which 60.3 billion (2.7%) was allocated to health sector (Figures 2.3 and 2.4)[29].

FIGURE 2.3: KENYA'S BUDGET FOR THE FY 2016/2017 ALLOCATIONS (BILLIONS)



Source: Republic of Kenya budget for FY 2016/2017 highlights

FIGURE 2.4: DISTRIBUTION OF HEALTH BUDGET IN THE FISCAL YEAR 2016/2017



The government also allocated conditional grants for level 5 hospitals of KES 4.0 billion, a special purpose grant of KES 200 million to support emergency medical services in two counties (Lamu and Tana River) which are vulnerable to terror attacks.

2.4 Health status

UNICEF, in its report with the title, *State of World Children 2015*, observed that the 2013 overall life expectancy in Kenya was 61.7 years at a fertility rate of 4.3 per woman and crude birth rate of 34.9 per 1,000 population. The report indicated that people of all ages infected with HIV worldwide were approximately one billion six hundred thousand whereby 6% of adults aged 15 years and above are living with HIV/AIDS[23]. Only 62% of Kenyans had access to an improved source of water.

Communicable diseases, non-communicable conditions as well as violence/ injuries continue to contribute to the high disease burden in the country (figure 2.5). The main contributors of morbidity and mortality in Kenya are infectious diseases such as HIV/AIDS, tuberculosis, conditions related to pregnancy, and respiratory infections (table 2.1). Non-communicable diseases are expected to rise before the year 2030. Kenya did not manage to meet the 2015 targets on reduction of mortality rates of her population. The mortality rate indicators remained higher than the WHO targets (table 2.2).

Table 2.1: Top ten causes of morbidity and mortality in Kenya

Causes of death			Causes of DALY's*		
Rank	Disease or Injury	% total of deaths	Rank	Disease or injury	% total DALYs
1	HIVE/AIDS	29.3	1	HIV/AIDS	24.2
2	Conditions arising during the perinatal period	9.0	2	Conditions arising during the perinatal period	10.7
3	Lower respiratory infections	8.1	3	Malaria	7.2
4	Tuberculosis	6.3	4	Lower respiratory infections	7.1
5	Diarrheal diseases	6.0	5	Diarrheal diseases	6.0
6	Malaria	5.8	6	Tuberculosis	4.8
7	Cerebral-Vascular disease	3.3	7	Road Traffic Accidents	2.0
8	Ischemic heart disease	2.8	8	Congenital abnormalities	1.7
9	Road Traffic Accidents	1.9	9	Violence	1.6
10	Violence	1.6	10	Uni-polar depressive disorders	1.5

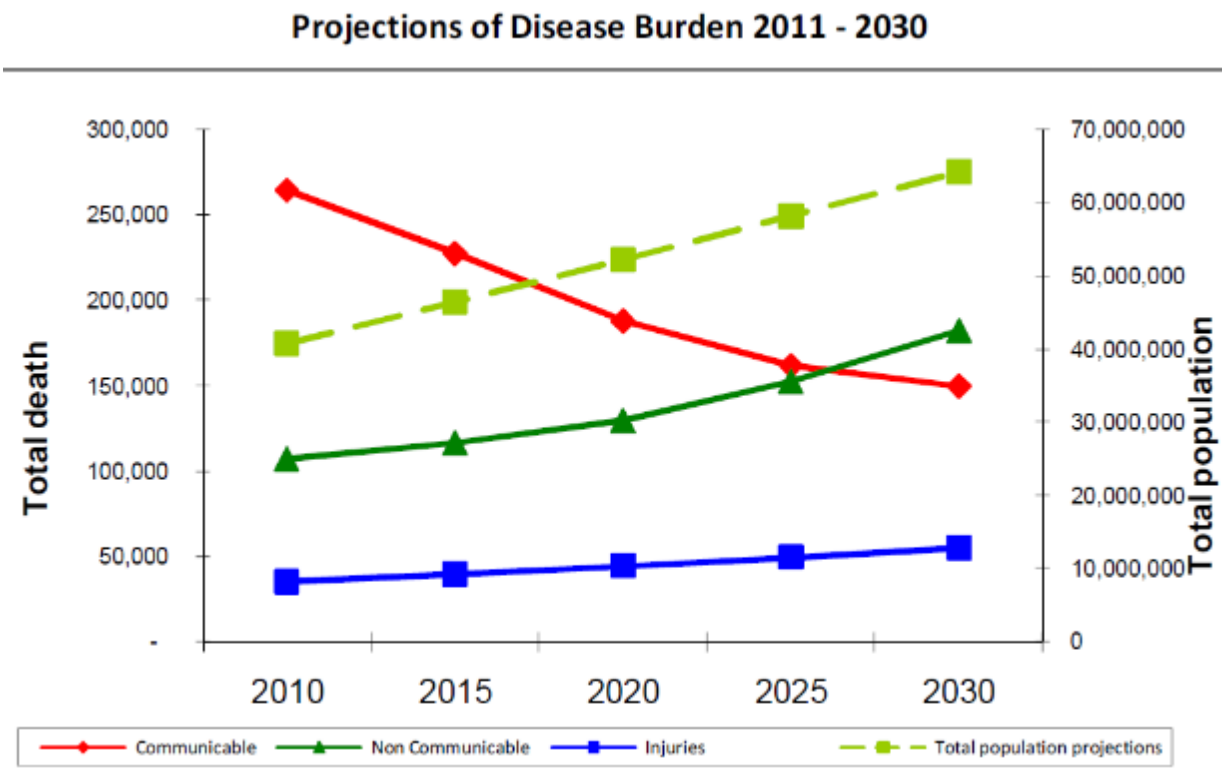
*** DALY's=Disability Adjusted Life Years**
Source: GOK 2010. Review of the Kenya Health Policy Framework, 1994-2010

Table 2.2: Selected mortality rate indicators

Mortality Rate/Year	1990	2005	2006	2007	2008	2009	2010	2015 MDG Target
Neonatal Mortality Rate	31	30	30	29	29	28	27	10
Live Infant Mortality Rate	64	61	60	59	57	56	55	21
Under Five Mortality Rate	99	98	95	92	89	87	85	33
Maternal Mortality Ratio	600	409	399	388	378	368	358	150
Adult Male Mortality Rate	-	435	423	410	400	390	380	-
Crude Death Rate		12	12	12	11	11	-	-

Source: WHO, World Bank Database (2012)

FIGURE 2.5: INJURIES, COMMUNICABLE AND NON-COMMUNICABLE DISEASES PROJECTIONS



Source: Health Sector Strategic and Investment plan 2013–2017

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3. Kenya's health system

3.1 Policy and governance

At independence, the local government in urban areas, faith-based organizations, and central government provided health services. In 1970, the Comprehensive Rural Health System was launched and emphasized the construction and utilization of primary health centres as points for promotive, preventive, and partial curative services. More primary health facilities were constructed to offer those services.

In 1994, Kenya launched the Kenya Health Policy Framework (KHPF 1994–2010), outlining a health sector agenda with measures to improve efficiency. The policy was operationalized through The First Health Sector Strategic plan (1999–2004), which defined the structure of healthcare system in Kenya, and the Second Health Strategic Plan (2005–2010), which introduced levels of care delivery in Kenya, prioritized some services such as reproductive health and child health. In 2006, Kenya launched Vision 2030 to focus on people-driven health services, where every citizen would enjoy the right to the highest attainable standard of health. Moreover, Vision 2030 stated every citizen had a right to emergency treatment and the government would be responsible for the health and social security of those who could not support themselves.

The Kenya Health Policy 2014–2030, is currently being implemented. It demonstrates the government's intention to guarantee the right to a high quality of health as stated in the constitution and its contribution to economic growth as described in Vision 2030 using the two-tier system of government. Currently, a health bill in Parliament is expected to harmonize all health-related laws in alignment with the new constitution.

"Currently, a health bill in Parliament is expected to harmonize all health-related laws in alignment with the new constitution."

The health care system is governed at two levels by national government and county government. National government functions include policymaking, financing, quality assurance and standards, monitoring and evaluation, education, national referral hospitals, national laboratories, management of port health, national healthcare agencies such as KEMRI, KEMSA, NHIF and disease control programs, like TB and HIV. The Ministry of Health is responsible for health workers in those institutions and all interns, irrespective of their place of work.

The county governments are responsible for management of county health facilities, ambulance services, promotion of primary health care, disease surveillance and response, public health and sanitation, disaster management, veterinary services and waste disposal. Human resource management has been one of the greatest challenges to devolution, as some health workers seek to return to national government and the devolved governments work to provide services in the face of numerous strikes, health workforce shortages, health workers leaving certain counties to work in more preferred locations, or resigning from the public sector to join the private

"Human resource management has been one of the greatest challenges to devolution, as some health workers seek to return to national government and the devolved governments work to provide services in the face of numerous strikes, health workforce shortages, health workers leaving certain counties to work in more preferred locations, or resigning from the public sector to join the private sector. "

sector. There is a need for clear structure and guidelines on promotion, retention, and pension for health workers.

To curb this trend, the Ministry of Health launched the Devolved Human Resource Management Policy on Human Resources for Health (2015). The policy recommended establishment of human resources for health in every county, and developed guidelines for recruitment, deployment, tracking and retention of health workers. However, it is not certain whether the policy has been adopted and/or implemented systematically across all counties.

3.2 Service provision

Health services in Kenya are provided by faith-based health facilities, private for-profit health facilities, and public government facilities. Private medical practitioners also provide services to a relatively small population. Development partners support facilities through technical assistance and resource mobilization.

The levels of service delivery before promulgation of the constitution comprised six levels: namely;

Level 1: Community-level services

Level 2: Dispensaries

Level 3: Health centres

Level 4: District referral hospitals

Level 5: Provincial referral hospitals

Level 6: National referral hospitals.

However, the Kenya Health Sector Strategic plan III (2012–2017) revised the service delivery structure into four tiers.

Tier 1 is the Community Health Services that were previously referred as Level 1. It comprises all community-based activities, mainly health promotion, disease prevention, and identification of cases that require reporting to higher levels of care.

Tier 2 is referred to as the Primary Care Level that encompasses the previously known Levels 2 and 3. It includes the maternity homes, dispensaries, and health centres.

Tier 3 is the county referral hospitals and refers to health facilities staffed by a particular county. It comprises facilities previously known as Leve

Tier 4 encompasses national referral hospitals that were previously Level 5 and Level 6.

3.3 Health care financing

Funding for healthcare comes from two major sources: private and public sources. The public source of healthcare funds contributes about 70% and includes government general taxes, loans from multilateral agencies and bilateral agreements, grants, charitable donations, and mandatory insurance payments. The private source of healthcare funds are direct payments by consumers, employers paying for their staff or providing health services, privately paid insurance plans, and charitable contributions from nongovernmental organizations.

Healthcare financing is monitored by the National Health Accounts and shared with the public through reports. The latest reports on healthcare financing are contained in the Kenya National Health Accounts (NHA) 2012/2013 and the Kenya Household Health Expenditure Utilization Survey (KHHEUS) 2013. Both documents were launched in June 2015. The NHA 2012/2013 reported the percentage of government expenditure on healthcare in 2012/2013 was 6.1% which amounted to KES 234 billion (6.8% of GDP). Out-of-pocket funding was 26.6%.

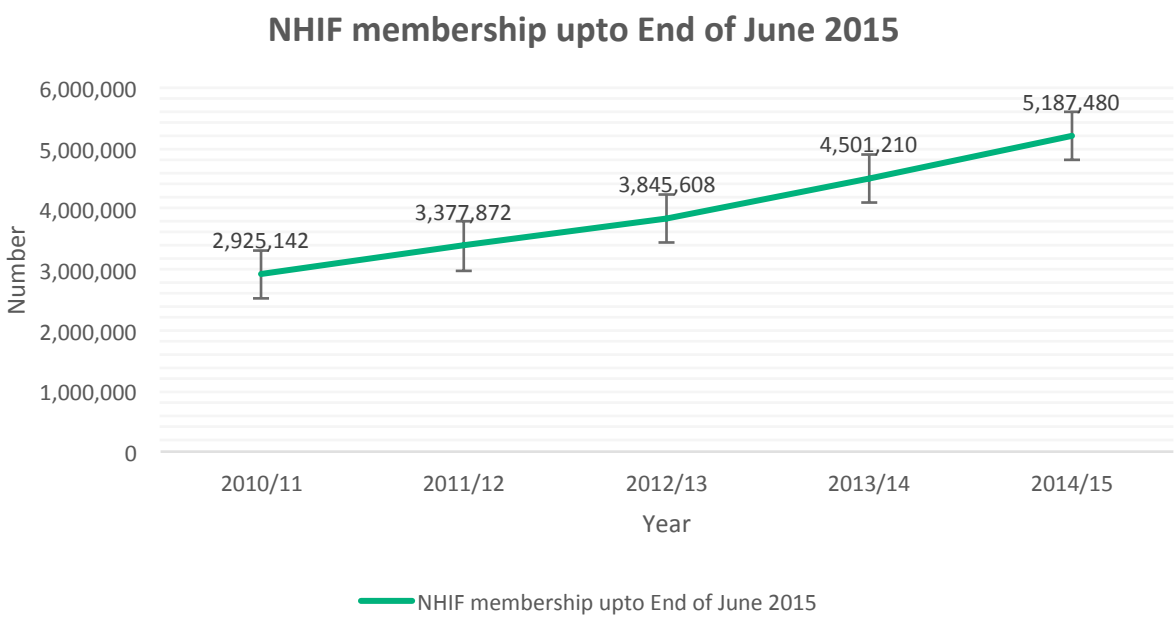
The top diseases consuming revenue included HIV/AIDS which consumed 18.7% of the funds, reproductive health (12.9%), and Malaria (9.8 %). Expenditure on communicable diseases, vaccine-preventable diseases, and respiratory diseases utilised 6.0%[30]. Contribution to the healthcare funding by donors was 26%, down from 35 % in the year 2009. Per capita spending on healthcare amounted to US $ 67. These findings revealed increased government spending on healthcare, although the report noted a third of healthcare expenditure was borne by direct payments by consumers (Approximately KES 80 billion).

In addition to releasing healthcare funds through the county governments, the national government supports selected hospitals directly, based on their reported workloads, through the Health Sector Services Fund (HSSF). Moreover, this fund aims at increasing the health facility management teams' role in addressing the community-felt health needs. In the year 2014/2015, close to a billion was disbursed to tier 2 facilities to support free maternity care, among other expenditures.

According to KHHEUS 2013, the public sector was the main provider of both inpatient and outpatient care, which accounted for 58% of outpatient visits and 56% of admissions. The proportion of people who sought outpatient services was 87.3% and those who utilised in patient services were 2.5%.

The survey observed an unmet need for health services of 22.7%. Besides, the survey established 17.1 % of Kenyans had some form of health insurance with 88.4 % of them covered by NHIF (Figure 3.1).

Figure 3.1: NHIF membership from June 2010 up to June 2015



To ensure widespread accessibility of services and reduce burden of expenditure on households, the government analysed long-term health costs and financing options through a report Health Care Financing Options for Kenya: FY2013/14–2029/30. This report observed the need to improve efficiency of available financial resources and increase domestic funds for healthcare by improving government expenditure and reforming NHIF, among other measures. In 2013, the government announced free maternity services as an indication of its intention to pursue an increased access to healthcare by reducing household expenditure on health.

3.4 Health service professional organizations

There are three categories of health service professional organizations: regulatory agencies, associations, and unions. Regulatory agencies are government agencies that regulate various professions. Associations are professional groups that promote self-governance and aim to promote quality of services provided by various professions. Unions are political professional agencies that are registered to champion better welfare for their members.

Regulatory Agencies

Almost all healthcare professions have regulatory agencies that assist and advise the government on management of various professional activities in Kenya. The regulatory regulations are as shown in Table 3.1 below.

Table 3.1. Health professional regulatory agencies in Kenya

	Profession	Regulatory agency
1	Nurses	Nursing Council of Kenya (NCK)
2	Medical Doctors and Dentists	Kenya Medical Practitioners and Dentist Board (MPDB)
3	Clinical Officers	Clinical Officers Council (COC)
4	Medical Laboratory Technicians and Technologists	Kenya Medical Laboratory Technicians and Technologists Board (KMLTB)
5	Pharmacists	Pharmacy and Poisons Board (PPB)
6	Public Health Officers	Public Health Officers and Technicians Council (PHOTC)
7	Radiators	Radiation Protection Board (RPB)
8	Dieticians and Nutritionists	Kenya Nutritionists and Dieticians Institute (KNDI)

Professional Associations

Professional associations are entities formed by various health professionals to promote self-governance and improve quality in their professional activities. Professional associations are not limited to the level of professions but also involves specialities and groupings within the professions. Some of the associations are shown in Table 3.2 below.

Health Professional Unions

There are two registered health professionals unions in Kenya: (1) the Kenya Medical Practitioners, Pharmacists, and Dentists Union and (2) the Kenya National Union of Nurses. The unions' main task is to champion the rights of health workers in Kenya.

Table 3.2 Health service professional associations in Kenya

	Profession/Specialization	Professional association
1	Nurses	National Nurses Association of Kenya (NNAK) Kenya Progressive Nurses Association (KPNA) Kenya Midwives Association
2	Doctors and Dentists	Christian Medical & Dental Association Kenya Health Systems Management Association Kenya Association of Dermatologists Kenya Association of Family Physicians Kenya Association of Paediatric Dentistry Kenya Association of Pathologists Kenya Association of Physicians Kenya Association of Prevention of Tuberculosis and Lung Disease Kenya Association of Radiologists Kenya Association of Urological Surgeons Kenya Dental Association Kenya Hospices and Palliative Care Association Kenya Medical Association Kenya Medical Women's Association Kenya Obstetric and Gynaecologists' Association Kenya Orthopaedic Association Kenya Paediatric Association Kenya Psychiatrists Association Kenya Renal Association
3	Clinical officers	Kenya Clinical Officers' Association (KCOA) Ophthalmic Clinical Officers Association (OCOA) Ear, Nose & Throat (ENT) Clinical Officers & Audiology Society
4	Pharmacists	Pharmaceutical Society of Kenya (PSK)
5	Pharmaceutical Technologists	Kenya Pharmaceutical Association (KPA)
6	Medical laboratory officer	Association of Kenya Medical Laboratory Scientific Officers
7	Radiographers	Society of Radiography in Kenya (SORK)
8	Medical engineers	Association of Medical Engineering of Kenya
9	Health Information Management Officers	Kenya Health Informatics Association
10	Diabetes specialists	Diabetes Kenya Association
11	Infection control	Infection Prevention Network – Kenya (IPNET-K)

4. Background information on the regulatory agencies

4.1 Regulatory agencies

There are eight health professionals regulatory agencies established through acts of Parliament to represent individual professions. They include, the Nursing Council of Kenya (NCK), Medical Practitioners and Dentist Board (MPDB), Clinical Officers Council (COC), Kenya Medical Laboratory Technicians and Technologists Board (KMLTB), Pharmacy and Poisons Board (PPB), Public Health Officers and Technicians Council (PHOTC), Radiation Protection Board (RPB) and Kenya Nutritionists and Dieticians Institute (KNDI).

4.2 Regulatory functions

Kenya health professionals' regulatory boards and councils regulate the training and practice of health professionals (Figure 4.1), which can include professionals and training institutions as well as health facilities. Although functions vary somewhat among the various agencies, the following are the general functions of most regulatory agencies.

Figure 4.1: Role of regulatory agencies in regulating training of health professionals in Kenya

DIAGRAM SHOWING REGULATION OF HEALTH PROFESSIONALS' TRAINING IN KENYA

REGULATION OF HEALTH PROFESSIOANALS' TRAINING IN KENYA	***ROLE REGULATORY BODIES***
Step 1 Approval of Training Program and Training School	STEP 1 1. Issue minimum training curriculum regulations 2. Inspect facility for adequacy of resources 3. Approve curriculum and Training institutions/colleges that have met required standards
Step 2 Admission at Medical School/College	STEP 2 1. Countercheck adherence to entry qualifications 2. Issue Indexing number
Step 3 Entry into Internship	STEP 3 1. Counterchecks the length of training, disruptions, completion of set curriculum objectives, and character 2. Recommends internship posting by Ministry of Health
Step 4 Licensing Exams	STEP 4 1. Administers Licensing exams upon completion of pre-set conditions 2. Recommends registration and Licensure upon passing
Step 5 First Time Registration	STEP 5 1. Receives first time applications for registration 2. Issue license and register the name of application on the professionals roll

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Accreditation of training institutions

All training institutions, whether public, private or faith-based, are required to be approved by their respective health professional regulatory agencies. The process of accreditation of training institutions begins with the established institution applying for accreditation to the regulatory agency, followed by inspection of the institution, and review of the curriculum, after which the regulatory agency makes a decision on whether or not to approve the institution. After approval, institutions are allowed to admit students. Thereafter, inspection of institutions is a random continuous activity to promote quality training of health professionals.

New student enrolment

Upon accreditation, institutions are required to submit data on the enrolment of new students, to enable the regulatory agencies to keep track of their performance in a process commonly referred to as "indexing." When students begin their training, key demographic data are collected, including county of origin, secondary school, date of birth and gender. Regulatory agencies use data provided on each student to ensure that the students meet the minimum qualifications set by the agency for entry into the various training programs. Regulatory agencies assign each student an index number, which serves as a unique identifier for that individual through graduation and into their career.

Internship and licensing examinations

After students show proof of completing the approved training, regulatory agencies recommend certain health professional students for internship posting by the Ministry of Health, whereas other cadres proceed directly to licensure examinations. Internship is compulsory to nursing students at degree level, pharmacists, clinical officers, doctors, dentists and nutritionists. Regulatory agencies conduct licensing examinations at different times after completion of the approved curriculum. Doctors trained outside Kenya, pharmacists, and clinical officers must pass the licensing examinations before they are recommended for internship, but degree-level nurses have an option to apply for examinations before or after internship. Diploma and certificate-level nurses are also required to pass the licensing examination, but are not required to do an internship. As a prerequisite for registration, pharmacists undergo internship for a period of 12 months, and pharmaceutical technologists' attachment is for 7 months. Before internship, pharmacists and pharmaceutical technologists are required to pass Stage 1 and Level 1 examination, respectively. Similarly, they are required to pass respective Stage 2 and Level 2 examination after successful completion of their internship before applying for registration. The board examinations are based on competencies from their respective training programs.

KMLTTB administers competency examinations to graduates of medical laboratory sciences training at different levels of training. On successful passing of the examinations, the graduates get registered as either medical laboratory technicians or technologists, depending on the course taken. There is no internship for medical laboratory technologists.

Licensing and registration

Students who have passed their national qualifying exams (when required) and the stipulated internship period (when required) are allowed to apply for licensing and registration. During this process, the regulatory agencies review students' training, discipline, and clinical performance reports before licensing and registering them. Once in the registry, health professionals are given a unique registration number. During the hiring

process, employers are required to confirm registration and licensure status of individual health professionals with the regulatory agency. Licensure and registration promote greater employment transparency and public safety, ensuring that health workers are adequately trained with the minimum competencies to deliver a consistent standard of care.

Regulation of registered professionals

Regulation of the health workforce is a continuous quality control measure. Regulatory agencies maintain and update registers of active health professionals. After initial registration and licensing, health professionals are expected to renew their licenses with their respective regulatory agencies within specified periods. They are required to achieve a specified number of continuing professional development (CPD) training hours. The CPD system aims to ensure health professionals keep abreast of the new developments in health care through organized CPD programmes. Administration of CPD points differs across regulatory agencies. Doctors and dentists have an online CPD submission system accessible at www.icpdkenya.org; while, other professions utilize CPD point booklets.

Table 4.1 CPD points required to renew licenses in various regulatory agencies

Profession	Frequency of License Renewal	Required CPD points before License Renewal
Doctors	Annually	50 CPD points per calendar year
Clinical Officers	Biennially	30 CPD points per year
Nurses	Every 3 years	20 CPD hours per annum
Pharmacists	Annually	40 CPD points per year
Medical Laboratory Officers	Annually	Not fully enforced
Public Health Officers	Biennially	Not fully enforced
Radiographers	Annually	No CPD required
Nutritionists	Annually	Not fully enforced

Disciplinary actions

The regulatory agencies are responsible for investigating disciplinary cases and administering disciplinary actions against health professionals who are found culpable.

Immigration and out-migration

Regulatory agencies oversee the immigration and out-migration of health professionals in Kenya. They are responsible for determining suitability of foreign-trained health professionals who apply for licensure to practice in Kenya. In that regard, regulatory agencies administer various competence tests, additional training, and internship to foreign-trained professionals to match Kenya's quality requirements. For example, foreign-trained medical professionals must sit for internship qualifying exams or preregistration before they are approved to do internship or registration, respectively.

Kenyan professionals who wish to work outside the country are required to get documentation of their training and practice from their regulatory agencies. For example, the NCK verifies nursing credentials for Kenyan nurses applying to out-migrate. The information gathered during this process is used to capture the number of nurses intending to leave the country.

Health facility inspections

The regulatory agencies inspect private and public health facilities to guarantee quality healthcare. They conduct periodic joint inspections of private healthcare facilities in conjunction with the Ministry of Health to ensure quality healthcare standards are achieved. In addition, they regulate licencing of private healthcare facilities. The Medical Practitioners and Dentists Board coordinates the inspection, and a report is forwarded to the Ministry of Health for enforcement of the recommendations.

Besides joint inspections, some regulatory agencies, including PPB, COC, and KMLTTB have full-time inspectors who carry out routine inspection and enforcement of health facilities. For example, KMLTTB conducts periodic inspections of private clinical medical laboratories which are either stand-alone or facility-integrated entities. The inspections are conducted by KMLTTB- trained inspectors in the national government. Occasionally, county laboratory coordinators are coopted during the inspections. The inspection reports are forwarded to MOH for enforcement of recommendations.

4.2.1 Nursing Council of Kenya (NCK)

The mandate and composition of NCK

The Nursing Council of Kenya is established under Section 3 of the Nurses Act Cap 257 that was enacted by Parliament in 1983 and revised in 2012. The Act mandates the Council to regulate the training, registration, enrolment, and licensing of nurses and to regulate their conduct and practice. It also mandates the Council to regulate the standards of nursing practice, nursing commodities, and environmental health for institutions.

The Nursing Council draws membership from the Director of Medical Services, the Director of Education, the Chief Nursing Officer, and the Attorney General. In addition, the following members are appointed by the Health Minister;

1. A registered midwife (elected by registered midwives);
2. A registered community health nurse (elected by registered community health nurses);
3. A registered psychiatric health nurse (elected by registered psychiatric health nurses);
4. A registered general nurse (elected by registered general nurses);
5. A nurse (nominated by the National Nurses Association of Kenya);
6. A nurse (nominated by the Kenya Progressive Nurses Association);
7. A registered nurse educator (actively involved in the training of nurses and nominated by recognized universities in Kenya);
8. Two registered nurses (nominated by registered faith-based organizations providing health services in Kenya);
9. One person with a professional background in human resource management;
10. The chief executive officer of the Kenya Medical Training College or his representative.

Programs regulated by NCK

The Council has approved the training of nurses at three levels: Certificate (Enrolled nurses), Diploma (Registered Nurses), and Degree training (Bachelors of Science in Nursing). There are 21 types of approved nursing training programs; 5 are certificate level programs, 4 are diploma basic programs, 11 are specialisation diploma programs, and 1 is a degree

program. The specific approved training programs are provided in Appendix 1. NCK tracks upgrades in academic education. An academic upgrade occurs when a nurse advances her educational status from enrolled to registered or registered to a bachelor's degree. Academic upgrades also include post-basic training in specialty areas such as critical care nursing. Masters degrees and PhDs are recognized as special qualifications.

Regulation of private practice

Nurses who open a private practice must register with the Council and submit a facility inspection report from their local supervising authority. In 2013, the Council expanded the scope of private practice by introducing a Community Nursing Services (CNS) programme to allow nurses to reach out to communities and provide nursing services in the comfort of their homes. To provide CNS services, a nurse must register as an individual or through an agency/bureau that is licensed for CNS Coordination within a given CNS community location. Renewal of the CNS Practice License is carried out annually with a fee stipulated by NCK upon fulfilling all requirements.

4.2.2 Medical Practitioners and Dentist Board (MPDB)

The mandate and composition of MPDB

The Board is established under Section 4 of the Medical Practitioners and Dentists Act Cap 253 that was enacted in 1977 and became operational on 1st January 1978. The Mandate of the Board is to regulate the training, practice, and licensing of medicine and dentistry as well as healthcare institutions that include private and mission hospitals, medical, dental centres and clinics, nursing and maternity homes, and standalone funeral homes.

Since its enactment, the Act has undergone several amendments to improve composition and functions of the Board. The Act mandates the Board to regulate the training and practice of medicine and dentistry as well as healthcare standards in health institutions and clinics in the country.

The Board is comprised of a Chairman; the Director of Medical Services (DMS), who is the Registrar of the Board; a Deputy Director of Medical Services; and four medical/dental practitioners, all appointed by the Cabinet Secretary (CS). In addition, the Board includes five medical practitioners and two dentists elected by the votes of all medical and dental practitioners, and deans appointed by the Cabinet Secretary (C.S) representing medical and dental training institutions in Kenya.

Programs regulated by the Board

The Board recognizes two undergraduate course types: Bachelor's of Medicine and Surgery and Bachelor's of Dental Surgery, which require 6 and 5 years of training, respectively. Internship is required for 1 year upon completion of the 6-year/5-year training period. In addition, the Board also recognises various specialist training courses in the field of medicine and dentistry that take between 3–4.5 years depending on the area of specialisation.

Regulation of private practice

Medical and dental practitioners wishing to join private practice should apply for Private Practice License upon fulfilling a set of requirements as prescribed under Section 15 of Cap 253 Laws of Kenya.

4.2.3 Clinical Officers Council (COC)

The mandate and composition of the Council

The Clinical Officers Council (COC) is mandated to oversee the training, registration, and licensing of clinical officers as stipulated in Clinical Officers Act Cap 260 section 3 that was enacted by the Parliament of Kenya in 1988 and became operational in 1989.

The Council members include a Chairman, appointed by the Cabinet Secretary of Health from amongst the members of the Council; the Director of Medical Services (DMS), or his representative; and the Registrar of the Council, who is the Chief Clinical Officer. Other members include one clinical officer nominated by the faculty of clinical medicine in KMTC, and seven clinical officers elected by the Kenya Clinical Officers Association (KCOA) among its members; of whom four are elected from public practice and three from private sector.

Programs regulated by COC

The training of clinical officers in Kenya began in 1928 with certificate programs that were hospital-based. This is the oldest medical training program in Kenya. The Council has approved training of clinical officers at two levels: Diploma (Diploma in Clinical Medicine and Surgery) which takes 3 years and Degree training (Bachelor's of Science in Clinical Medicine), which takes four 4 years. A 1-year internship is required upon completion of the 3-year/4-year training period.

Mt. Kenya University was the first university in Kenya to offer a degree program to train clinical officers. It began training clinical officers at degree level in 2009 with an aim to provide a solid career path for clinical officers, improve their research skills, and ability to attain high scholarly levels (Master's and PhDs) in addition to improving health and wellbeing of their clients. Then other universities followed; currently, eight universities offer degree program for clinical officers in Kenya.

There are 21 approved clinical officers' training programs. One is a diploma basic program, 12 are specialisation in higher diploma programs, 3 are degree programs, and 4 are master's programs. The specific approved training programs are provided in Appendix 2. The council tracks upgrades in academic education. An academic upgrade is when a clinical officer advances his or her educational status from diploma level to a bachelor's degree level. Academic upgrades also include post-basic training in specialty areas such as ophthalmology. Master's degrees and PhDs are recognized as special qualifications.

Regulation of private practice

Clinical officers wishing to join private practice should apply for Private Practice License upon fulfilling a set of requirements as prescribed under Section 11 of Cap 260 Laws of Kenya.

Renewal of the private practice license is carried out annually with a fee stipulated by COC upon fulfilling all requirements.

4.2.4 Pharmacy and Poisons Board (PPB)

The mandate and formation of the Board

The Pharmacy and Poisons Board (PPB) is established under Section 3 of the Pharmacy and Poisons Act, Chapter 244 Laws of Kenya as amended in 1993 through Act No. 11 of 1993. The Mandate of the Board (PPB) is to regulate the profession of pharmacy and the manufacture and trade in drugs and poisons.

The Board members include the Director of Medical Services (DMS); Chief Pharmacist who is the Registrar; Director of Veterinary Services or a veterinary surgeon nominated by him; four pharmacists nominated by the Pharmaceutical Society of Kenya (PSK); a representative of the pharmacy department of University of Nairobi (UoN); and one pharmaceutical technologist.

The Board's functions include developing and implementing policies, guidelines, and rules governing the profession of pharmacy and the trade in drugs and poisons. While regulating pharmacy practice, the Board not only ensures the availability of pharmaceutical services in Kenya but also ensures that qualified personnel distribute pharmaceutical products legally and professionally. The Board's inspectorate services are meant to ascertain the minimum requirements set by the Board are met in production, storage, and distribution of drugs and poisons.

Programs regulated by PPB

The PPB accredits training institutions offering courses in pharmacy at diploma and degree levels. Those qualifying with a diploma work as pharmaceutical technologists and provide middle-level services, and they can upgrade to degree level and work as pharmacist.

The PPB recognizes and has approved training of pharmacy personnel at two levels: Diploma (pharmaceutical technologist) and Degree training (Bachelor of Pharmacy). The specific approved training programs are provided in Appendix 3. The PPB tracks upgrades in academic education. An academic upgrade is when a pharmaceutical technologist advances his or her educational status from diploma level to a bachelor's degree (pharmacist). Master's degrees and PhDs are recognized as special qualifications.

Regulation of practice

Registered pharmacists and enrolled pharmaceutical technologists who intend to practice in their professional capacity are required to apply for practice license upon fulfilling a set of requirements as prescribed under Cap 244 Laws of Kenya. Renewal of the practice license is carried out annually with a fee stipulated by PPB upon fulfilling all requirements, but this does not apply to those practicing in the public sector. In addition, registered pharmacists and pharmaceutical technologists are required to practice in licensed premises which include chemists or pharmacies. These facilities are categorized as retail, wholesalers, or manufacturer of pharmaceuticals. The person in charge of the facility applies to the board requesting registration of the facility. The Board approves the application and sends its inspectorate department to inspect the facility, who in turn submits a report to the Board with recommendation. Based on the recommendation by the inspectorate, the facility is either approved and issued with a license or is rejected. The approved facilities are issued with an annual license which they are required to renew every year.

It is proposed that from 2017, professionals practicing in public sector will be issued with annual practice license showing that they are practicing in a public institution.

4.2.5 Kenya Medical Laboratory Technicians and Technologists Board (KMLTTB)

The mandate and composition of the Board

The Kenya Medical Laboratory Technicians and Technologists Board (KMLTTB) was established under CAP253A Laws of Kenya. It has the mandate to regulate and control the training, practice and business of medical laboratory profession, including advising the government on all aspects of the profession in Kenya. Through a subsidiary legislation in Kenya Gazette No.113 of 2011, the Board is charged with the responsibility of regulating laboratory equipment and reagents, including all in-vitro diagnostics, to ensure quality laboratory services in the country.

The KMLTTB operates under the Ministry of Health, and its members are appointed by the Cabinet Secretary for the Ministry of Health. Membership of the board is composed of a chairman, the Director of Medical Services, the Registrar (the Chief Medical Laboratory Technologist), the Head of National Public Health Laboratory services (NPHLS), the Director of Technical Training in the Ministry of Education, the medical laboratory technologist in charge of the Division of Vector Borne Diseases (DVBD). Others include three registered laboratory technicians in private practice, the Executive Chairman of the Association of Kenya Medical Laboratory Scientific Officers (AKMLSO), three medical laboratory technicians, three medical laboratory technologists, and not more than two members co-opted by the board based on their expertise and knowledge of the profession.

Programs regulated by the Board

By December, 31st 2015 the basic training in medical laboratory sciences (MLS) was at three levels (certificate, diploma, and degree) (see appendix 4). The certificate level was offered for 2 years, diploma 3 years, and degree 4 years. After completion of institution training at all levels and passing the Board's registration examination, students are registered as either medical laboratory technician (certificate holders) or medical laboratory technologists (degree and diploma holders).

Specialization in medical laboratory science is at two levels. For bachelor's degree holders, one undertakes a Master of Science (MSc) training in any of the following subjects: parasitology and entomology, clinical chemistry, microbiology, histopathology, haematology and blood transfusion sciences virology, immunology, molecular biology, clinical cytology, laboratory management and epidemiology. Specialization can proceed to doctorate level (PhD) training.

For diploma holders, one undertakes a Higher National Diploma (HND) training, for 1 year to specialize in any of the six core subjects or virology and is awarded a Higher National Diploma (HND) certificate in MLS (e.g. parasitology and entomology). There is no specialization at certificate level, but one can take a 2-year in-service training in MLS and get upgraded to a medical laboratory technologist.

Regulation of private practice

To practise privately as a registered medical laboratory technician or technologist, one must be licensed by the Board and must have worked for 5 years under supervision of a senior medical laboratory officer. The licenses are issued to medical laboratory superintendents in the private sector.

4.2.6 Public Health Officers and Technicians Council (PHOTC)

The mandate and composition of Council

The Public Health Officers (Training, Registration and Licensing) Act No.12 of 2013 establishes the Public Health Officers and Technicians Council (PHOTC). The Council regulates training, registration, and licencing of all public health professionals in Kenya, in addition to advising the government in all matters related to public health.

The Council aims to be an excellent public health regulatory agency maintaining the highest attainable standards in public health training and practice. Its mission is to ensure compliance with appropriate regulation on public health training, registration, licencing, and practice. The core PHOTC values are professionalism, excellence, integrity, innovation, teamwork, gender equity, transparency, and accountability.

The Council is composed of a chair appointed by the Cabinet Secretary, the Chief Public Health Officer, the Director of Medical Services (DMS), the Director of KMT, a representative of the universities, chair of the public health association, and four public health officers representing public health specialties specified by the association. Other key members include one public health officer (PHO) from a local authority appointed by the Cabinet Secretary (CS), a representative of the Kenya Bureau of Standards, a representative of the Physical Planners Registration Board, and a public health technician (PHT) elected by the association.

Programs regulated by the Council

The Council regulates the training of Public Health Officers (PHOs) and Public Health Technicians (PHTs) at three levels: certificates for two 2 years, diploma for 3 years and degree for 4 years. Council has also established a core curriculum for the training of environmental health sciences at the three levels. In addition, the Council regulates the PHO workforce by accrediting PHO and PHT training institutions, ensuring the minimum entry requirements for PHO applicants, conducting Council examinations for PHOs and PHTs, and ensuring prerequisites for registration and licensure are met, including the completion of a twelve 12- month internship. Upon completion of internship, candidates are registered by the Council as Public Health Officers and Public Health Technicians and are issued with a practicing license, which is renewed annually for PHOs. PHOTC require PHOs to obtain CPD, which is linked to renewal of license on annual basis. The Council regulates professional conduct and maintains a register and records of all PHOs and PHTs and also regulates those in private practice.

Regulation of private practice

The Council is mandated by law to regulate professional private practice. This applies to a Public Health Officer who has been under supervision for a period not less than 5 years. The Act does not allow any person to engage in private practice if one is employed by the government or any other public body, a state corporation as defined by the state corporation Act, or if all fees and charges earned by the person are to the benefit of his employer. A private practitioner should practise on his own account and is entitled to receive the entire amount of all fees and charges earned.

4.2.7 Society of Radiography in Kenya (SORK)

The SORK is registered by the registrar of societies in Kenya under the Societies Act Cap 108, as a society exempted from registration. It is a professional body that caters to the professional interests of all the radiographers practicing in Kenya. Founded in 1962, the Society boasts of having a registered membership of about 1,100 practicing radiographers, which is estimated to be more than 90% of the diagnostic and therapeutic radiographers in Kenya. The Society is affiliated to related professional and community agencies, including the International Society of Radiographers and Radiological Technologists (ISRRT), which is the umbrella body that represents radiological technologists in all international platforms, including WHO. SORK is also affiliated with the Association of Professional Societies in East Africa (APSEA), Kenya Health Professionals Society (KHPS), and the Ministry of Health in Kenya. In order to create synergy and enhance effectiveness in the execution of its mandate, the Society is also seeking collaborative alliances with renowned training institutions like the University of Johannesburg in South Africa.

SORK is the only professional body that represents radiographers in any professional forum. The Ministry of Health classifies radiography under unregulated professions due to absence of a professional board established by an act of Parliament. In lieu of a professional regulatory body, SORK, with approval from the Ministry of Health, has actively filled this gap in regulating training, practice, and ethical issues for radiographers. It is directly responsible for the professional, educational, research, public service, and workplace interests of its members. It also determines the radiological healthcare agenda and gives opinions on a wide range of professional issues. In addition, it also sets the practicing and training standards that become the policies co-opted and acclaimed by the government and health professionals in the country.

SORK Radiographers fall into three categories.

- **Diagnostic Radiographers.** These radiographers are those who use both ionizing radiation and non-ionizing radiation techniques in producing images used for diagnosis. Some of the techniques employed include x-rays, ultrasound, fluoroscopy, CT (Computed Tomography), MRI (Magnetic Resonance Imaging), nuclear medicine, and angiography. These radiographers account for 73% of the radiographers practicing in Kenya.
- **Therapy Radiographers.** These are radiographers qualified to plan and deliver radiotherapy treatment, mostly in cancer treatment. These account for 25% of the radiographers practicing in Kenya.
- **Lecturing Radiographers.** These account for 2% of the radiographers.

Regulation of training institutions and programs

Radiography training in Kenya is offered in two institutions: Kenya Medical Training Collage (KMTC) which trains at diploma and higher diploma levels, and the Jomo Kenyatta University of Agriculture and Technology (JKUAT), which trains at bachelor's level. For KMTC, radiographers are trained in six campuses: Nairobi, Eldoret, Nyeri, Manza, Mombasa, and Kisumu. The programs trained at diploma level include medical imaging sciences. Those at higher diploma level include radiotherapy and ultrasound. The programs offered at bachelor's level include diagnostic and therapy radiography. The society, through its Professional Development, Education and Research (PDERC) Committee, is also currently overseeing the development of Computed Tomography and Magnetic Resonance (CTMR), ultrasound, and nuclear medicine curricula for the upcoming master's programs.

The degree program in JKUAT has been running since 2012. By 31st December 2015, a total of 159 people were enrolled in the bachelor's program, both by direct entry and upgrading. KMTC has an average intake of 25 radiography students per campus and an average number of 160 radiographers graduating annually in the last 5 years. The society is in the process of accrediting Thika School of Medical and Health Sciences, a private institution, to train Diploma of Medical Imaging Sciences, and will be initiating indexing protocols.

The activities of SORK are geared towards carrying out quality control, continuous professional development (CPD) and continuous education (CE) all over the country, and SORK accredits the CPD points attained for onward transmission to the Ministry of Health (MOH). In order to achieve its objectives, the PDERC Committee of the Society:

- Ensures that training institutions are adequately equipped through standardized education curriculum and guidelines that have been internationally benchmarked, in order to train internationally competitive professionals. With this regard, the committee has developed the following essential tools: a national requirement for training radiographers and CPD booklets. It is currently developing a national curriculum.
- Organizes opportunities for members to engage in CPD activities, thereby, retaining relevance in service (e.g. radiographers scientific conferences and the Pan African Congress of Radiology and Imaging (PACORI) conference). The Society also collaborates with interested partners to provide subsidized professional training for its members.
- Works to ensure its members enjoy the freedom to practice, that in no way are they being marginalized or mishandled. It oversees the professional wellbeing of radiographers at the national and county levels.

Collaboration with RPB

Pursuant to the provisions of the Radiation Protection Act Cap 243 Laws of Kenya and regulations therein require that all radiation workers, including radiographers, apply for registration and/or license to administer ionizing radiation. With that regard the Radiation Protection Board ensures that all radiographers applying for license to administer ionizing radiation have been vetted by SORK for professional regulation in training and practice.

4.2.7 Radiation Protection Board (RPB)

The mandate and composition of the Board

The first Radiation Protection Law (RPL) was published in 1968 and was referred to as the Radiation Protection Ordinance of 1968. This was mainly published to regulate uses of ionizing radiation (IR) such as x-ray used in diagnostic radiography and gamma/x-ray/positrons used in cancer treatment. However, use of IR progressively continued to increase in other economic sectors and the 1968 Radiation Ordinance was repealed to be the Radiation Protection Act (RPA) and published in 1982 as Cap 243 Laws of Kenya. The RPA was enacted in 1986 with two Legal Notices; 54 and 55. The two Legal Notices (54 & 55) were reviewed and combined to be Legal Notice 160 of 2010, which is currently in use.

Radiation Protection Act, Cap 243 resulted in establishment of a regulatory authority – Radiation Protection Board (RPB) with the responsibility for protecting the health and safety of people and the environment from the harmful effects of ionizing radiation. It regulates

the use of ionizing radiation, exportation, importation, distribution, and possession/ applications of radiation sources. The Board operates under two subsidiary legislations namely, The Radiation Protection (standards) Regulations – (LN 54/1986) that provides for the levels of radiation exposure in the medical profession and consumer products. The Radiation Protection (structural requirements and inspection of buildings) Regulations LN 55/1986 that deals in radiation safety of all buildings, packages and storage sites of radiation sources.

The current Board membership covers all national economic sectors and comprises a Chair appointed by the Cabinet Secretary (CS) of health, and the Director of Medical Services. Other members are appointed by the Cabinet Secretary (CS) of health and include a public officer responsible for labour, public officer responsible for higher education, public officer responsible for industry, public officer responsible for agriculture, public officer from Kenya Defence Forces, public officer from National Police Service, public officer from National Intelligence Service, public officer responsible for Labour, public officer responsible for Foreign Affairs, public officer responsible for Research (KEMRI), public officer responsible for Law office (AG Office), public officer responsible for United Nations office and a public officer nominated by the National Council for Science and Technology. Additional members include not more than two persons with special knowledge in safe handling of radiation sources and the Chief Radiation Protection Officer who is the Secretary to the Board.

Programs regulated by the Board

1. Provides radiation safety inspections/assessments using an annual inspections planner programme. Inspections are carried out as a requirement for renewal of annual licences for facilities.
2. Carries out inspections by board-certified radiation protection service providers, also referred to as Technical Service Organizations (TSOs).
3. Provides registration and licensing of all radiation workers in the medical field. These workers include: Diagnostic Radiographers, Radiation Therapy Technologists, Medical Physicists, Oncologists, Dental Specialists, Radiologists and Nuclear Medicine Specialists.
4. Approves/accredits TSOs by issuing annual certificates
5. Conducts radio-analysis of consumer products such as food items, materials used to process the foods, motor vehicles originating from suspicious countries that had incidents of nuclear, explosions.
6. Provides border surveillance for illicitly trafficked radiation sources that can be used to make dirty bombs.
7. Regulates/controls/carries personal radiation dose-monitoring services for all radiation workers through certified TSOs.
8. Attends to radiation incidents through the emergency preparedness programme to harness and control risks of radiation exposure.
9. Liaises with regional and international organizations in ensuring safety culture both within and outside Kenya.
10. Authorises by licensing the importation, exportation, possession and use, transport and disposal of radiation sources.
11. Advises the Minister of Health in making regulations for the control and safety of all practices and processes where uses of ionizing radiation take place.

4.2.8 Kenya Nutrition and Dieticians Institute (KNDI)

The mandate and composition of the institution

The Kenya Nutritionists & Dieticians Institute (KNDI) was established in Kenya to provide for training, registration, and licensing of nutritionists and dieticians; provide for the registration of the standards and practice of the profession; ensure their effective participation in matters relating to nutrition and dietetics; and for related purposes under the Nutritionists & Dieticians Act No. 18 of 2007. In carrying out its mandate, the Institute under its Council shall:

- Determine and set a framework for the professional practice of Nutritionists and Dieticians
- Set and enforce standards of professional practice for nutrition and dietetics
- Enforce a program of quality assurance for the nutrition and dietetics profession
- Approve institutions for the purpose of training persons seeking registration under the Act
- Research into and provide public education on nutrition and dietetics
- Maintain the competence of members by updating their knowledge through publications and the conduct of continuing professional education
- Provide training for nutritionists and dieticians
- Design programs and methods for sensitization on suitable dietary and nutritional habits
- Perform other functions as may be necessary for the proper administration of the Act.

KNDI Council is made up of 18 members that were gazetted to run the affairs of the Institute five years earlier (amendments were on –going in Parliament at the time this report is written). The Council works through committees, which include Accreditation, Registration, and Disciplinary.

Each committee has a chairperson and members. These committees work for the Council on Strategic Technical Functions of the Institute. KNDI has an oversight role to regulate the profession of nutrition and dietetics practices within diverse sectors in Kenya.

Programs regulated by KNDI

KNDI now recognizes 54 training institutions that are progressing well with compliance with the 11 minimum standards for training. Seven training institutions are on full license, and the remaining are on interim license and progressing well towards compliance.

KINDI regulates training of nutritionists at three levels: degree, diploma, and certificate. In the last 5 years, the Institute has established core-curricula for training in nutrition and dietetics at certificate, diploma, and degree level. KNDI has also instituted mandatory indexing for students, which is done within the first month of admission for first-year students based on the guidelines. KNDI regulates a 1-year internship programme, and the posting of interns commenced in June 2015. The internship builds on the theoretical knowledge of an undergraduate degree in nutrition and dietetics based on the prescribed KNDI BSc. core curriculum. Completion of the internship establishes eligibility to take the KNDI national professional examination required to become a registered nutritionist or dietician and satisfies requirements for professional recognition at KNDI. The internship provides students with the requisite skills, expanded knowledge base, and experiential background necessary to function as entry-level nutritionists or dieticians with a well-defined professional niche.

KNDI has developed an internship framework that allows graduates of nutrition and dietetics to develop professional expertise in various disciplines of nutrition and dietetics in line with the scope of practice. Having recognized that the profession of nutrition and dietetics is wide and diverse, KNDI defines core areas of internship based on the expected scope of work in Kenya and beyond. These core professional areas shall also define the continuous professional development (CPD) path for the nutrition and dietetics graduates. The framework creates two categories of professionals within the broad scope: nutritionists and dieticians. The framework identifies four professional paths for a nutritionist (clinical nutritionist, public health nutritionists, community nutritionists, and food science nutritionists) and two paths for a dietician (clinical dietician and food service diet therapist).

Regulation of private practice

There are 40 private practitioners in this field. The private practitioners have an interim license with a check list comprising of 11 standards and are given a period of 1 year to comply. KNDI inspectors are called for inspection after 1 year to inspect for full licensing. All the tools for accreditation have been developed and are in use. KNDI is recruiting institutions to serve as CPD centers, with seven institutions expressing interest.

5. Methods

Over the past 10 years, Kenyan regulatory agencies have developed and implemented an electronic data system to assist in the efficient regulation of health professionals. This system, called the regulatory Human Resource Information System (rHRIS), facilitates the role of regulatory agencies in monitoring and regulating the health workforce. The information system enables the boards and councils to perform their everyday duties with more ease and in a timely manner. For example, employers can easily verify a candidate's credentials with the respective board/council during the hiring process to screen for fraudulent certificates. In this manner, the rHRIS is utilized to enhance health professional regulation in Kenya.

"Over the past 10 years, Kenyan regulatory agencies have developed and implemented an electronic data system to assist in the efficient regulation of health professionals. This system, called the regulatory Human Resource Information System (rHRIS), facilitates the role of regulatory agencies in monitoring and regulating the health workforce."

This report presents an analysis of five regulatory agencies' data that have a fully functional rHRIS. They include Nursing Council of Kenya (NCK), the Medical Practitioners and Dentists Board (MPDB), the Clinical Officer's Council (COC), Pharmacy and Poisons Board (PPB), and the Kenya Medical Laboratory Technicians &Technologists Board (KMLTTB). The remaining three regulatory agencies—the Public Health Officers and Technicians Council (PHOTC), Radiation Protection Board (RPB) and the Kenya Nutrition and Dieticians Institute (KNDI)—are in the process of developing their rHRIS. Therefore, only accredited training institutions data are reported from these agencies, since the rest are incomplete and cannot give a correct status of the agency processes. In addition, the background information of each has been included to inform respective professionals and sensitize the public on their legislation and mandates. The rHRIS at each board/council provides data to track the supply of Kenya's health workforce as well as health professionals training and regulation.

In the process of developing this report, key stakeholders from the Kenya's health sector, including leaders from the public, private and faith-based institutions, provided technical advice on areas of data analysis and reporting related to the regulation, training, licensing, and deployment of respective health professionals in Kenya (Appendix 8).

The report examines the training institutions and students, internships, licencing examinations, newly registered health professionals, ever-registered professionals, license renewal/retention, immigration/out-migration, and distribution of professionals within the counties. Through stakeholders consultative meetings, the information on the standards and regulation of health professionals' education and practices were summarized in the sections above. Entry requirements to training of different professional cadres are outlined in appendix 5.

The approved training institutions and trends in students enrolled by various professional institutions were analysed using different time periods for each profession from 2000 to 2015, depending on availability and quality of data. The data provide information on health professional training institutions' production capacity in Kenya including types of health professionals and levels of training; the number and distribution of training institutions; internship centres for those professionals who undergo internship; and internship-sponsoring organisation (i.e. government, faith-based or private).

The report also examines the number of ever-registered health care professionals who are under 60 years of age (mandatory age of retirement from public services, and those retained via licensure renewal) in the various registers by age, gender, and county of deployment.

The retained workforce represents the actively practicing workforce. Those not retained may not be practicing (e.g. employment in another sector, death), may have out-migrated, or may be practicing illegally. The period reported for renewed licenses differed according to the category of the health profession. The table below provides a summary of periods reported per profession.

Table 5.1: Renewal of licenses periods reported per profession

S.No	Regulatory Body	Professional Cadre	Practice License Renewal Frequency	Renewals Period Reported
1	NCK	Nurses, Midwives	After 3 years	2012–2015
2	MPDB	Physicians, Dentists	Annually	2006–2015
3	COC	Clinical Officers	Biennially	2013–2015
4	PPB	Pharmacists, Pharmaceutical Technologists	Annually	2010–2015
5	KMLTB	Lab Technologists, Lab Technicians	Annually	2006–2015

This report also examines the distribution of healthcare professionals according to the ratio of professionals to the population (number per 10,000 population) at the national and county levels. This indicator is useful in examining whether the distribution of professionals is equitable across counties. The number of professionals used in the ratio includes healthcare professionals from the public, private and faith-based health sectors who are actively practicing, that is those who retained their license with their respective agencies.

Summary of the process of tracking, registering, and regulating health professionals

The Ministry of Health (MOH) is responsible for the deployment of all health professionals at the national and county level in Kenya's public sector, which delivers approximately half (50.8%) of the health services in Kenya.[32] The MOH also partners with faith-based and private organizations to ensure access to health services across Kenya. Since every practicing health professional is required to register with their respective regulatory agency, the rHRIS contains data on all health workers in Kenya, regardless of sector (i.e. public, private, faith-based). Each health professional agency manages the data on the supply and regulation of their health professionals, including licensure renewal.

All health-training institutions, whether public, private or faith-based, are required to be approved by their respective regulatory agencies, and submit data on the enrolment of new students for indexing. However, not all training institutions have been submitting their data, which makes some agencies' data limited. NCK has been requiring indexing since 1987, COC since 2009, KMLTTB since 2003, PPB since 2004, and MPDB since 2015. All the other boards or councils mentioned in this report either started in 2015 or are in the initial stages of starting the indexing of students' process. Each student is assigned an index number, which serves as a unique identifier for that individual through graduation and into his or

> *"Since every practicing health professional is required to register with their respective regulatory agency, the rHRIS contains data on all health workers in Kenya, regardless of sector (i.e. public, private, faith-based)."*

her professional career. Key demographic data are also collected when students begin their training, including their home province and county, secondary school, date of birth, and gender.

During the student's training, some regulatory agencies collect information on training disruptions, although these data are incomplete at the time of this report and are not included. Other information collected includes licensure, registration, and areas of specialty. The NCK, COC, and KMLTTB administer a national qualification examination for registration of nurses and midwives, clinical officers, and laboratory technologists and technicians, respectively; while PPB administers the same for registration of pharmacists and enrolment of pharmaceutical technologists. Upon successful completion of these exams, the graduates can apply to enter the national professional registries. The MPDB does not require a national exam for registration except for foreign-trained doctors. Doctors trained outside Kenya but not from the EAC Region are subjected to Internship Qualifying and Pre-Registration Exam. Those from the EAC Region are given reciprocal recognition that exempts them from the exam.

Previously, for locally trained doctors, their initial point of entry to the Board's records was at internship stage. Currently as at October 2015, this has changed to indexing stage where the Board is tracking the medical students in training. Although NCK does not require internship for certificate and diploma-level nurses, BScN nurses must complete a 1-year internship prior to entry in the registry. A registration number is issued upon entry into the registry, and only registered practitioners are allowed to practice in Kenya. The rHRIS captures information on these stages of professional qualification and are presented in this report.

The rHRIS captures data on student application and scores for nurses, clinical officers, pharmacists, and medical laboratory professionals. To maintain an updated national registry, the boards/councils also track information such as continuing education, retention, disciplinary action, and intention to out-migrate. Education upgrades and short courses in academic education are also captured. An academic upgrade is when professionals advances their educational status from enrolled to registered, registered to a bachelor's

degree, bachelor to master's level, or master's level to PhD. Academic upgrades also include post-basic training in specialty areas (e.g. critical care, internal medicine). Short courses include CPD to ensure up-to-date skills, but this categorization is not provided in this report since regulatory agencies do not regulate the course or do not often capture this information. Retention, or licensure renewal, is required periodically. During retention, personal information is verified as well as attainment of the required continuing professional development hours. Disciplinary complaints from patients, facilities, and other professionals are also reported to the regulatory agencies for investigation and action; however, this information is not provided in this report. In addition, rHRIS does not capture attrition due to deaths. A proxy measure for deaths was sourced from AFYA Sacco, an organisation that draws its membership from all health professions. This is an organisation that helps its members save and get loans for development at low interests. It captures data on deaths of its members through the benevolent funds.

The boards and councils also grant permission to practice in Kenya for professionals trained outside the country who may be either Kenyan citizens or foreigners, and this information is captured in the rHRIS and presented in this report. The regulatory agencies are required to submit information on the credentials and good standing of professionals wishing to out-migrate, and that information is also captured and presented in this report.

Finally, the health regulatory boards and councils collect data on the regulation of private practice in Kenya. The private practitioners must register with the respective board/council and submit a facility inspection report from their local supervising authority. Information on the number of private practice licenses and renewals is provided in this report. The boards/councils also conduct inspections of respective health training institutions and health facilities to ensure certain standards are maintained with respect to tutor/lecturer capacity, the physical facilities, transportation, bed capacity, bed occupancy, and other infrastructure.

This report captures data on the training institutions and students, internships, licencing examinations, newly registered health professionals, ever-registered professionals, license renewal/retention, attrition (immigration/out-migration and deaths) and distribution of professionals within the counties, from 2006 to 2015.

6. Tracking health professionals' supply, regulation, and redeployment

6.1 Pre-service education for health professionals in Kenya

6.1.1 Health Professionals' Training Institutions

As of 2015, Kenya had 148 health training institutions accredited by the health regulatory agencies to train various health professionals to meet the growing demand for quality health care in the country (Figure 6.1). A majority of these training institutions (84 or 56.8%) trains at least one health professional discipline and five private institutions (3.4%) train in all the six disciplines: nursing, clinical medicine, medicine, dentistry, medical laboratory sciences, and pharmacy. Surprisingly, no government institution offers all six disciplines.

Figure 6.1 shows the distribution of the training institutions in Kenya by county and cadre. By 2015, Kenya had 102 approved nurse training institutions; 10 medical doctors training institutions of which 2 also train dentists; 36 clinical officers training institutions; 32 pharmacist and pharmaceutical training institutions, and 42 medical laboratory technicians and technologists (MLTTs) trainings institutions distributed in 36 out of 47 counties. Additionally, the PHOTC has accredited 23 training institutions, while KNDI has accredited 38 training institutions. Both PHOTC and KNDI initiated the process of accrediting training institutions recently and therefore more of these are yet to be captured in the database since the process is ongoing.

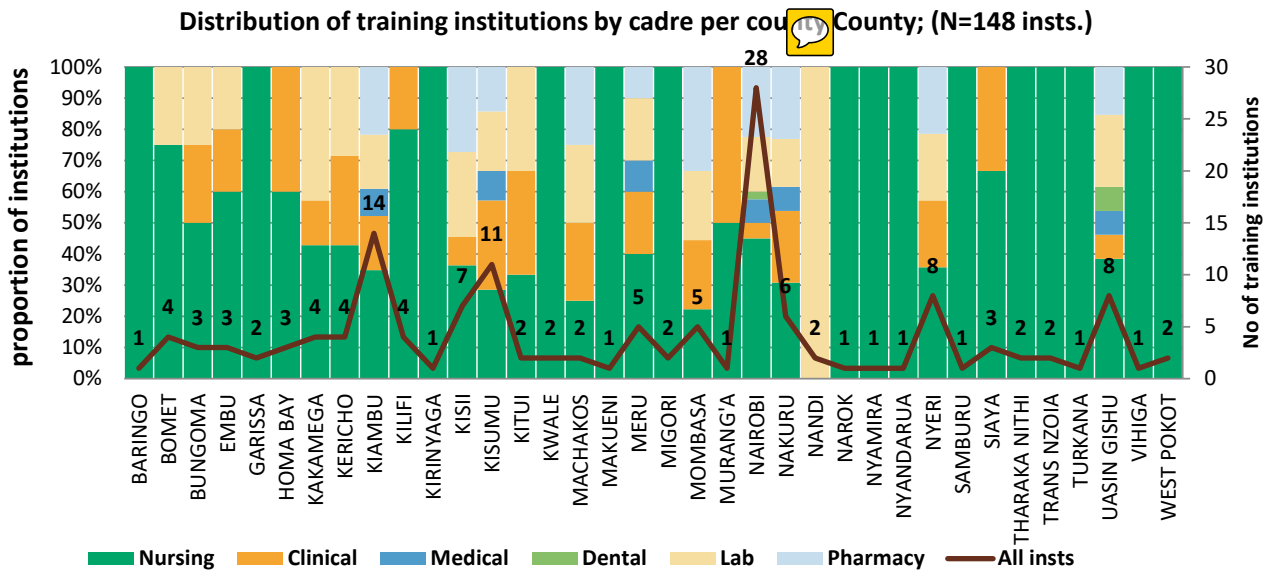
Training institutions are distributed in 36 (76.6%) of Kenya's 47 Counties. These 36 counties have at least one health training institution, with varying distribution of the cadres trained (Appendix 6). Only 5(10.6%) counties (Nairobi, Nakuru, Meru, Kisumu, and Uasin Gishu) have all health professionals cadres trained in one or more of their institutions. The 11 counties without any health training institution are Busia, Elgeyo-Marakwet, Isiolo, Kajiado, Laikipia, Lamu, Marsabit, Mandera, TaitaTaveta, Tana River, and Wajir Counties.

> *"From 2006 there has been a steady increase in the number of health training institutions for all the cadres."*

Of the 36 counties with health training institutions, 4 do not have government training institutions, thereby increasing the number of counties in Kenya without at least a government- sponsored health professionals training institutions to 15 (31.9%). In addition, 14 of the 36 counties with training institutions have only government-sponsored institutions. They include Baringo, Bungoma, Garissa, Kitui, Kwale, Machakos, Mombasa, Makueni, Muranga, Nyamira, Siaya, Trans-Nzoia, Turkana, and Vihiga. Four counties namely Kirinyaga, Narok, Nyandarua, and Samburu have predominantly faith-based institutions as shown below (Figure 6.2). A total of 73 (49.3%) of health training institutions are public institutions, 36 (24.3%) are faith-based, and 39 (26.4%) are private sponsored.

From 2006 there has been a steady increase in the number of health training institutions for all the cadres, for example Kenya had 2 training institutions in 2006 for doctors and 10 in 2015.

Figure 6.1 : Health training institutions by county and cadre



Nursing training institutions

The distribution of nurse training institutions varies across counties by sponsoring agent. Of the 102 nurse training institutions accredited by 2015, 51(50.0%) are government-owned, 33 (32.35%) are Mission/FBO, and 18 (17.65%) are private training institutions. Ten counties (Baringo, Bungoma, Kitui, Kwale, Machakos, Makueni, Murangá, Nyamira, Siaya, and Turkana) have predominantly government-based training institutions while Bomet, Homabay, Kiambu, Meru and Vihiga counties have more faith-based nurse-training institutions than public and private. Out of the 148 health professional training institutions, 57 (38.51%) only produce nursing professionals.

Nurse training institutions may offer programs at three levels: certificate, diploma, and bachelor's degree. Of the 102 nurse training institutions, 22 are universities and 80 are mid-level colleges, including 34 medical training colleges (MTCs), with some offering more than one type of program. Among the universities, 11 are public, 5 private- and 6 faith based.

Clinical officers training institutions

By 2015, there were 36 clinical officers training institutions of which 22 (61%) were public, 4 (11%) faith-based and 10 (28%) private. The 36 training institutions are located in 19 out of the 47 counties. Kisumu county has the majority 5 (14%), followed by Kiambu and Kisii with each 4(11%), Nakuru and Nyeri each with three training institutions, while the rest have either two or fewer training institutions that produce clinical officers. Only 2(5.56%) of the 36 training institutions train clinical officers' cadre only and the rest are integrated with the other health professional disciplines.

Clinical officers training institutions may offer programs at two levels – diploma and bachelor's degree. Of the 36 CO training institutions, 6 (17%) train clinical officers at bachelor's level in addition to training at diploma level.

Medical and dental training institutions

As of 2015, there were 10 medical institutions training physicians, but only 2 of these have dental institutions. Six (60%) are public, 2 (20%) private and 2 (20%) faith-based. None of the institutions train physicians or dentists exclusively; they also train other cadres of health professionals. The institutions are located in 6 out of Kenya's 47 counties. Nairobi has 3 (30%) institutions, Kiambu and Kisumu counties each have 2 institutions, and Meru, Nakuru and Uasin Gishu each 1 institution. Dentistry is only taught in two institutions in Kenya—the University of Nairobi in Nairobi County, and Moi University in Uasin Gishu County.

Pharmacy and Pharmaceutical Technologists training institutions

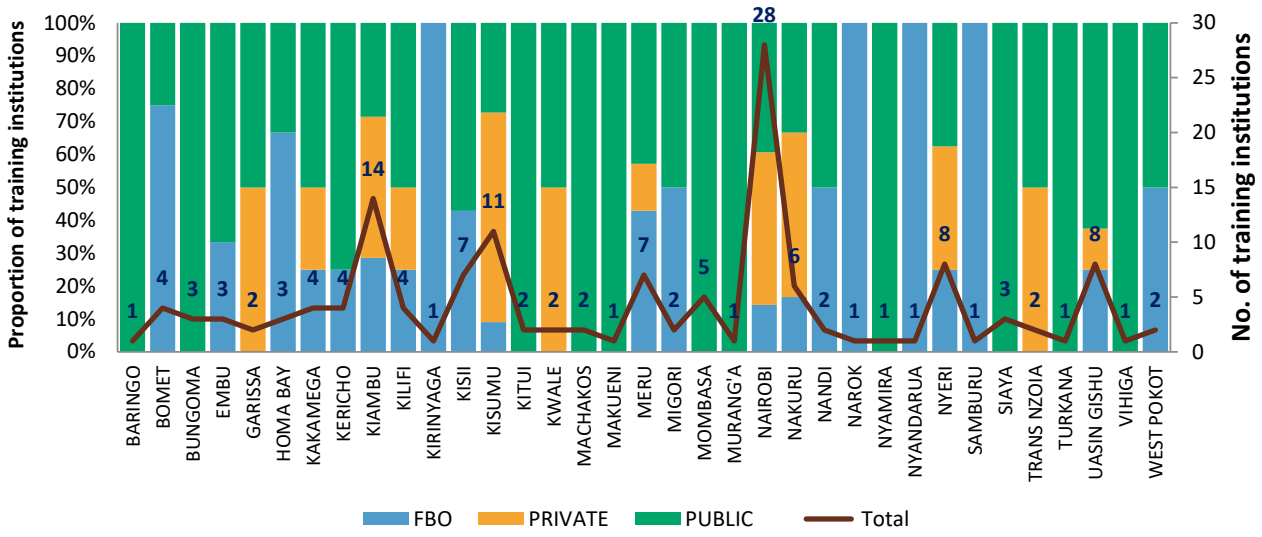
There were 32 training institutions approved by PPB, comprising of 7 universities for training pharmacists and 25 diploma colleges for training pharmaceutical technologists. Of these, 20 (63%) are public, 3 (9%) faith-based, and 9 (28%) are private (Figure 6.2). The 32 training institutions are located in 10 (21%) out of the 47 counties in Kenya. Nairobi County has the majority of the training institutions—8 (25%); followed by Kiambu 5(16%). Kisii, Kisumu, Mombasa. Nakuru and Nyeri counties has each three training institutions, Uasin Gishu two; whereas, Meru, and Machakos, have each one government (public)-owned pharmacists and pharmaceutical technologists training institution.

Of the 32 pharmacists and pharmaceutical technologists training institutions, 25 (78%) are training at diploma level and the rest are training at degree level. Three public, one private and one faith-based universities train pharmacists at bachelor's level. Technical University of Kenya and Kisii University are currently training at diploma level.

Medical laboratory technicians and technologists training institutions

By the end of 2015, there were 42 medical laboratory technicians and technologists training institutions in Kenya, of which 27 (64%) are public institutions, 11 (26%) are private and 4 (10%) are faith-based institutions. Four institutions train at degree level only; 1 trains both diploma and degree level; 4 train all the three levels; 22 train at both diploma and certificate levels, while 11 train at diploma level only. Of the 42 training institutions, 17 (36%) of the 47 counties in Kenya have at least one MLTTs training institution. Nairobi County has the highest number (7), with more public (5) than private (2) institutions. Kiambu and Kisumu counties follow with four training institutions each. Of the 17 counties with training institutions, 4 (24%) counties have each only 1 training institution sponsored by the government: Bungoma, Embu, Kitui, and Machakos counties. Kisii and Mombasa counties have more than one training institution and all are fully government-sponsored institutions. Only 12 institutions offer specialized MLTTs training without other disciplines. (See Figure 6.1)

Figure 6.2: Health training institutions by county and sponsoring agent

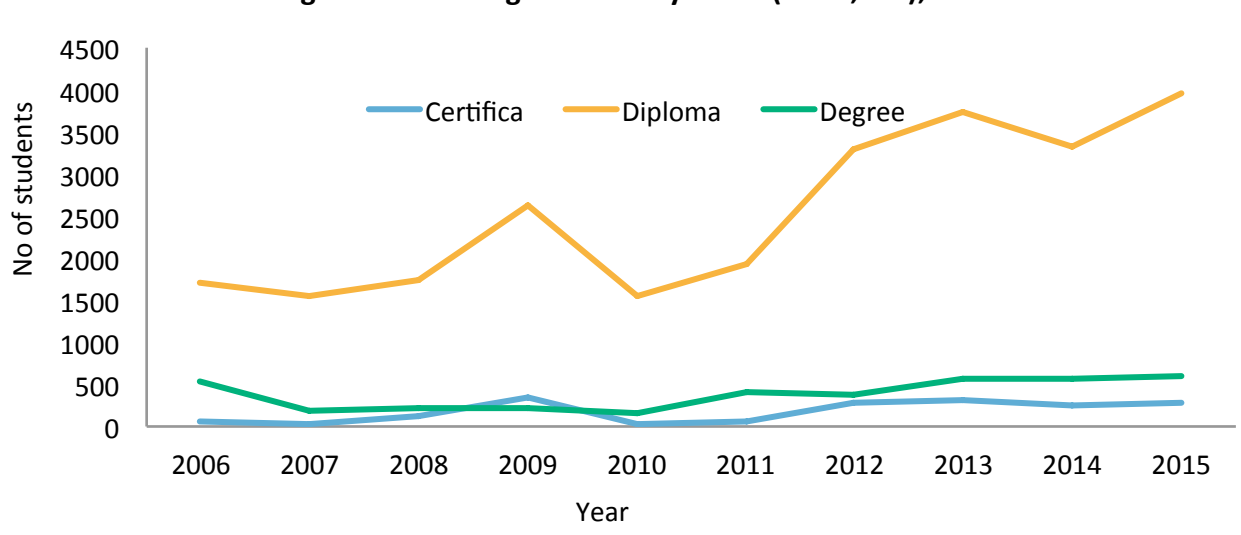


6.1.2 Health professionals' training capacity (annual output) in Kenya

a. Nurses

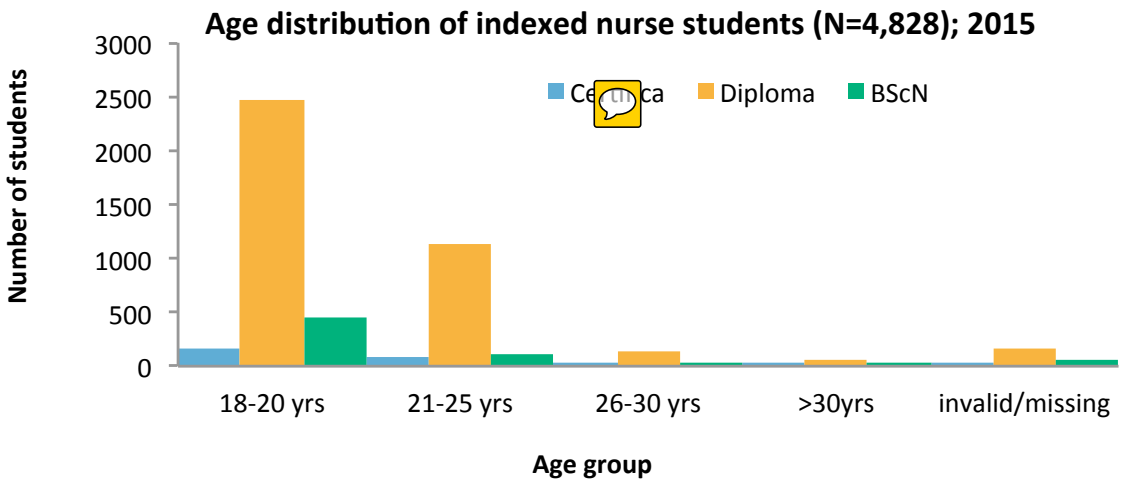
From 2006–2015, 30,993 nursing students were admitted into nursing programs either as new entrants [29,620 (95.6 %)] or as upgrading students [1,373 (4.4 %)]. During these 10 years, 25,397 (81.9%) students were admitted in diploma programs, 3,849 (12.4%) in BScN and 1,747 (5.6%)]in certificate programs. In 2015, more than 4,000 students enrolled in nursing programs (Figure 6.3). The majority (63.8%) were between 18–20 years of age (figure 6.4). The annual intake of new students has been fluctuating over the period of the report; however, the number of indexed students has been increasing gradually for all levels of nursing training, rising twofold in 2015 as compared with the year 2006. This increase followed the expansion of nurse training institutions from 77 schools in 2006 to 102 in 2015.

Figure 6.3: Indexing of new nursing students by cadre, 2006–2015 in Kenya (N=30,993)



Of the new nursing students in training, almost half 15,065 (48.6%) were from 10 of the 47 counties in Kenya. Of these, 2,670 (17.7%) were from Nairobi county, followed by 2,391(15.9%) from Kisii, 1,710 (11.4%) from Meru, 1,419 (9.4%) from Kiambu, 1,288 (8.5%) from Kakamega and 1,283 (8.5%) from Nakuru. At the time this cohort (2006–2015) was being trained, 34 (72.3%) of 47 counties in Kenya had at least 1 nursing school. Many of the 13 counties without a nursing school have lower ratios of retained nurses to the county population (e.g. Marsabit, Tana River, and Mandera as seen in Appendix 7).

FIGURE 6.4: AGE DISTRIBUTION DURING ENROLMENT TO NURSING PROGRAMS IN 2015

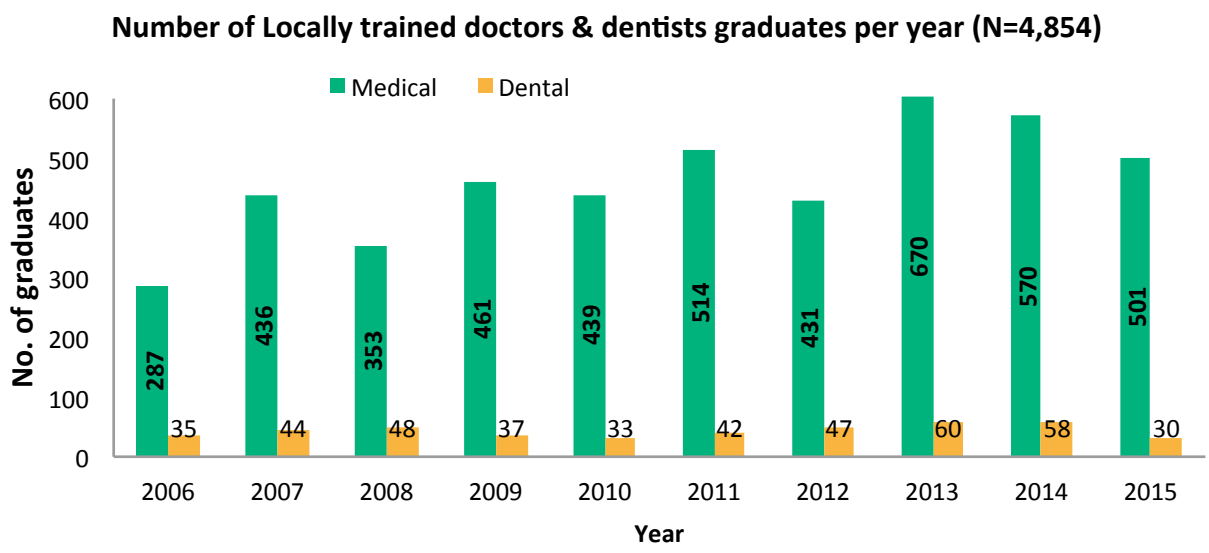


B. MEDICAL DOCTORS AND DENTISTS

As noted previously, the MPDB recently started indexing students entering approved medical and dental institutions. Beginning October 2015, the Board started enforcing indexing for the students entering training institutions. Without indexing data, training capacity can be estimated through the number of medical doctors and dentists in institutions graduating per year, as captured in the database during application for internship.

The number of medical doctors graduating almost doubled from 287 in 2006 to 501 in 2015, giving an average output of 466 doctors per year. The number of dentists graduating in a year averaged 43 dentists with a high of 60 in 2013 (Figure 6.5). This increase in medical and dental graduates is likely due to the increase in number of medical and dental training schools in Kenya from 2 in 2006 to 10 in 2015.

Figure 6.5: Number of doctors and dentists' graduates per year (2006–2015)



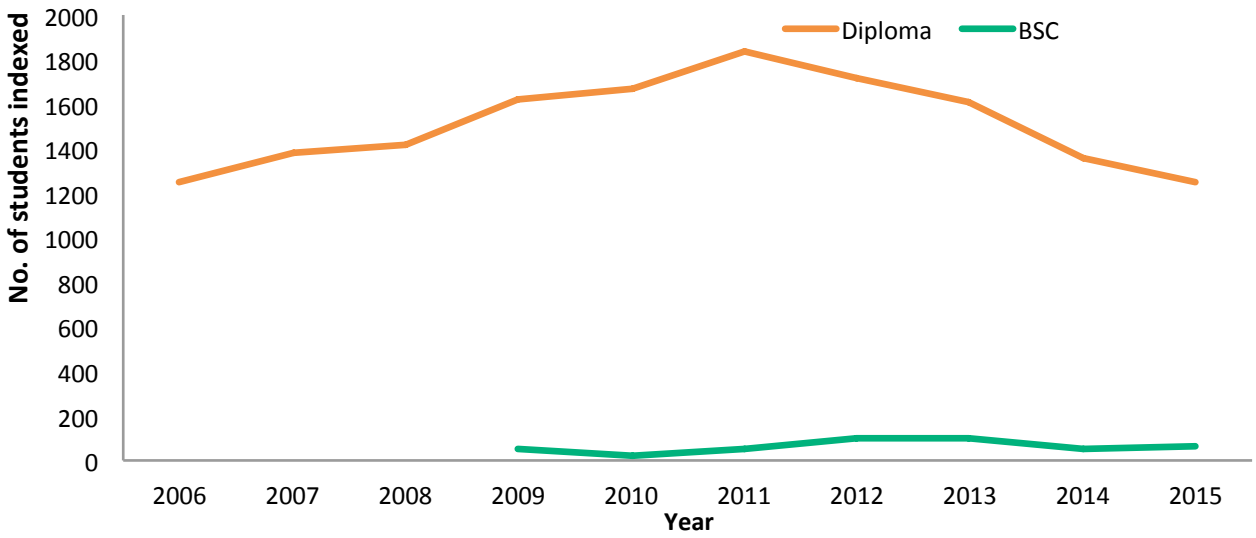
c. Clinical officers

The annual intake figures of new students admitted for diploma program has consistently declined from 1,833 in 2011 to 1,254 students in 2015 (Figure 6.6). The online indexing process rolled out in 2014 and fully automated in 2015, initially led to a slow uptake. In 2014, both desktop and online processes were allowed since some training institutions were still being trained. Those encountering challenges were allowed to submit their application directly to the Council, but in 2015, full automation took effect and due to strict validation checks, some records were not cleared for processing. Through the help desk, professionals are getting help on how to process their own applications.

On average, a training institution has a student holding capacity of 57 clinical medicine students. The range is between 50 and 90 students, but only one training institution has a student holding capacity of 90 for both diploma- and degree-level courses. Recently, the revised guidelines for online indexing have harmonized the intakes per institutions to 50 students as a measure to regulate the quality of training. The online application that was rolled out in 2014 was designed to accept the first 50 applications from any given institution; therefore there was a drop in the number of new clinical medicine students indexed, as this was met to help regulate the quality of training. The COC did not accept any paper-based indexing after 2014.

After the introduction of online indexing in 2014, the number of students who were successfully indexed dropped because the training institutions faced some challenges using the new technology. Some cases had supporting documents uploaded incorrectly, and due to strong validation checks, the system automatically rejected them into a holding module for further review. Others did not complete the online indexing application form appropriately and the application was declined and the student expected to reapply. With streamlined processes, COC started enforcing the maximum number of students per training institution and hence some had to lower their intake levels from what they previously enrolled. The capping of maximum number of students was geared towards improvement of the quality of training.

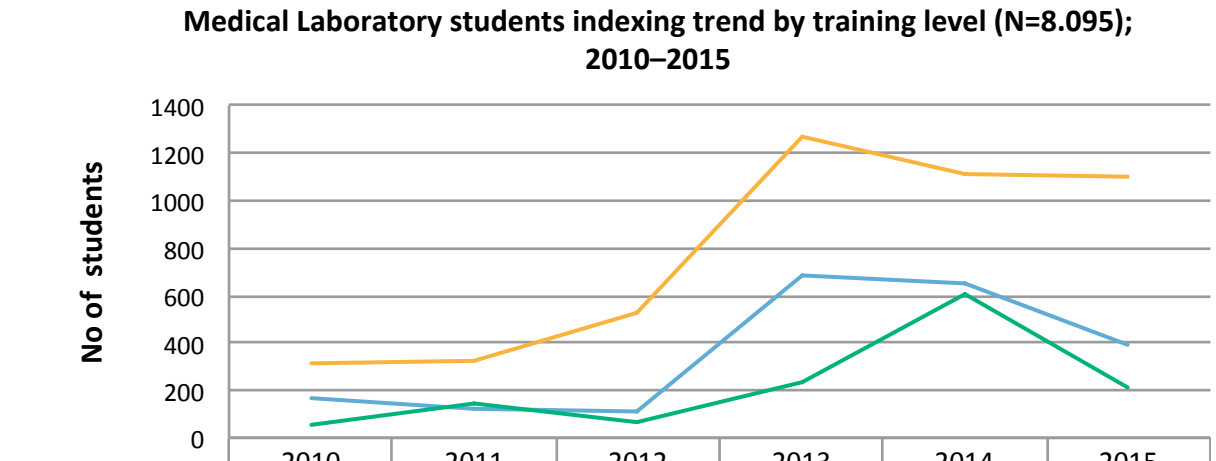
6.6: Indexing trend for clinical medicine students by program, 2006–2015



d. Medical laboratory students

Figure 6.7, shows the medical laboratory students (i.e. laboratory technologists and technicians) admitted into various institutions from 2010 to 2015.There were 8,095 students enrolled into MLTs training institutions at pre-service during that period. Of these, 4,653 (57.5%) were enrolled into diploma program, 2,124 (26.2%) into certificate and 1,318 (16.3%) in degree program. The annual intake of new students admitted for various MLT programs has been increasing gradually, reaching the highest peak in 2014 as more students enrolled for the programs, before a sharp decline in 2015. This was the period when enforcement of gazetted minimum entry requirement for medical laboratory science training took full force.

Figure 6.7: Medical laboratory science students indexing by training level (2010-2015)

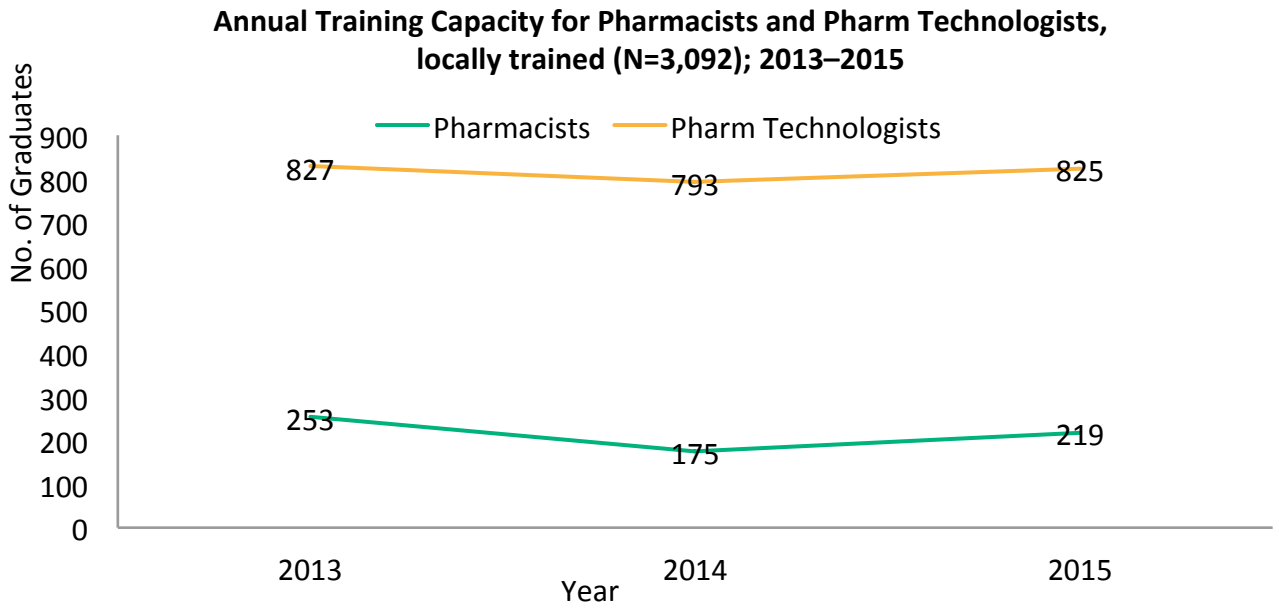


	2010	2011	2012	2013	2014	2015
CERTIFICATE	164	123	108	683	656	390
DIPLOMA	314	325	528	1266	1117	1103
BSC	54	140	69	237	609	209

e. Pharmacists and pharmaceutical technologists

The PPB started indexing students admitted to the training institutions in 2014, but has reported challenges in tracking the numbers. To estimate training capacity, the number of pharmacists and pharmaceutical technologists that graduated in each of the 3 years (Figure 6.8) for which data were available was utilized. Training capacity is estimated at 216 new graduates annually for pharmacists and 815 new graduates annually for pharmaceutical technologists.

Figure 6.8: Annual training capacity for pharmacists and pharm technologists, locally trained (2013-2015)



f. Public health officers, radiographers and nutritionists

The regulatory agencies for public health officers and radiographers are newer, and therefore there are no data available on indexing. This process is currently being initiated at both PHOTC and RPB, which are developing indexing policies. For nutritionists and dieticians, the student tracking process has begun but is yet to cover all the accredited training institutions. Therefore, indexing data on new student enrolment for these cadres will be reported in future reports.

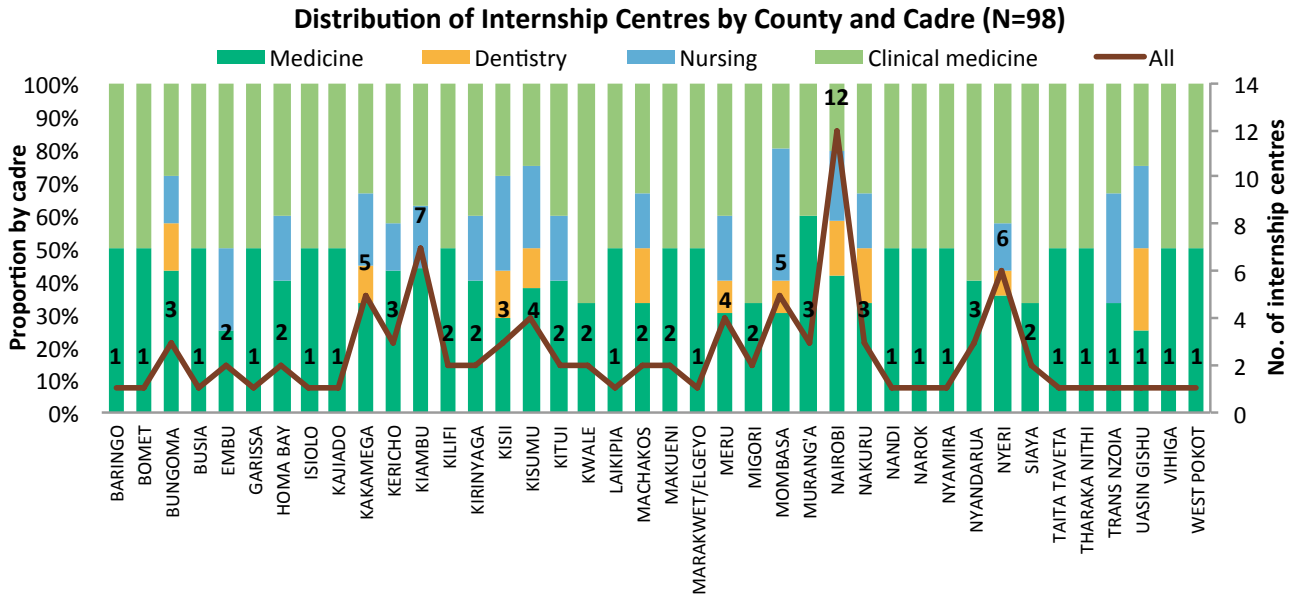
6.2 Internship and licensing examinations

6.2.1 Internship

Figure 6.9 shows the distribution of internship centers by cadre and county for the four cadres who have reported their internship data. However, six cadres including bachelor's-trained nurses (BScNs), doctors, dentists, clinical officers (diplomas and BSC), nutritionists, and pharmacists are required to complete a 1-year internship following their graduation. All the other professionals enter the labor market immediately after graduation, but their clinical or other practical experience/internship is part of their training curricula

At least 40 of the 47 counties in Kenya have an approved internship center, but only 10 (21.3%) counties have internship centers for all the 4 professionals (figure 6.9).

FIGURE 6.9: DISTRIBUTION OF INTERNSHIP CENTERS BY CADRE AND COUNTY (2015)

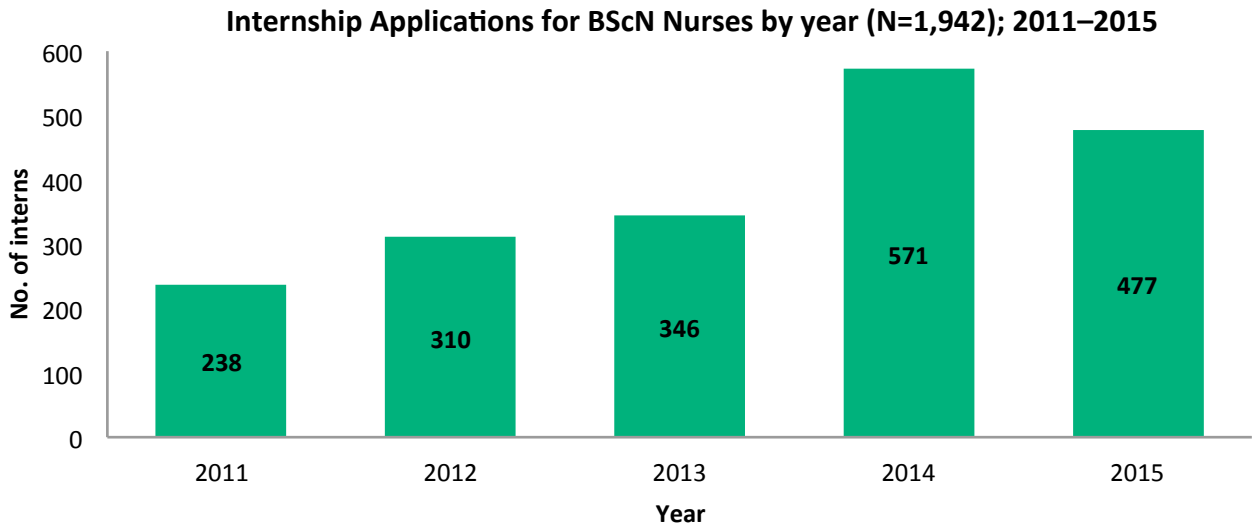


**NB// some training institutions train more than one program

NURSES

Degree-level nurses must complete a 1-year internship before registration. However, nurses upgrading from diploma to degree do not undergo internship posting. Nurses have 32 internship centers distributed in 18 (38.3%) of the 47 counties in Kenya. The highest is Nairobi 5 (15.6%), followed by Mombasa 4 (12.5%) and Kiambu 3 (9.4%). Application for BScN internship increased from 2011 to 2015, peaking in 2014 (figure 6.10).

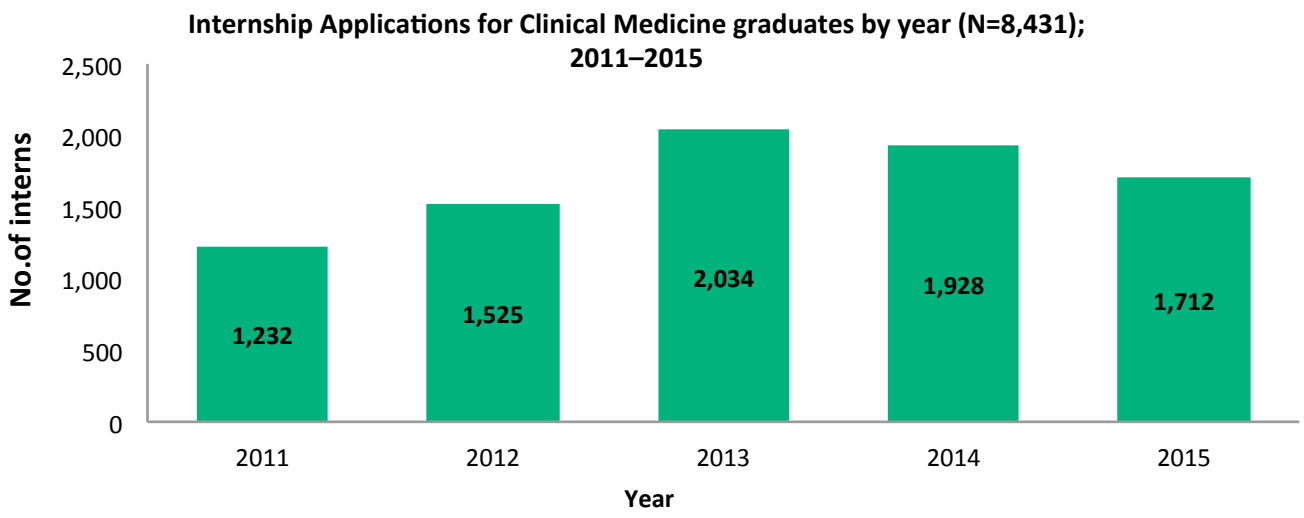
Figure 6.10: Number internship applications for BScN graduates by year



Clinical officers

Clinical officer graduates must pass a COC exam to be posted for internship. Clinical officers have 81 internship centers distributed in 40 counties. Counties without internship centers are Lamu, Mandera, Marsabit, Samburu, Tana River, Turkana, and Wajir. Application for internship in clinical medicine grew from 1,232 in 2011 to 1,712 in 2015, peaking at 2,034 in 2013 (See Figure 6.11).

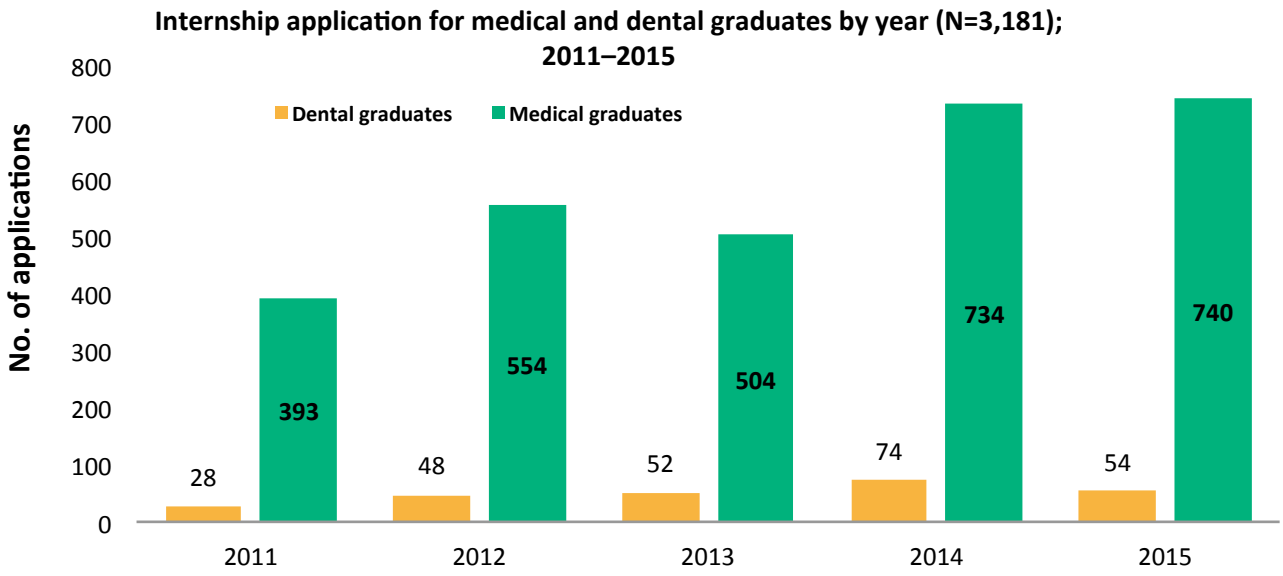
Figure 6.11: Number of internship applications for clinical medicine graduates by year



Medical doctors and dentists

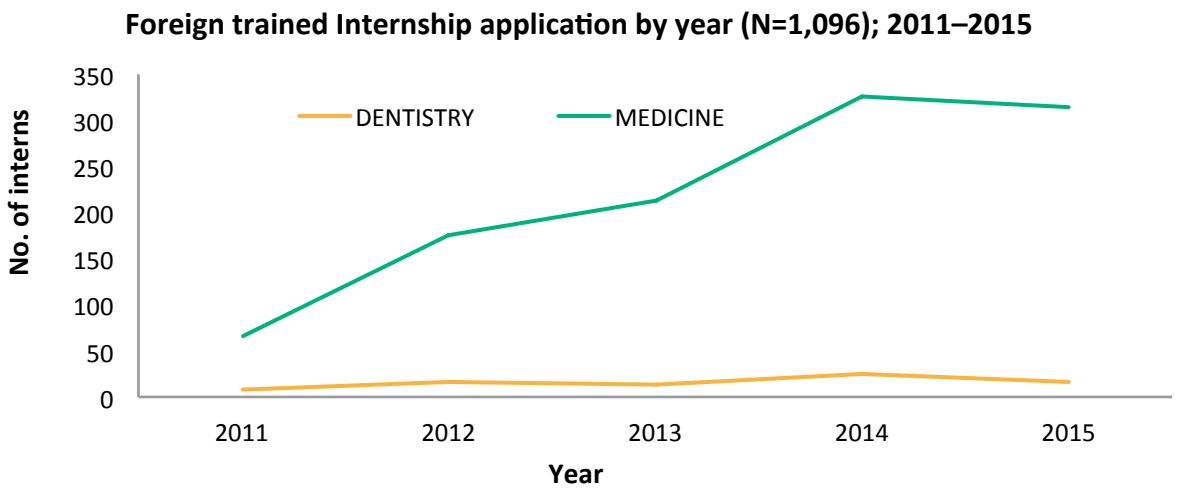
MPDB requires doctors to successfully complete 1- year of internship prior to registration. The internship is conducted on a rotational basis, including 3 months in each of the main disciplines, including internal medicine and mental health, surgery, pediatrics and child health, and obstetrics and gynecology. Similarly, every dentist is required to undergo an internship training program for a period of 1 year to be conducted on a rotational basis, 3 months in each of the main disciplines: oral and maxillofacial surgery, conservative dentistry and prosthetics, orthodontics and paediatric dentistry, and periodontology. By 2015, there were 82 approved medical internship centers distributed in 40 of the 47 counties and 14 approved dental internship centers located in 11 of the 47 counties. Nairobi County has the highest number [10 (12.2%)] of medical internship centers. Most [61 (74.4%)] of these centers are government affiliated; [15 (18.3%)] are private and [6 (7.3%)] are faith-based. Application for doctors and dentists internship increased from 393 and 28 in 2011 to 740 and 54 in 2015 (figure 6.12).

Figure 6.12: No. of internship applications for medical and dental graduates by year



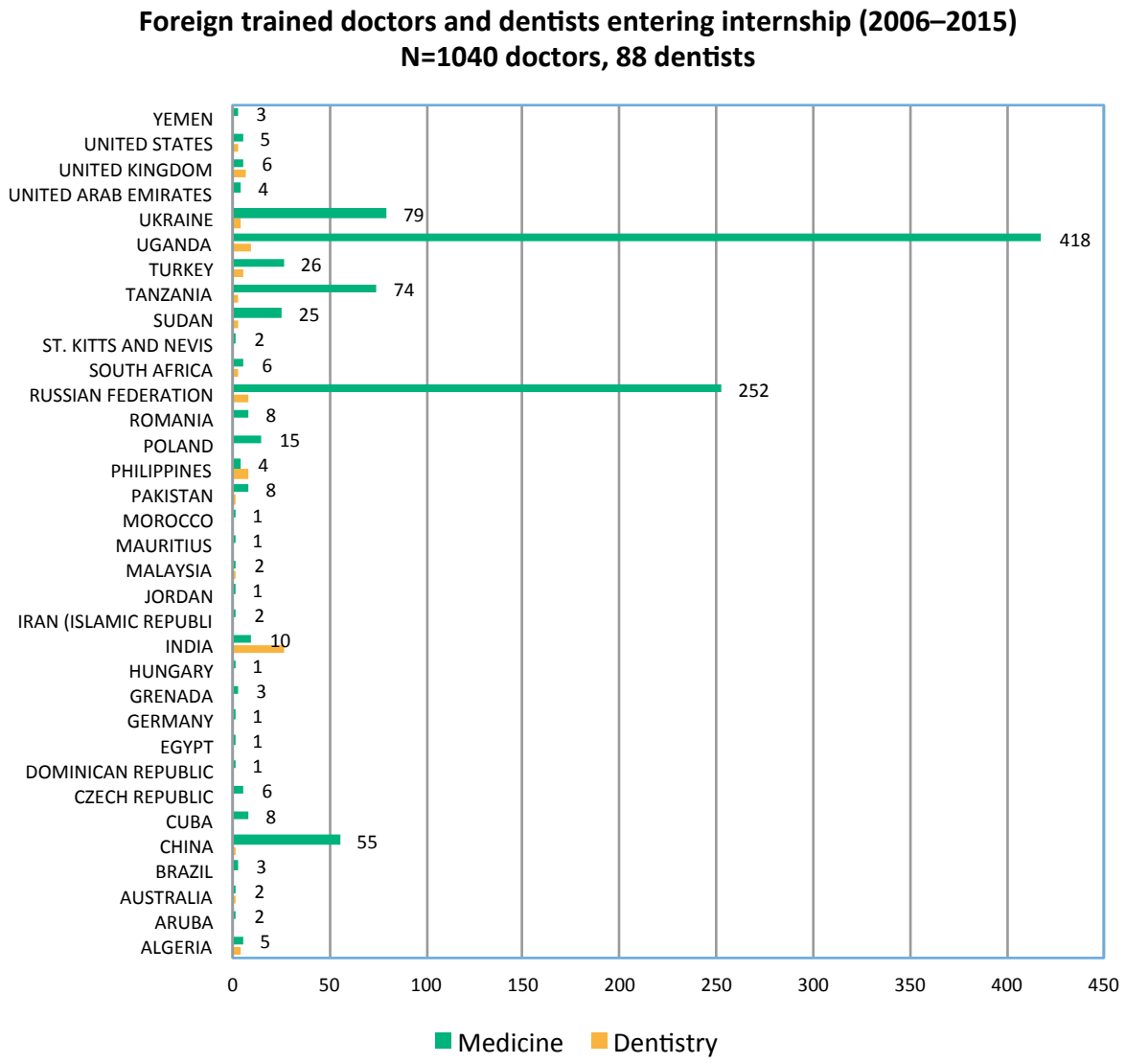
Foreign-trained health professionals must undergo compulsory internship before registration with MPDB. A review of medicine internship applications by foreign-trained graduates between the years 2011 to 2015 shows an increasing trend in the number of applicants coming into the country. Applications by foreign-trained dentists remained steady throughout the period on average.

Figure 6.13: Number of foreign trained medical doctors and dentists internship applications by year



Of the 3,213 doctors who entered internship between 2006 and 2015, 1,040 (32.4%) were foreign trained, and out of 274 dentists who took internship within the same period, 88 (32.1%) were foreign-trained. The majority of foreign-trained dental interns were trained in India, 26 (29.5%), followed by Russian Federation and the Philippines with 8 (9.1%) each, and United Kingdom with 7 (8.0%). Most of the foreign-trained medical interns during the 10 years were from Uganda, 418 (40.2%) followed by Russian Federation, 252 (24.2%), Ukraine, 79 (7.6%), Tanzania, 74 (7.1%) and China, 55 (5.3%). Figure 6.14

FIGURE 6.14: COUNTRY OF TRAINING OF FOREIGN-TRAINED MEDICAL AND DENTAL INTERNS



PHARMACISTS AND PHARMACEUTICAL TECHNOLOGISTS

As a prerequisite for registration, pharmacists undergo an internship of 12 months. Pharmaceutical technologists attachment is for 7 months. Internship entails a structured training program carried out under the supervision of a PPB-approved preceptor, during which a graduate has an opportunity to consolidate his/her knowledge and skills to enable him/her to be a competent pharmacist in Kenya. Data on internship were not available for analysis.

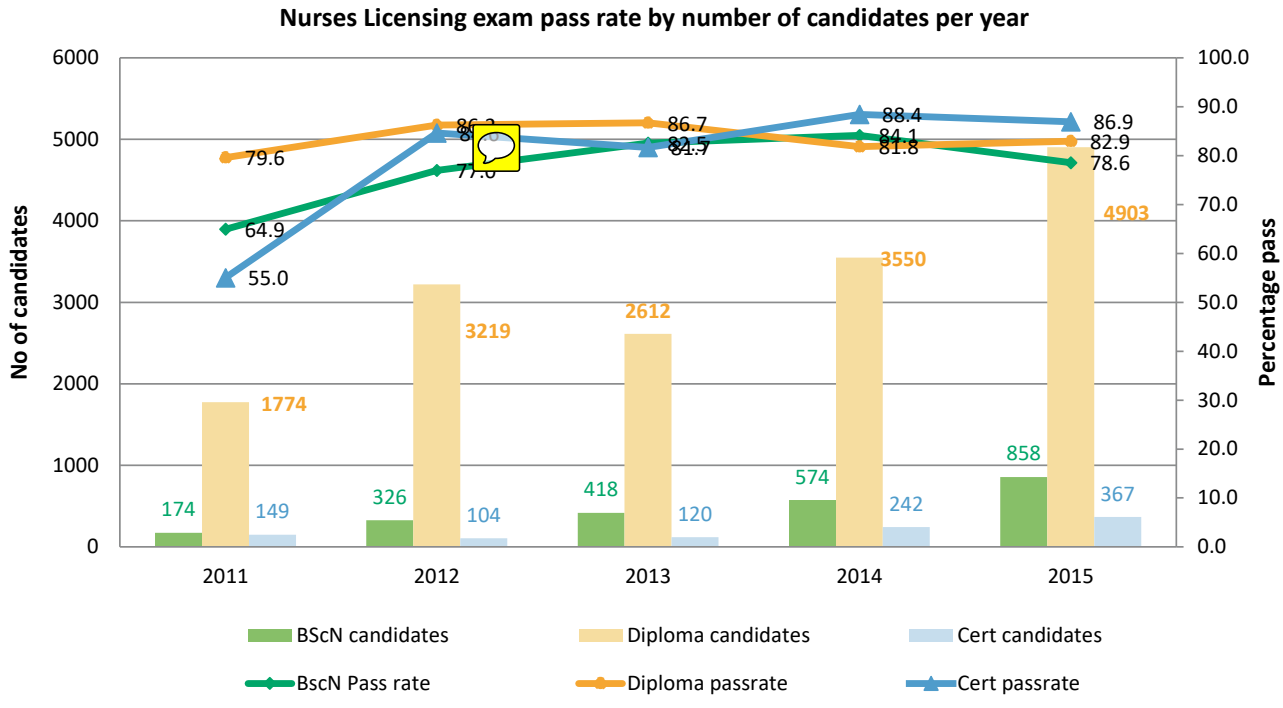
6.2.2 Licensing examinations

Health professionals undergo licensing examinations before they are licensed and registered to practice by their regulatory body. Licensing examinations are conducted after students graduate from the training institutions.

Nurses

The NCK administers a national qualification exam for certificate (enrolled), diploma (registered) and degree (BScN) nurses. After they successfully complete this exam, certificate and diploma nurses can apply to enter the national register. NCK reported there were increasing applications to nursing licensing examinations. Comparing 2011 and 2015, the annual nursing licensing examinations applications increased twofold (Figure 6.15). The pass rate for certificate- level and bachelor's-level nurses increased over the years, except for a slight drop in 2015. Diploma- and certificate-level trained nurses have maintained an average pass rate of more than 80% over the years. On average, 18.4% of certificate-level, 16.4% of diploma-level, and 20% of BScN-level candidates do not make it to register in their first attempt of sitting for registration examination. This implies that 16.9% of the trained nurses fail to enter the registry every year because they fail the registration examination. However, students who fail the NCK exam are eligible to retake the exam during the next exam period, and therefore most would eventually get registered.

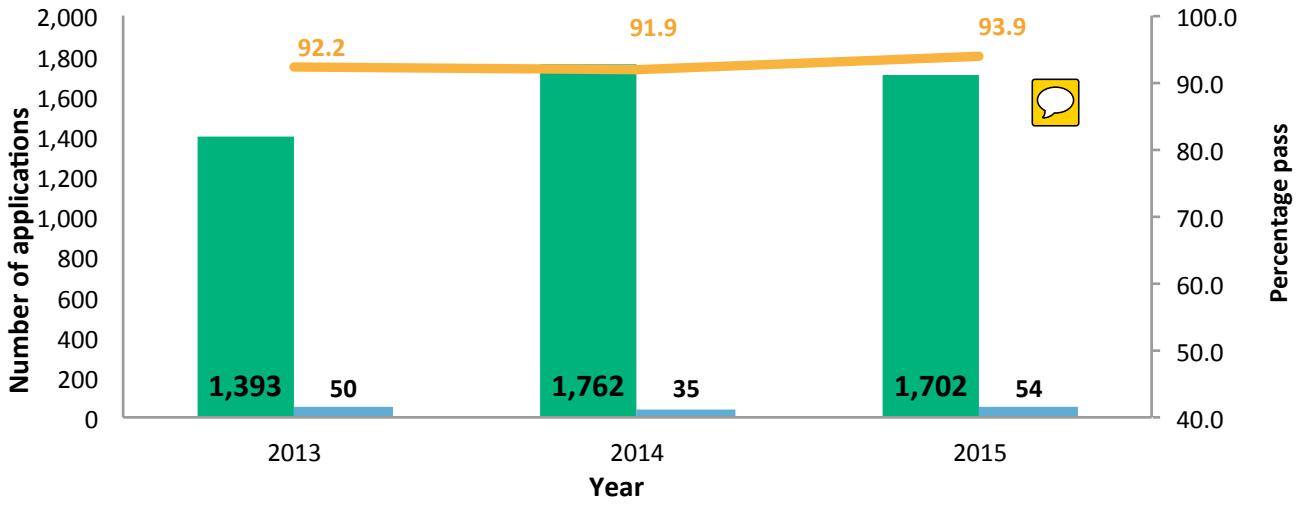
Figure 6.15: Nurse licensing examination candidates by year



Clinical officers

Initially, clinical officers (COs) who trained outside Kenya were subjected to an assessment process by the council before being posted for internship. In 2009, the council introduced a pre-internship examination to ensure standard of quality among all new clinical officers who intended to be registered under the Act. However, the process was manual and no electronic data were captured at the time up until the exam module was implemented in rHRIS. There was an increasing trend in the number of COs who sat for pre-internship examination from 1,393 in 2013 to 1,702 in 2015 for diploma holders. The majority of the candidates passed their examinations and qualified for internship placement with an average pass rate of 92.7% (Figure 6.16). As of 31st December 2015, only one institution had graduated bachelors' level professionals and therefore data were not adequate for comparison with the diploma holders.

Figure 6.16: CO Pre-internship exam pass rate by number of candidates per year



Medical doctors

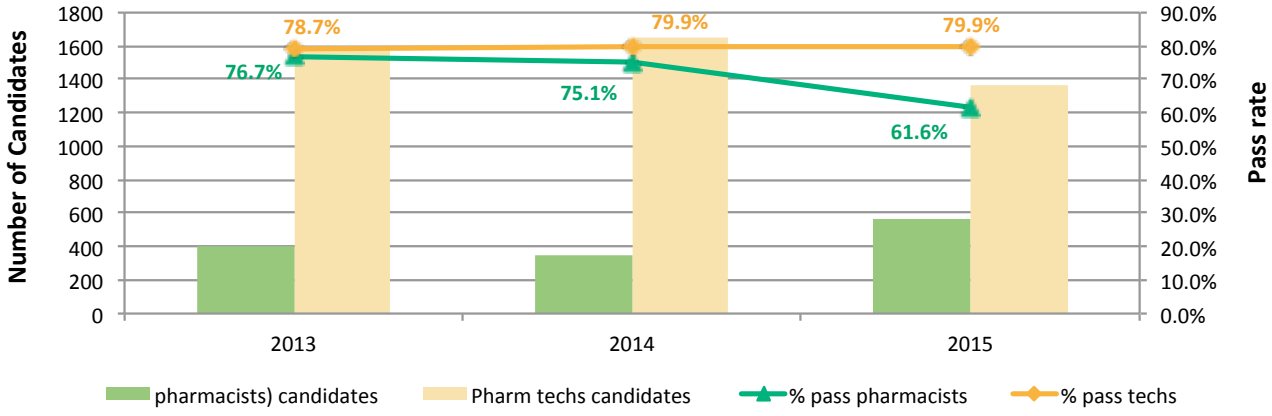
There are two types of exams offered for the doctors and dentists – internship qualifying exams and preregistration exams. These exams are administered to Kenyan citizens who take their training outside the country only. Details of the training institutions where they trained are captured, but data on exam pass rate are not collected since the process is mainly oral.

Pharmacists and pharmaceutical technologists

Pharmacists are required to take a preregistration examination before they are registered. The professional examination for the assessment of a pharmacist has been split into two parts. The Stage I examination assesses the candidates in the basic medical and

pharmaceutical sciences. This is administered before candidates proceed for a compulsory 1-year internship program. The Stage II examination is administered after the successful completion of internship and examines the candidate's knowledge of applied clinical and pharmaceutical sciences. The candidate is also examined on the relevant laws and ethics that govern the practice of pharmacy. For the 3 years where data were available, there was a noted increase in the number of pharmacists who sat for preregistration between 2014 and 2015. The same trend seemed to characterize pharmaceutical technologists sitting for pre-enrollment exam except for 2015, which recorded lower figures. The pass rate for pharmacists declined each year, whereas the pass rate for pharmaceutical technologists remained steady at an average of 79.5% (Figure 6.17).

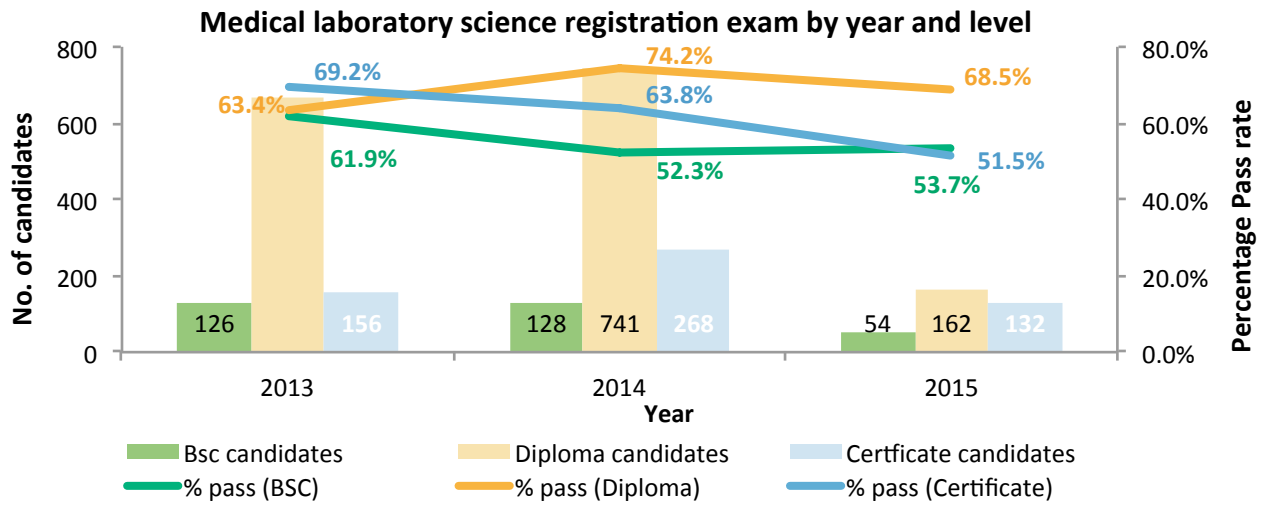
FIGURE 6.17: PHARMACISTS AND PHARMACEUTICAL TECHNICIANS PRE-REGISTRATION/PRE-ENROLMENT EXAM CANDIDATES BY YEAR



MEDICAL LABORATORY TECHNICIANS AND TECHNOLOGISTS

The KMLTTB administers a national qualification exam for those who want a certificate (technicians), diploma or degree (technologists). Laboratory technicians with a certificate and technologists with a diploma or a degree who successfully complete the exam can apply to enter the national register. Figure 6.18 shows the number of candidates who sat the various levels of examination and the pass rate. The number of medical laboratory graduates who applied for the registration exam declined by more than half in 2015. This was as a result of improved enforcement of registration regulations. Only those who had trained in accredited institutions were allowed to sit for the exam. The pass rate for the bachelor's level professionals increased from 2014 to 2015. However, candidates at the diploma level dropped probably because of improved regulation enforcement. There was a noted steady drop in the pass rate for the certificate-level trained over the years. KMLTTB embarked on a process of re-inspection for all training institutions to ensure standards of training are upheld and only compliant training colleges are accredited.

Figure 6.18: Medical Laboratory Science Registration exam pass rate by number of candidates per year



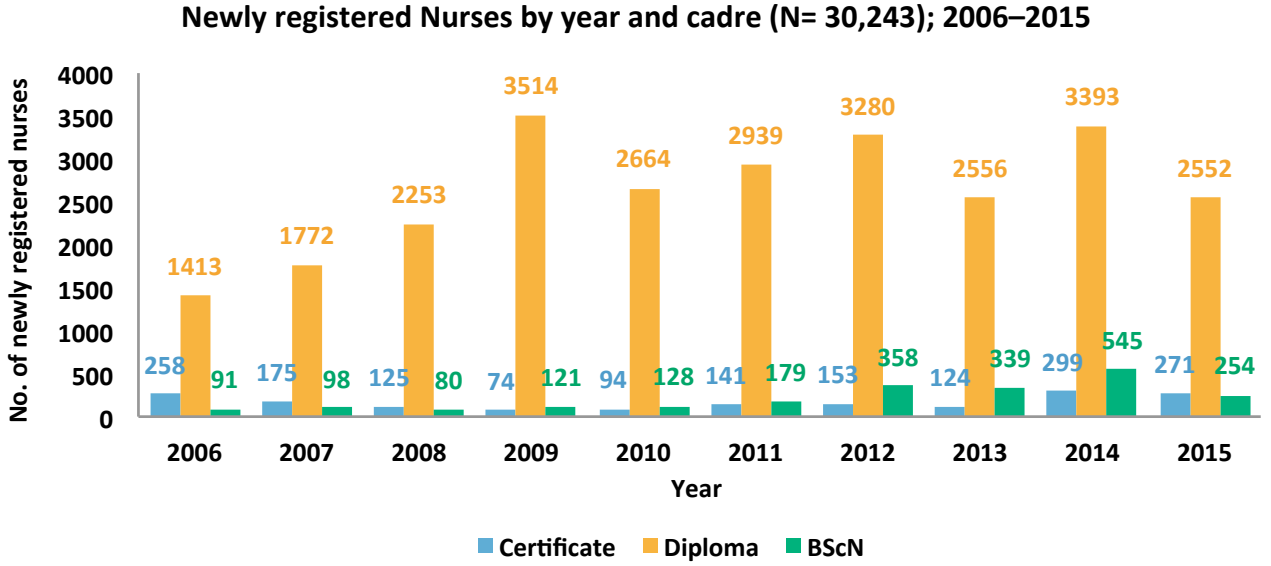
6.3 Registration of health professionals in Kenya

6.3.1 New registration

Nurses

After completing their training, passing the national qualifying exam, and completing internship (BSN only), nurses are registered with the Nursing Council of Kenya. From 2006–2016, 19,994 newly qualified nurses were registered with NCK to practice in Kenya. The number of newly qualified nurses entering the labor force increased by 68.5%; from 1,745 to 2,941 between 2006 and 2015. The number of newly registered enrolled nurses fell from 586 in 2006 to 271 in 2015, probably due to the phasing out of enrolled nursing programs. The newly registered diploma nurses rose from 986 in 2006 to 2,552 in 2015. Newly registered bachelor's level nurses increased from 98 in 2006 to 254 in 2015 (Figure 6.19).

Figure 6.19: Newly registered nurses by year and training level 2006–2015

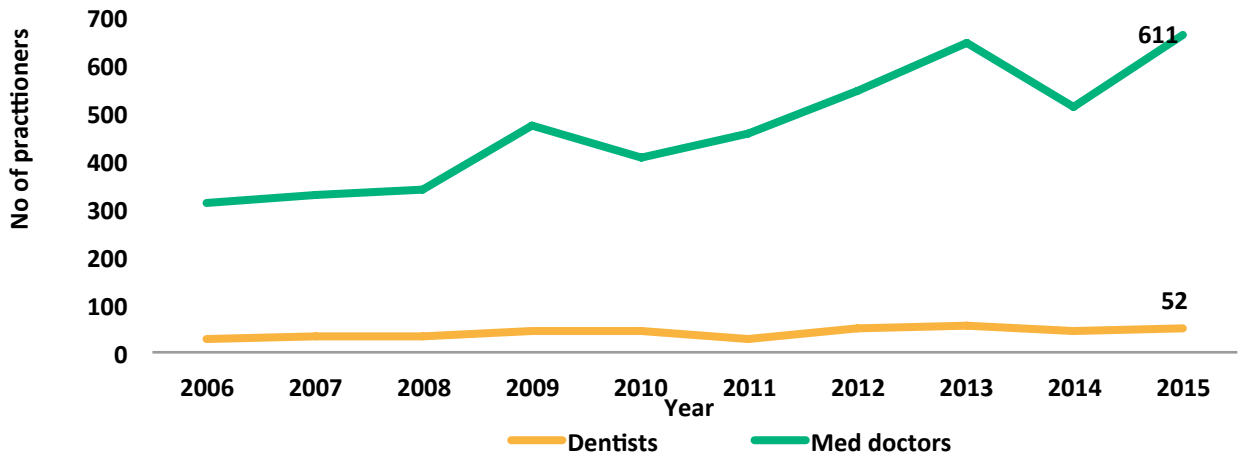


Between 2006 and 2010, Kenya enrolled a total of 21,854 nursing students; but by the end of 2015, 20,392 (93.3%) had registered with NCK. This translates to a pre-service attrition rate of 6.7%. The country generally has trained more diploma-level nurses, but recently the number of bachelor's trained nurses is increasing.

Medical doctors and dentists

After one year of internship, doctors are required to register with MPDB. From 2006–2015, 4,273 new qualified doctors and 410 dentists were registered with MPDB to practice in Kenya. The annual number of newly qualified doctors entering the workforce doubled from 25 in 2006 to 611 in 2015. Students graduating from newly established universities and/or programs have contributed to the increase in the number of registrations. The same applied for dentists from 25 in 2006 to 52 in 2015 (figure 6.20).

Figure 6.20: Registration of Medical and Dental practitioners by year (2006–2015)



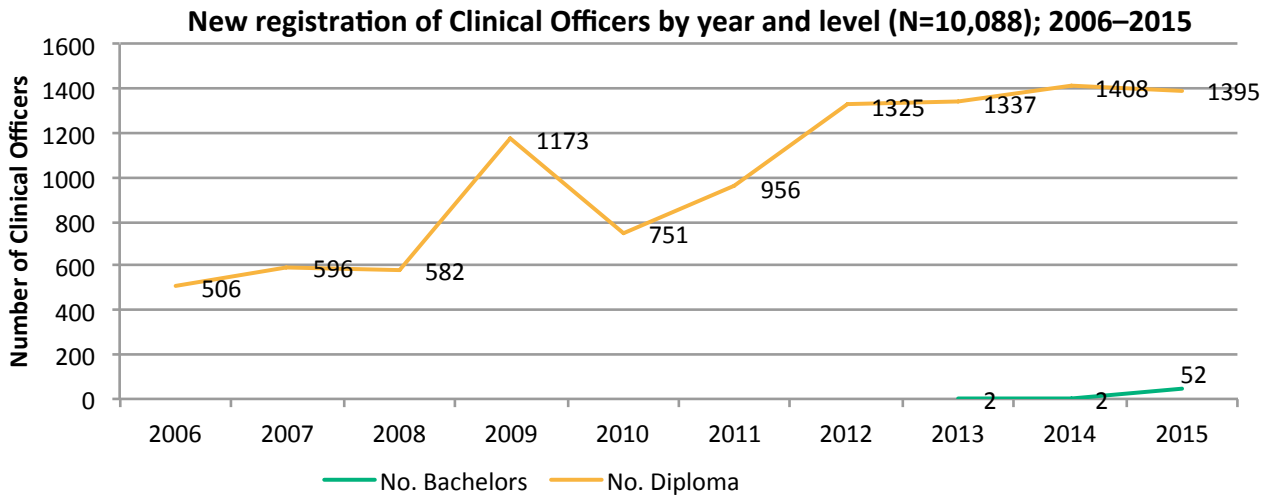
Clinical officers

Figure 6.21, shows the number of newly registered clinical officers from 2006–2015. It takes 4 years (3 for diploma + 1 for internship) to train and qualify for registration as a clinical officer. Between 2006 and 2010, a total of 7,420 clinical medicine students were admitted into the training institutions and 6,642 were registered by 2015. This implied a pre-service completion rate of 89.5%. The number of newly qualified clinical officers entering the labor force increased twofold within 5 years, from 2011 (956) to 2015 (1,395). This indicates a remarkable increment in the training capacity of COs in the country.

> *"Kenya generally has trained more diploma-level clinical officers, but recently the number of bachelor's-trained clinical officers is increasing."*

Kenya generally has trained more diploma-level clinical officers, but recently the number of bachelor's-trained clinical officers is increasing. The first group of degree-level clinical officers was registered by COC in 2015, although the training started in 2009, especially for those who were trained at diploma level earlier.

Figure 6.21: Number of newly registered Clinical Officers by year and training level



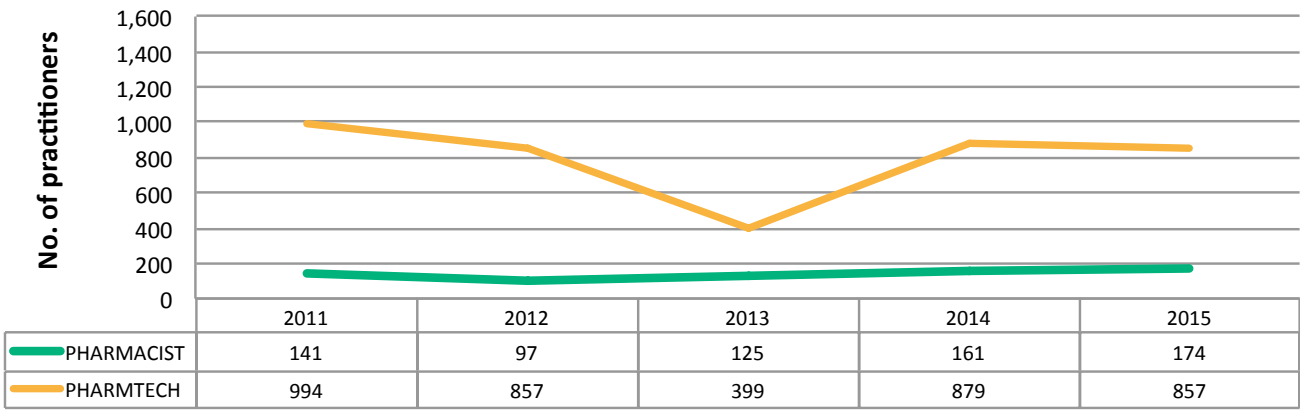
Clinical officers trained outside Kenya (TOK) may seek registration to practice in the country. These account for an average of 4.6% of the registered clinical officers yearly. The majority (646 or 97.4%) of these are Kenyan citizens. Others are from Uganda (6), USA (3), Rwanda (3), and India, Zambia, Somalia, and Tanzania with 1 each (figure 6.22).

Figure 6.22: No. of clinical officers trained outside Kenya

Pharmacists and pharmaceutical technologists

Figure 6.23 shows the trend of registration of pharmacists and enrolment of pharmaceutical technologists from 2011 to 2015. Pharmaceutical technologists are enrolled after 7 months post-college internship attachment, but pharmacists are registered after undergoing 1 year of internship. From 2011–2015, 3,943 newly qualified pharmaceutical technologists were enrolled, and 535 pharmacists were registered with PPB, to practice in Kenya. From 2009 to 2012 there was a surge as PPB was resolving disputes with colleges that had started training diploma courses without PPB approval. Enforcement of standards caused a reduction in the numbers turned out as seen in 2013. In 2014, the deadline was lifted to give another chance to clear the backlog.

Figure 6.23: New registration of Pharmacy/pharm tech practitioners by year (2011–2015)

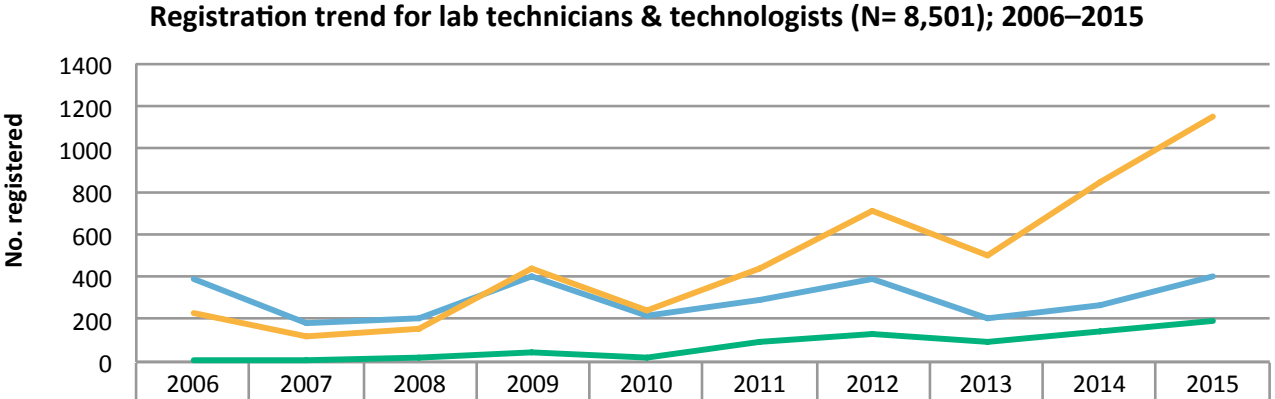


	2011	2012	2013	2014	2015
PHARMACIST	141	97	125	161	174
PHARMTECH	994	857	399	879	857

Medical laboratory technicians and technologists

A majority of newly registered medical technologists are diploma holders followed distantly by certificate holders and lastly degree holders. The number of degree-level trained medical technologists entering workforce increased from 90 in 2011 to 192 in 2015 and the diploma level technologists had a twofold increase within the five year period. However certificate-level trained technicians fluctuated from a high of 289 in 2011 to a low of 261 in 2014, but rose to 402 in 2015. This sudden rise was not explained but may require more follow up to establish the cause. The proportion of medical laboratory technologists entering the workforce has been increasing over the years (Figure 6.24). In 2009, the Board started enforcing quality standards to ensure that new graduates met the board requirements, including successful internship completion, and payment of stipulated registration fees. The drop in newly registered MLTs in 2013 reflects the failure of some to meet these requirements.

Figure 6.24: Newly registered Medical Laboratory technicians and technologists, 2006–2015



	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
BSC	4	2	17	41	22	90	125	94	146	192
CERT	394	182	204	402	223	289	393	206	261	402
DIP	226	120	151	435	236	441	708	498	845	1,152

6.3.2 Ever-registered

Nurses

Figure 6.25, shows the trends in the registered nurses from 1980 to 2015, noting a steady increase in number of nurses registered by qualification level. Before 1999, there were more certificate-level nurses than diploma-level nurses registered in Kenya. This trend has reversed due to phasing out of the certificate program.

Currently, in terms of age, there are 51,649 nurses aged 60 years (the mandatory age of retirement in the public sector) and below. Of these 15,649 (30.3%) are certificate-trained, 33,595 (65.0%) are diploma holders and 2,373 (4.6%) are degree holders. There are 10,737 (19.6%) nurses are aged 21–30 years, 14,380 (27.8%), 31–40 years, 13,924 (27.0%) 41–50 years, and 12,608 (24.4%) are 51–60 years (Figure 6.26). Nurses aged above 60 years account for 14.1% of the-ever registered nurses. The majority of the nursing workforce is female 39,169 (75.8%).

Figure 6.25: Number of nurses and midwives aged 60 years and below ever registered by year of registration

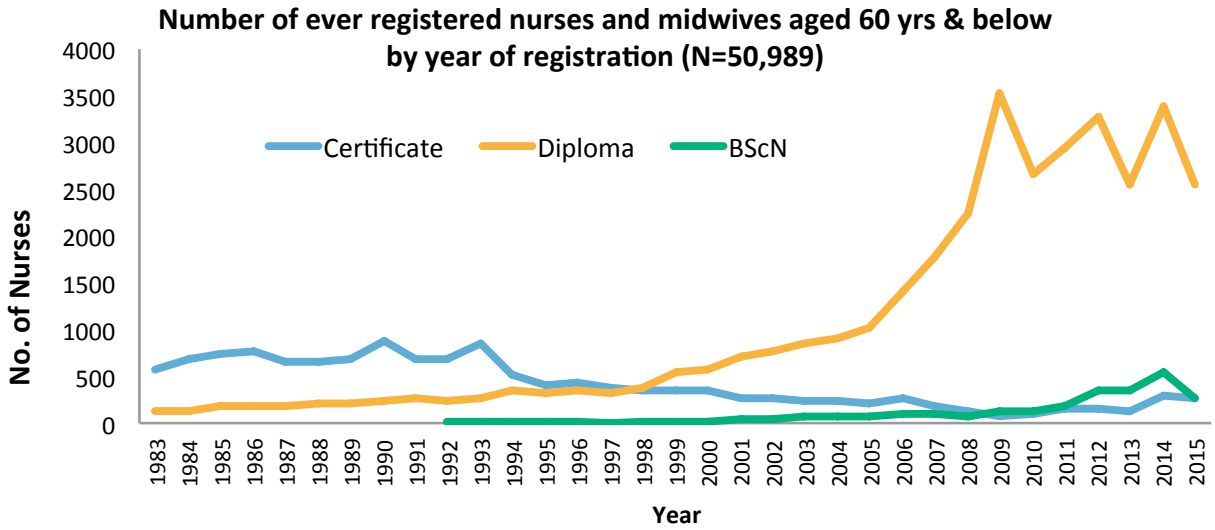
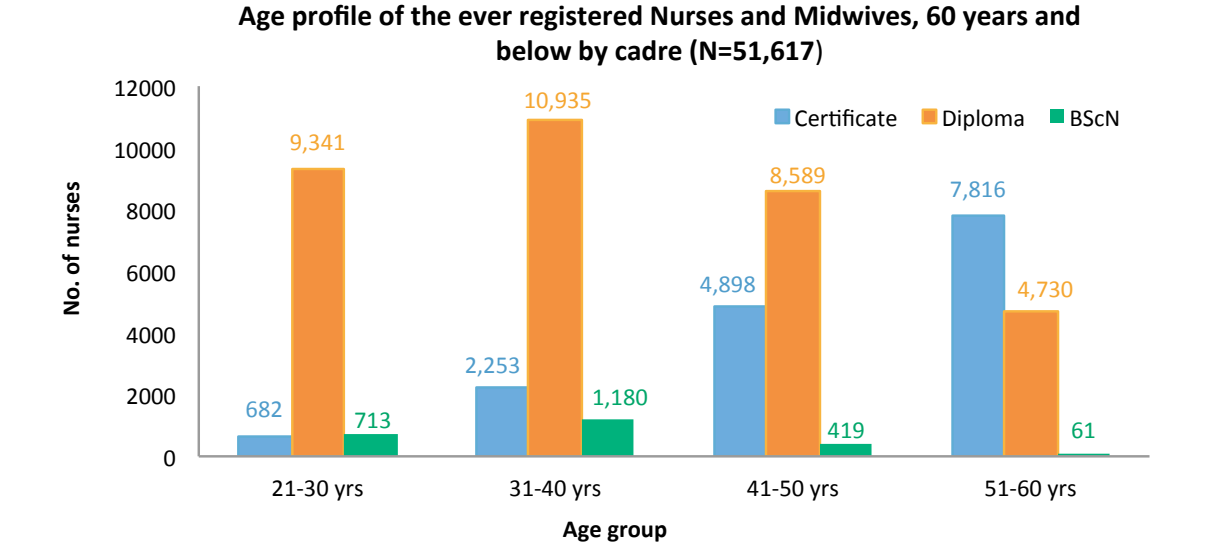


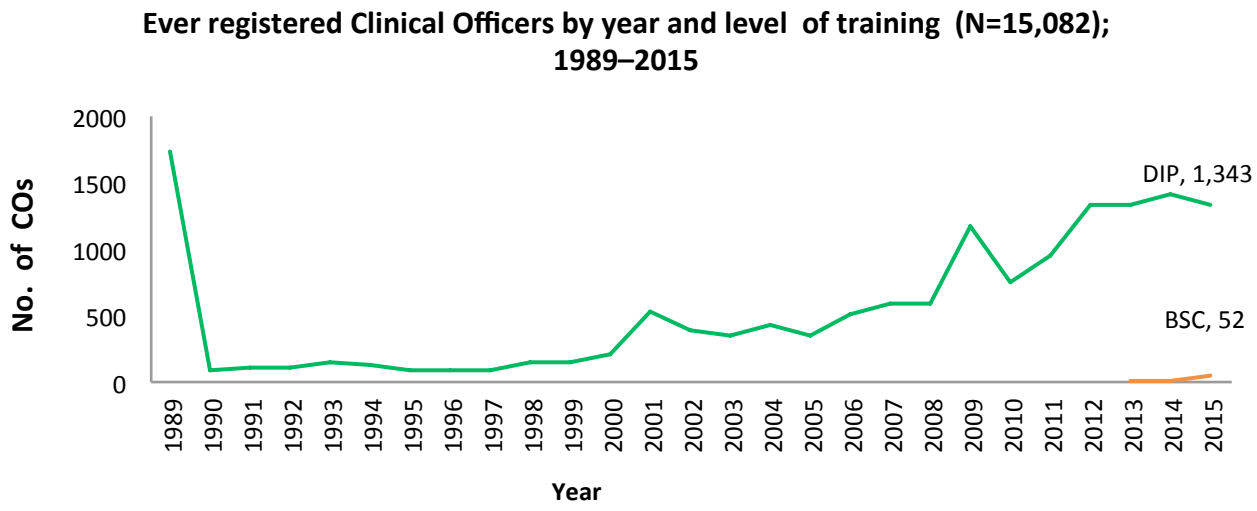
Figure 6.26: Age profile of the ever-registered Nurses and Midwives, 60 years and below by cadre



Clinical officers

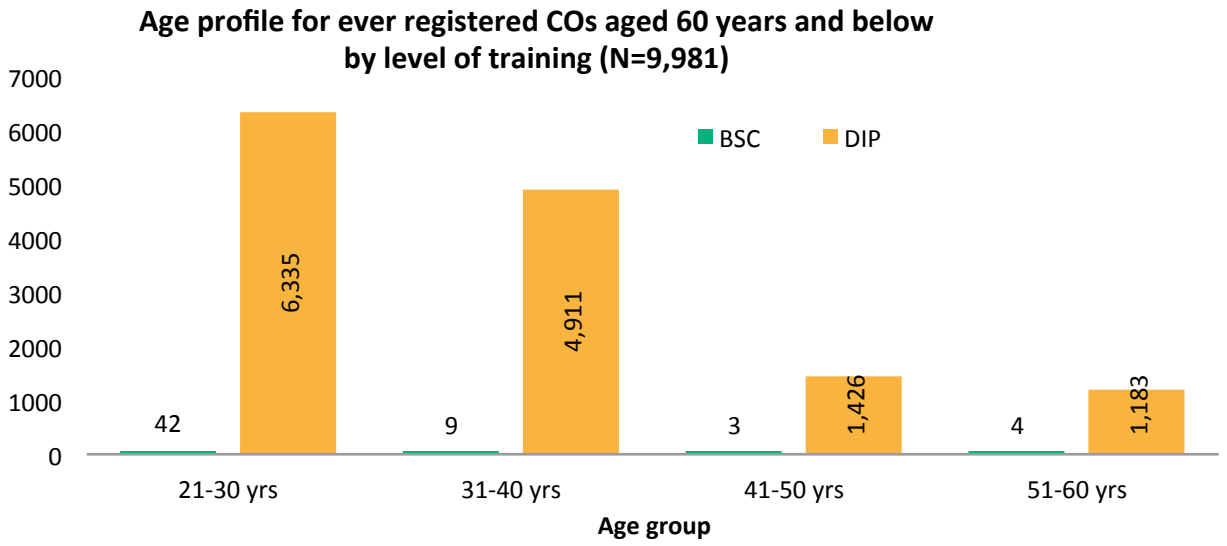
Registration of clinical officers (COs) started in 1989, when the Act was enacted. In that year, more than 1,700 ever-trained diploma-level clinical officers were registered. Since then, the Clinical Officers Council has registered a total of 15,237 clinical officers as of December 2015. Of these, 13,913 (91.3%) are aged 60 years and below, which is the mandatory age of retirement from public service. The remaining 8.7% are over the age of 60 years, and are eligible for service in the private and faith-based sectors. Kenya generally has trained more diploma-level clinical officers, but recently the number of bachelor's-trained clinical officers has increased. Almost all clinical officers registered to practice in Kenya, and aged 60 years and below (99.6%) are diploma-trained. The first class of COs who trained at basic bachelor's level started training in 2009 and were registered in 2015. This already accounts for 0.4 % of the ever-registered clinical officers. This scenario is expected to change as more and more degree-trained practitioners qualify. Previously, bachelor's level training was an upgrading course (Figure 6.27).

Figure 6.27: Registration trend for all clinical officers that have ever been registered, 1989–2015



The age distribution of registered COs aged 60 and below is illustrated in Figure 6.28. There are relatively young COs practicing in the country, with a majority (45.8%) aged between 20–30 years; the numbers decrease with age (figure 6.29).

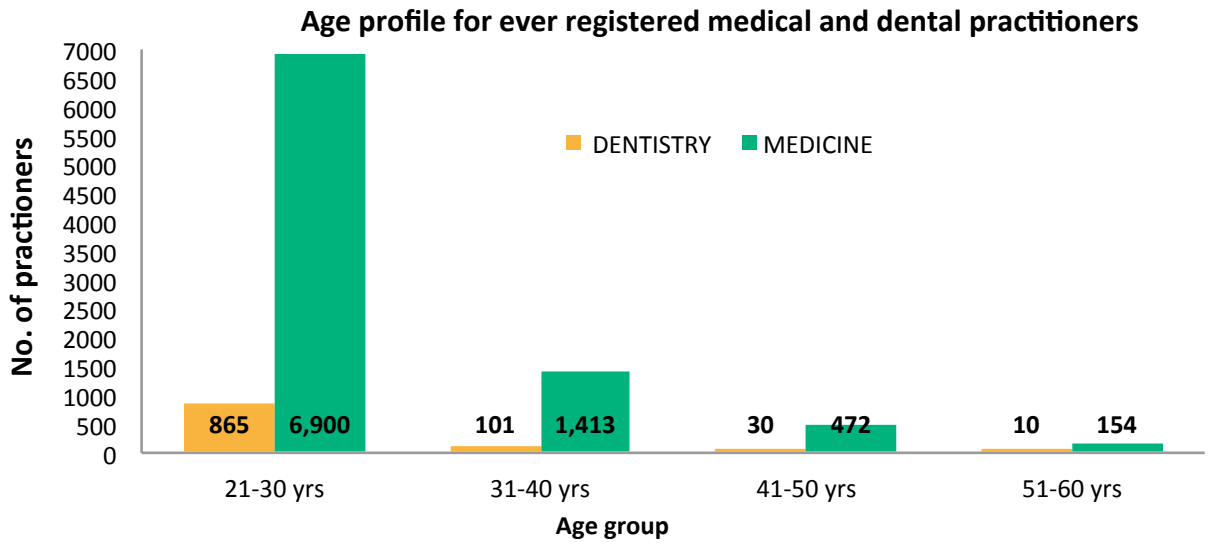
Figure 6.28: Age distribution of registered COs aged 60 years and below by level of training



Doctors and dentists

Kenya started registering medical doctors and dentists in 1978 with MPDB. Since then the total ever-registered medical doctors are 9,497 and for dentists, 1,066. Of these, 8,939 registered medical doctors and 1,006 dentists are aged 60 years and below (Figure 6.29). Most doctors and dentists (88%) are below the age of 40 years. Doctors aged above 60 years account for 5.1%, and mainly contribute to the health services delivery through private practice.

Figure 6.29: Age distribution for ever-registered medical and dental practitioners in Kenya

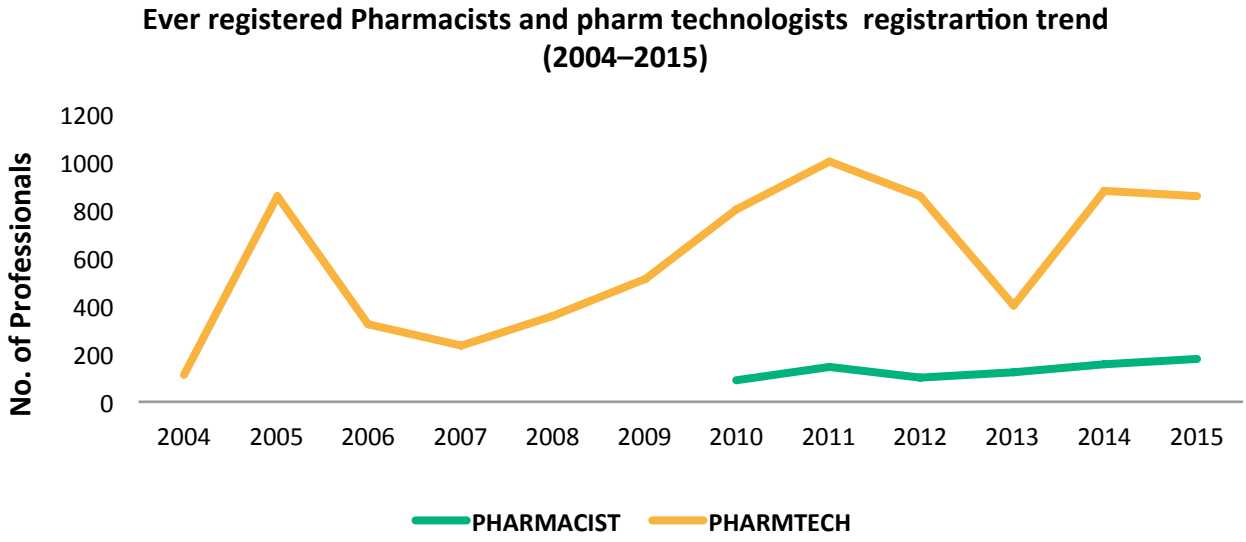


Pharmacists/pharmaceutical technologists

Since 1957, 2,377 bachelor's-level trained pharmacists and 7243 diploma -level trained pharmaceutical technologists have been registered and enrolled in Kenya (Figure 6.30). While the pharmacists are included in the register (registered), the pharmaceutical technologists are included in the roll (enrolled) upon completion of their internships. The enrollment trend indicates fluctuations in the number of pharmaceutical technologists (PT) and can be explained by several factors

- Enrollment of PTs commenced in 2004 upon implementation of an amendment in cap 244 to allow for their enrolment. Initial uptake was slow but after a major drive and notice of a deadline for those who had ever been trained and were duly qualified to apply for enrollment, there was a surge in numbers in 2005, clearing a backlog.
- From 2009 to 2012 there was a surge as PPB was resolving disputes with colleges that had started training diploma courses without PPB approval. A deadline was also announced, hence the surge to clear the backlog of those trained from early 2000 to 2010.
- Enforcement of standards caused a reduction in the numbers, as seen in 2013.
- In 2014, the deadline was lifted to give another chance to clear the backlog.

Figure 6.30: Ever-registered pharmacists and pharm technologists' registration trend (2004–2015)



Accurate data on year of registration, gender, and age were not available at the time of analysis but currently, rHRIS is facilitating the pharmacy and poisons board to capture quality data to guide future analysis and decision making.

Medical laboratory technicians and technologists

Since 1912, 11,071 medical laboratory technicians and technologists have been registered in Kenya. Figure 6.31, shows the trends of medical laboratory technicians and technologists registered from 2001 to 2015. Certificate-level shows a steady increase in the number registered, unlike the diploma- and the degree-levels which, always higher than certificate level, have been fluctuating over the period. Most (52.8%) of those registered within the period are diploma holders, 40.1% certificate holders, and 7.1% degree holders (figure 6.33). For the 10,833 (97.9%) MLTs that ever registered whose demographic data were available, there were 3,644 (33.6%) aged 21–30 years, 4,199 (38.8%) aged 31–40 years, 1,611 (14.9%) aged 41–50 years, 973 (9.0%) aged 51–60 years and 406 (3.7%) over 60 years (Figure 6.32). Most of the medical laboratory practitioners (99.9%) ever-registered are Kenyans.

Figure 6.31: Trend of Ever-registered medical laboratory technicians and technologists' registration (2004–2015) by qualification level

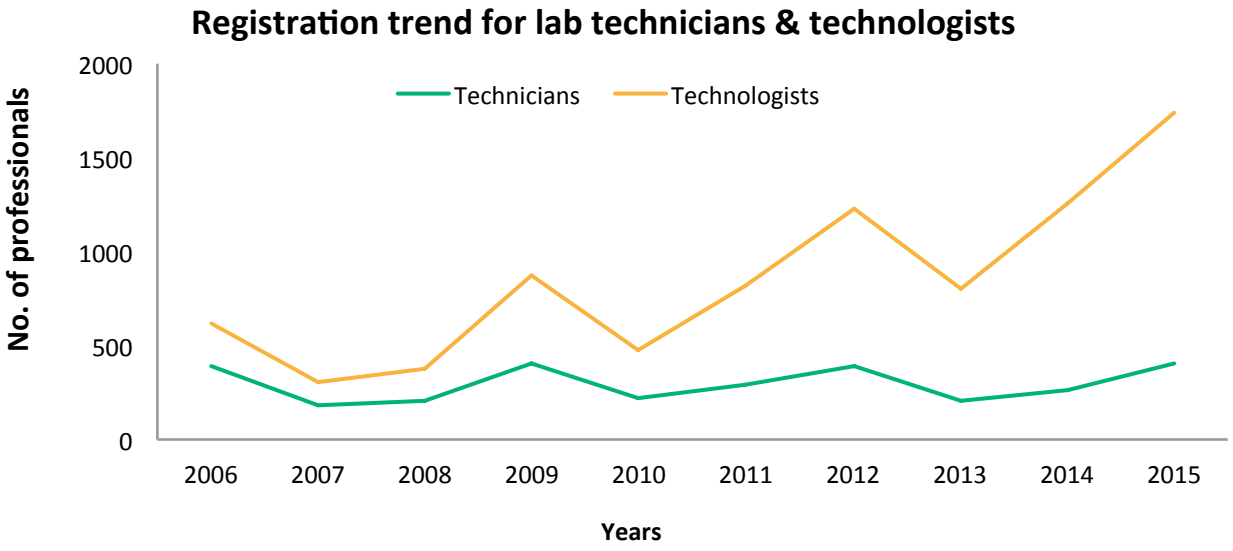
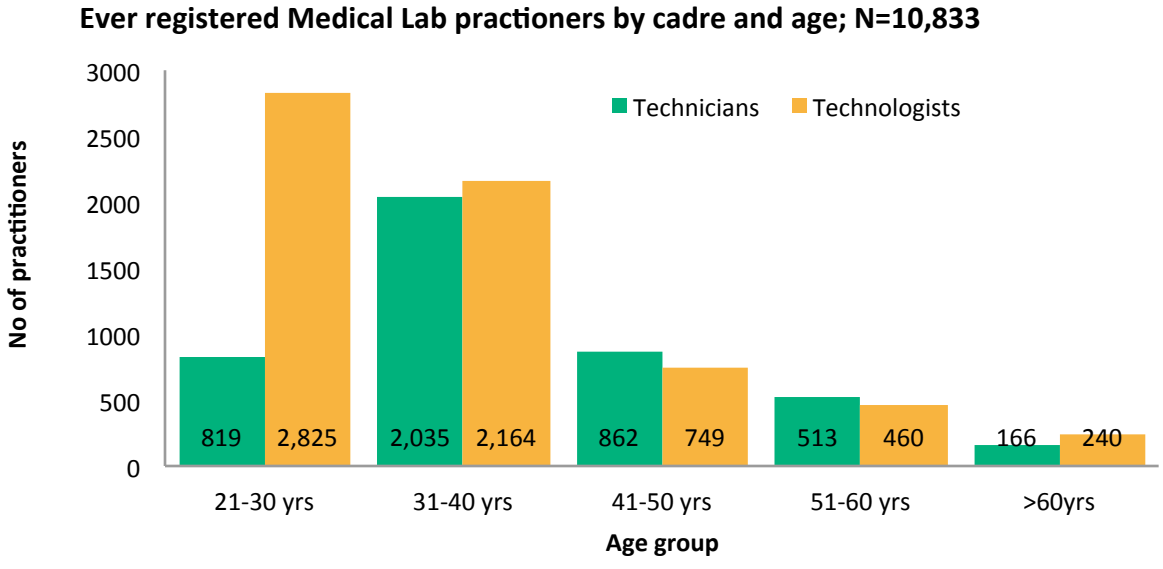


Figure 6.32: Number of ever registered medical laboratory practitioners by cadre and age (N=10, 833)



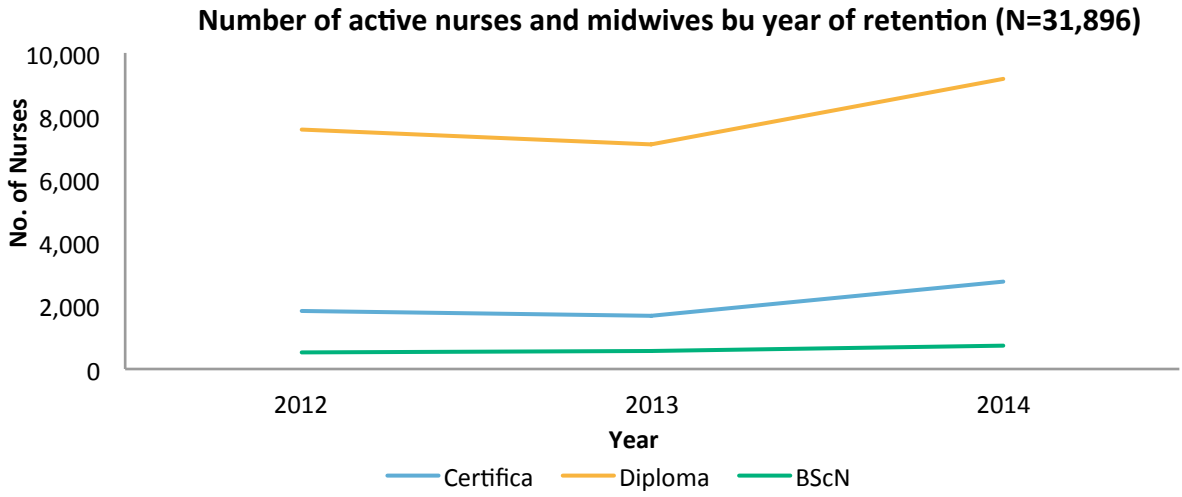
6.3.3 Retention/renewal of health professionals in Kenya

Nurses

The NCK requires practicing nurses to renew their licenses once every 3 years, and to remain active in the national register. Only nurses with active, up-to-date licenses are permitted to practice in Kenya. The report considers retention data for the 3 years from 1 January 2013 to 31st December 2015 as representing active nurses in the workforce (Figure 6.33). From 2013 to 2015, NCK issued 31,896 renewal licenses for nurses practicing in Kenya. This represents 61.8% of ever-registered nurses under 60 years of age. Based on these data of active nurses practicing, the nurse population ratio in Kenya is 8.3 nurses per 10,000 population.

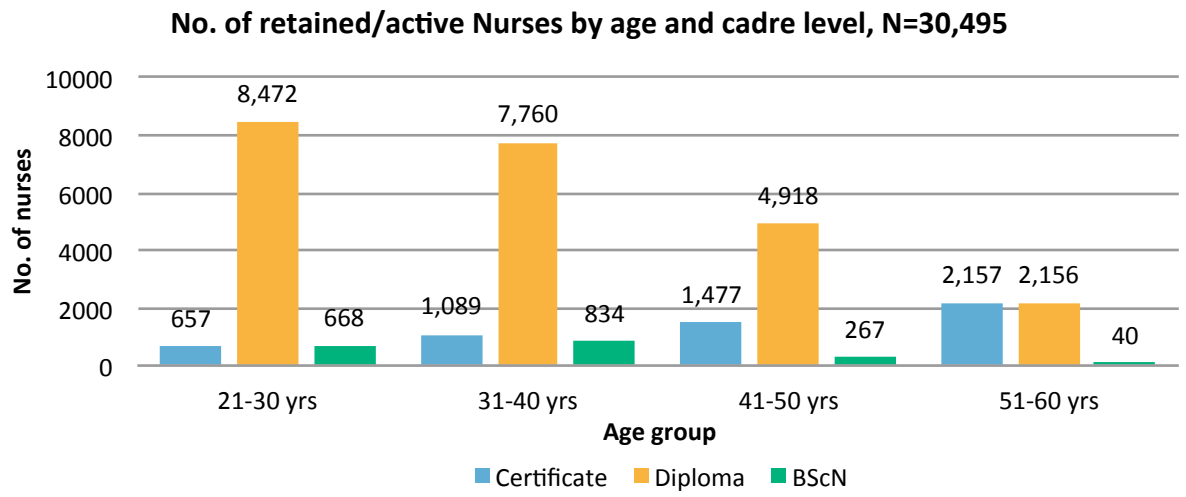
> *"Based on these data of active nurses practicing, the nurse population ratio in Kenya is 8.3 nurses per 10,000 population."*

Figure 6.33: Retention/renewal of license for nurses and midwives by year and level of training, 2013–2015



Of the 31,896 active nurses by 2015, 30,495 (95.6%) are aged 60 years and below (Figure 6.34). These are the nurses presumed to be lawfully offering nursing health services since their practice licenses are valid. More than half (76.4%) of the active nurses aged 60 years and below are diploma -level trained, while, 17.6% are certificate –level, and 5.9% are bachelor's-level trained. A majority [19,488 (63.9%)] of the active nurses are aged 40 years and below, indicating a relatively young nursing workforce in the country. The mean age of the enrolled nurses (46.5 years) is higher than that of diploma nurses (36.0 years) and BScN (33.4 years). This finding is likely due to the fact that the certificate program in nursing is being phased out.

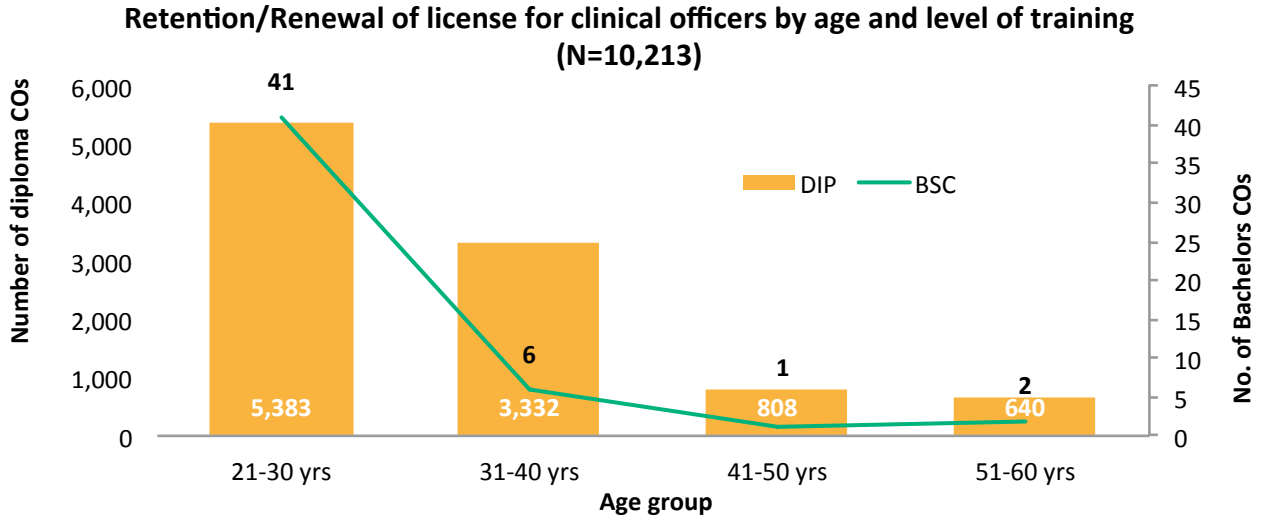
Figure 6.34: Retention/renewal of license for nurses and midwives by age and level of training, 2013–2015



Clinical officers

In 2013, COC started licensure renewal for clinical officers on biannual basis. Renewals increased from 3,345 in 2013 to 7,827 in 2015, an increase of 134%. The total number of active clinical officers based on retention was 10,562, which represents 69.3% of ever -registered clinical officers. Most 10,213 (96.7%) of the clinical officers with active licenses are aged 60 years and below (Figure 6.35). Generally, the Kenya health sector has a young workforce of clinical officers with most of the BSc-trained (50%) and Diploma-trained (53.0%) falling in the age group between 20 to 30 years old. Based on the data of active clinical officers practicing, the ratio of clinical officers to population in Kenya is 2.7 per 10,000 population.

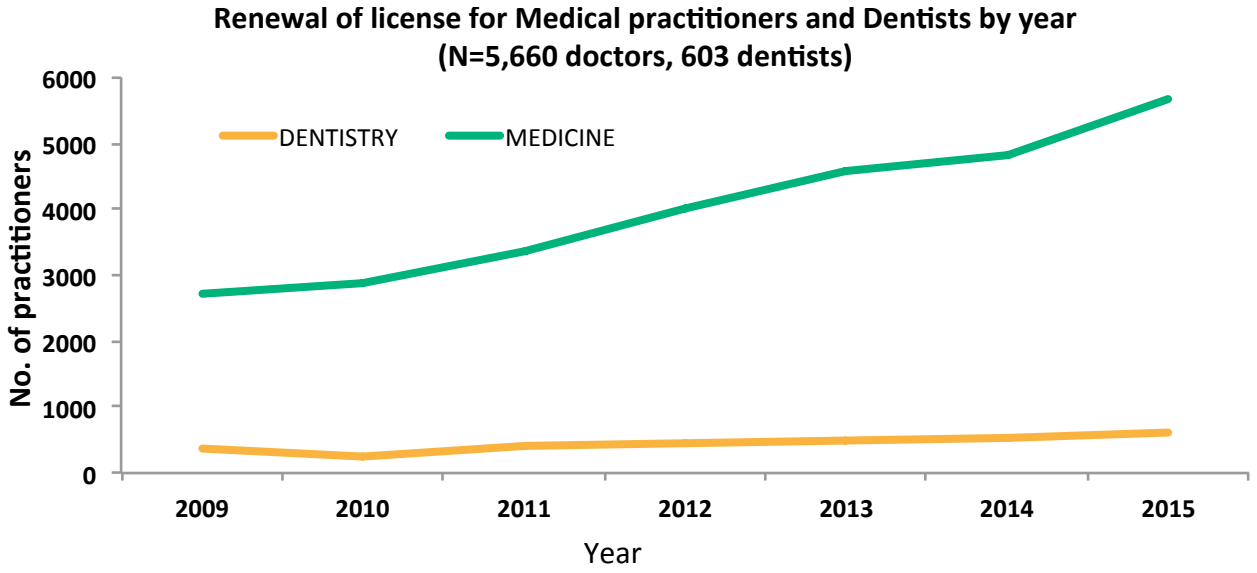
Figure 6.35: Retention/renewal of license for clinical officers by age and level of training (2014–2015)



Medical doctors and dentists

Doctors and dentists are required to renew their licenses yearly. By 2015, Kenya had 5,660 doctors and 603 dentists retained in the country. This represents 63% of ever-registered doctors and 60% of ever-registered dentists under 60 years of age. This translates to 1.5 doctors and 0.2 dentists to 10,000 population. In 2009, the MPDB initiated the implementation of the rHRIS to capture accurate data on practicing medical doctors and dentists. With a system for tracking the health workforce, enforcement of regulatory functions was scaled up, leading to a remarkable increase in license renewals. The number of doctors and dentists renewing their licenses has multiplied each year since rHRIS was implemented at MPDB (Figure 6.36). The numbers rose from 3,077 in 2009 to 6,263 in 2015, registering an increase of 103.5%.

Figure 6.36: Retention/renewal of license for medical practitioners and dentists by year (2009–2015)



Of the 5,660 ever registered under 60 years of age medical practitioners and 603 ever registered dentists, 62.7% and 69.5% of the practitioners are in private practice, respectively. A higher proportion of medical practitioners (48.6%) are specialists practising privately as compared to dentists (20.3%). However, more dentists (85.2%) are in full-time private practice and (70.4%) in self-employment, as compared to medical doctors (76.0% and 63.2%) respectively (Table 6.1).

Table 6.1: Distribution of retained medical doctors and dentists engaging in private practice

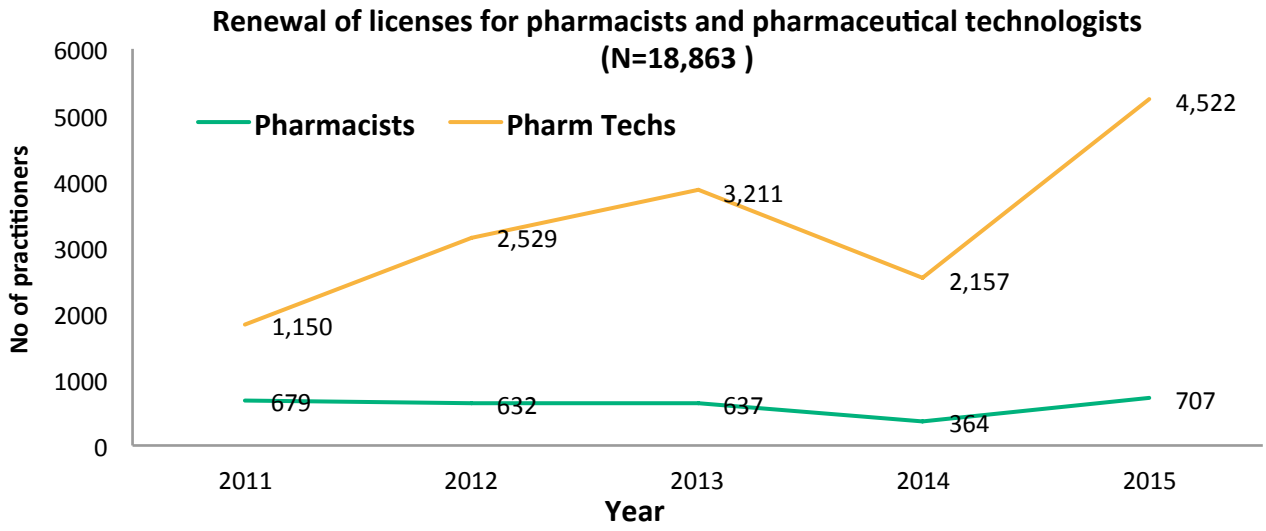
	Number of doctors retained, 2015	Total in private practice; proportion	In Private Practice		
			Type: Specialists (%)	Mode: % in full time Private Practice	Employer: Own behalf (%)
Medicine	5660	3552 (62.7%)	48.6%	76.0%	63.2%
Dentistry	603	419 (69.5%)	20.3%	85.2%	70.4%
All	6263	3971 (63.4%)	51.0%	76.9%	64.0%

Pharmacists and pharmaceutical technologists

The Pharmacy and Poisons Board requires pharmacists and pharmaceutical technologists working only in the private- and faith-based sectors but not public sector, to renew their practice licenses every year. The data presented in this section therefore, do not include practitioners working in the public sector. However, there are ongoing efforts towards requiring all practitioners, regardless of sector of deployment, to renew their licenses every year to ensure equivalent standards of quality practice across public, private, and faith-based sectors. According to the available data, renewals increased from 1,150 in 2010 to 4,522 in 2015, a threefold (293.2%) increase for pharmaceutical technologists, while pharmacist renewals increased slightly from 679 in 2011 to 707 in 2015 (Figure 6.37). The tremendous compliance has been facilitated by the implementation of online registration, which is less time-consuming since the practitioner does not need physical representation at the board. The process also cuts down on the cost that would have otherwise been used for transport. Online registration helps track down noncompliance.

> *"The tremendous compliance has been facilitated by the implementation of online registration, which is less time-consuming since the practitioner does not need physical representation at the board."*

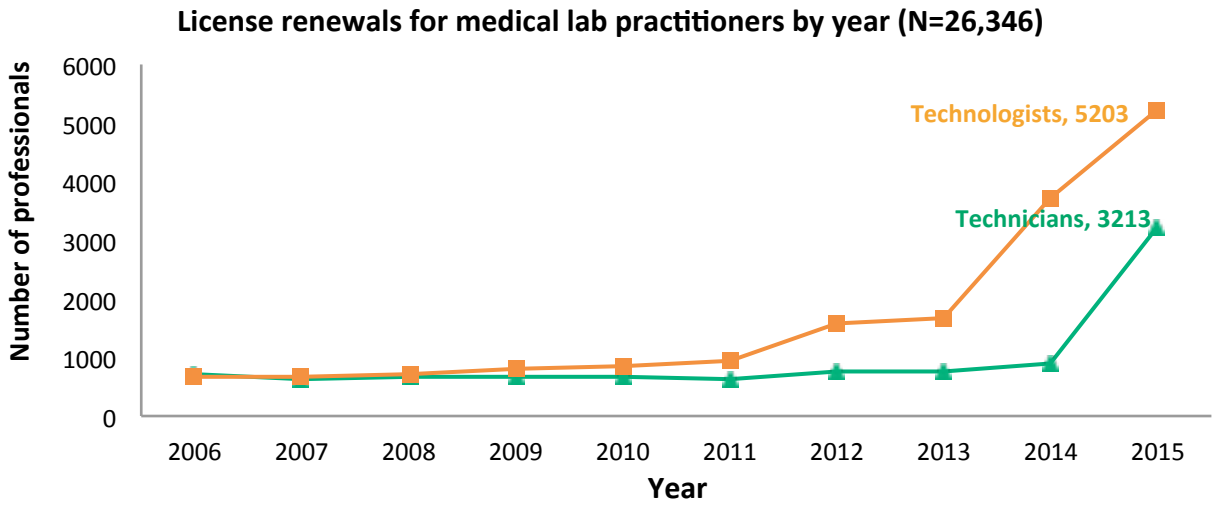
Figure 6.37: Retention/renewal of license for pharmacists and pharm techs by year (2011–2015)



Medical laboratory technologists and technicians

Medical laboratory technologists (diploma level and above) and lab technicians (certificate level) are required to renew their licenses annually. In 2015, 5,203 technologists and 3,213 technicians had renewed their licenses. Over the years, renewals by laboratory practitioners increased from 1,352 in 2006 to 8,416 in 2015, representing an increase of 522.5% in licensure renewal (Figure 6.38). This represents 76% of ever-registered technicians and technologists under 60 years of age.

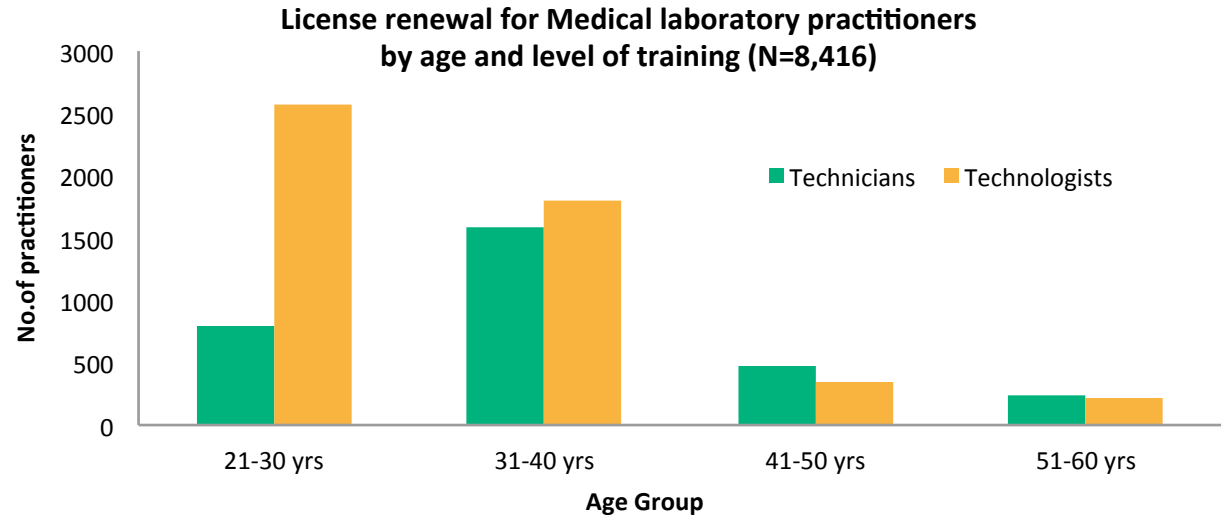
Figure 6.38: Retention/renewal of license for lab technologists and technicians by year (2006–2015)



Of the 3,213 technicians and 5,203 technologists retained in 2015, 96.4% of technicians and 94.8% of technologists are 60 years and below, respectively. The majority (84.2%) of laboratory practitioners are aged 40 years and below, indicating a relatively young medical laboratory workforce. Considering differences in proportions, there is a significant difference between medical laboratory officers age and cadre level ($p<0.001$). There is a high proportion (51.9%) of younger technologists aged between 20 and 30 years, also 31–40 years, as compared to technicians (25.9%) in the same age bracket. However, the order is reversed for the older age groups with a higher proportion of technicians. Based on the practitioners with valid licenses in 2015, the ratio of medical laboratory officers to population in Kenya is 2.1 per 10,000 (Figure 6.39).

> *"Based on the practitioners with valid licenses in 2015, the ratio of medical laboratory officers to population in Kenya is 2.1 per 10,000."*

Figure 6.39: Retention/renewal of license for Lab professionals by age and level of training (2009–2015)



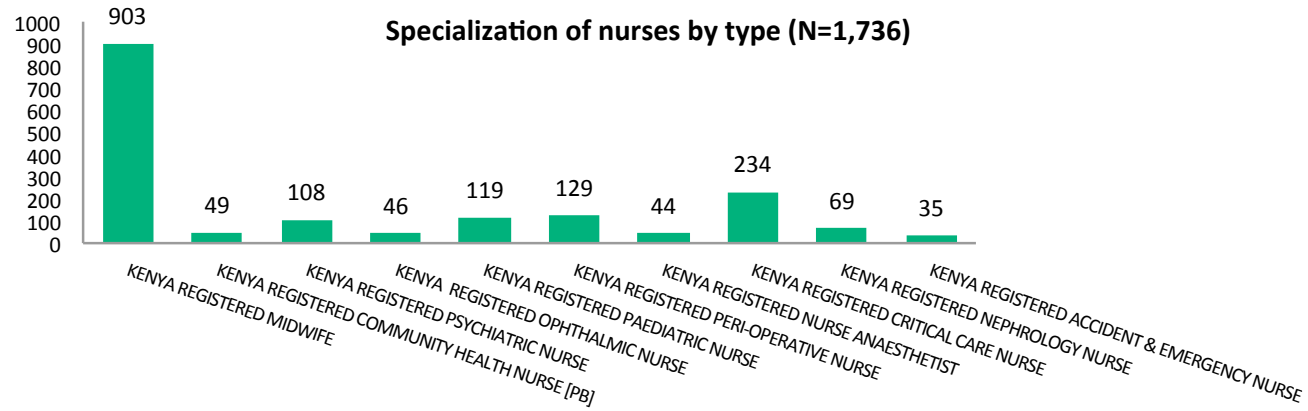
6.3.4 Retention/renewal (specialization)

Specialty training data are available only for nurses, doctors, dentists, and clinical officers.

Nurses

Of the 31,896 active nurses and midwives in the register, only 1,736 (5.4%) have specialized skills. (Fig 6:40). Specialization in registered community health nursing is considered at the post-basic training level, and the midwifery is specialized at the registered level. Post-basic training at certificate level is not considered a specialty.

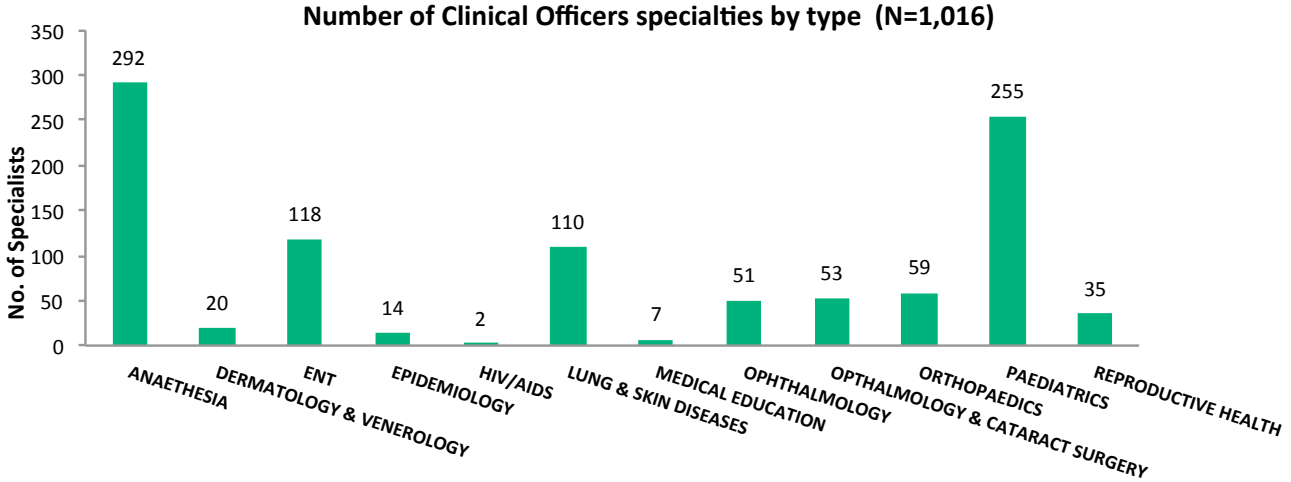
Figure 6.40: Types of specialization areas for nurses



Clinical officers

Clinical officers train in a number of specialties. Of the 10,562 active clinical officers by December 2015, 1,016 (9.6%) had some type of specialty training. The majority of these have specialised in anaesthesia (292), followed by paediatrics (255), ear nose throat (118), and lung and skin (110), among others. (Fig 6:41)

Figure 6.41: Types of specialization areas for clinical officers



Doctors and dentists

Kenya trains doctors and dentists in a number of specialty areas. Of the 5,660 retained medical doctors in 2015, 2,089 (36.9%) are specialists. Of 603 dentists actively in the service during the same period, 107 (17.7%) have some type of specialty training. Oral and maxillofacial surgery leads in specialty areas practiced by dentists, while obstetrics and gynaecology is the leading specialty among the medical doctors. (Figures 6.42 and 6.43)

> *"Of the 5,660 retained medical doctors in 2015, 2,089 (36.9%) are specialists."*

Figure 6.42: Types of specialization for dental practitioners

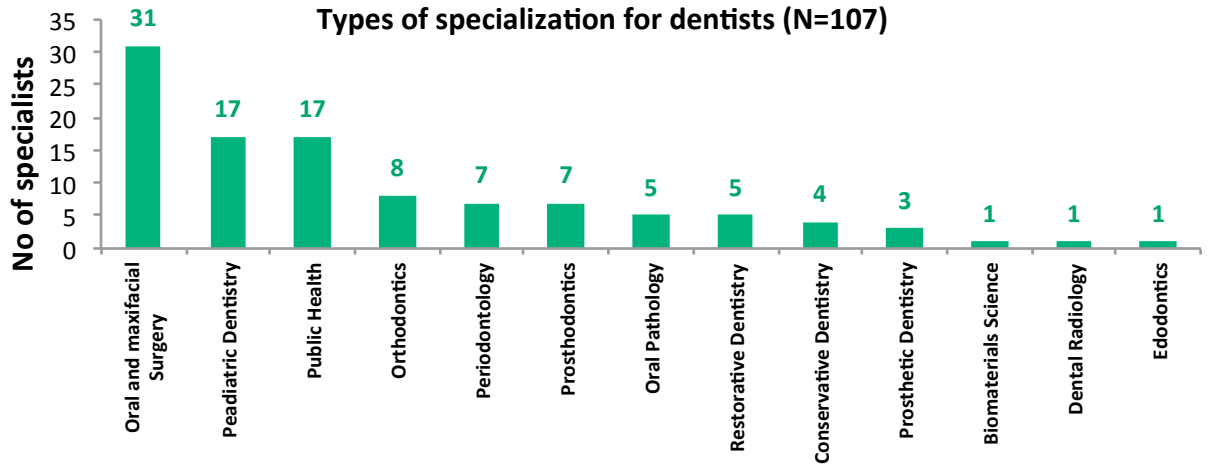
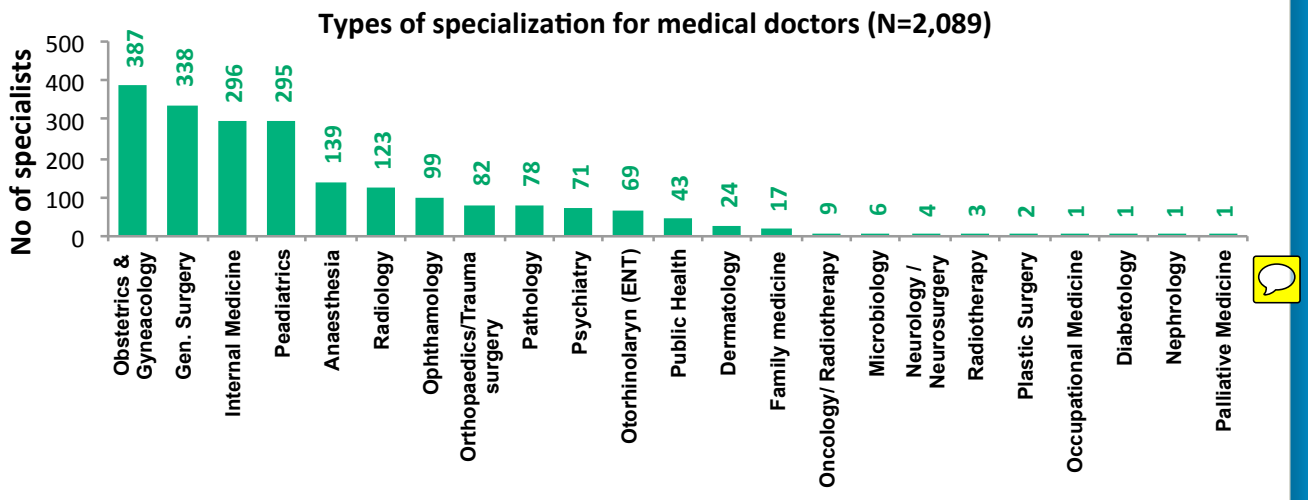


Figure 6.43: Specialization types for medical practitioners



6.4 Deployment and attrition

6.4.1 Deployment

Nurses

The ratio of nurses retained in Kenya to the population varies by county with a national ratio of 8.3 per 10,000 population. The five counties with the highest ratio of nurses below age 60 to population are Nairobi (9.7), Uasin Gishu (8.5), TharakaNithi (7.9), Isiolo (5.2), and TaitaTaveta (5.0). Counties with fewer nurses than 1 per 10,000 population include Mandera (0.1), Wajir (0.2), Tana River (0.2), Nandi (0.4), Samburu (0.5), Narok (0.8), Turkana (0.9) and Busia (0.9).

Medical doctors and dentists

By 2015, there were 5,660 medical doctors and 603 dentists actively practicing in the country, based on retention data. Practitioners with valid practicing licenses are considered to be lawfully active in the service. This results in a ratio of 1.5 medical doctors per 10,000 population, and 0.2 dentists per 10,000 population. Nairobi was leading with 9.5 doctors and 1.1 dentists per 10,000, followed by Mombasa (2.8), Uasin Gishu (2.1), Kisumu (1.6), Nyeri (1.3), Kiambu (1.1), and Isiolo (1.1). All the other 40 counties have a ratio of less than 10 doctors per 10,000 population.

Clinical officers

The ratio of clinical officers active in Kenya to the population varies by county with a national ratio of 2.7 per 10,000 population. Of the 47 counties, 5 had a high ratio of clinical officers aged below 60 years per population—Nyeri (7.3), Kisii (6.9), Baringo (6.7), Elgeyo Marakwet (5.2), and Busia (4.4). The bottom five counties with few clinical officers per population include: Turkana (0.3), Mandera (0.6), Garissa (0.6), Wajir (0.6), and Tharaka Nithi (0.7) (Appendix 7).

Pharmacists

By 2015, the PPB retained in the register and the roll only those pharmacists and pharmaceutical technologists working in the private sector. However, this has been revised to require every professional to be retained yearly with the Board from the beginning of 2017. For the purpose of this report, data from Integrated Personnel and Payroll Database (IPPD) have been added to the PPB retention data to calculate active pharmacists practicing in the country. The pharmacists' population ratio in Kenya is 0.5 per 10,000, while that of pharmaceutical technologist is 1.2 per 10,000 population. Combining both cadres, the ratio is 1.7 per 10,000 population. By county distribution, the top five counties with the highest ratio of pharmacists per 10,000 population are Nairobi (1.9), Laikipia (1.3), Mombasa (1.0), Lamu (0.7), and Kisumu and Embu (0.6) each. A total of 10 counties have a higher ratio than the national average. Nairobi has the highest ratio of pharmaceutical technologists to its population, i.e. 3.6 technologists per 10,000, followed by Mombasa (3.0), Uasin Gishu (2.8), Kiambu (3.9), and Kajiado (2.5). Eight out of 47 counties have equal or more than the country's national ratio for pharmaceutical technologists.

> *"The pharmacists' population ratio in Kenya is 0.5 per 10,000, while that of pharmaceutical technologist is 1.2 per 10,000 population."*

Medical laboratory practitioners

Using data of active laboratory practitioners, the ratio of lab technologist to the population is 1.3 per 10,000, while that of laboratory technicians is 0.8 per 10,000 population. For both, the ratio is 2.1 per 10,000 population. Of the 3,800 (73%) technologists, and 1,977 (62%) technicians with home county data, Nyandarua County has the highest technologists' ratio of 12.8 and technicians' ratio of 5.8, followed by Laikipia with 5.2 and 1.7 technologists and technicians respectively, per 10,000 population. A total of 14 counties have a higher technologists' ratio than the national, while 13 counties have a higher technicians' ratio as compared with the national.

Total deployment of the health workforce

Table 6.2 shows the annual output from training institutions, total ever-registered under 60 years of age, the total retained, the ratio per 10,000 population, and the density of the health professionals in Kenya. Figure 6.44 shows the map of Kenya and distribution density of healthcare workers and HIV prevalence per county.

Table 6.2: Ratio of health professionals to population in Kenya

	Annual Output	Total # registered	Total # Retained	Ratio per 10,000 pop	Density 1: n pop	Density 1: n pop
				Pop estimate: The 2009 Kenya Population and Housing Census	Pop estimate: The 2009 Kenya Population and Housing Census	*Population in "worldometers"
Medical Officers	611	9,497	5,660	1.5	1: 6,822	1: 7,516
Dentists	52	1,066	603	0.2	1: 64,030	1: 70,548
Pharmacists	330	2,377	1,971	0.5	1: 19,530	1: 21,518
Pharm Technologists	994	7,243	4,671	1.2	1: 8,266	1: 9,107
Clinical Officers	1,642	13,913	10,562	2.7	1: 3,656	1: 4,028
ML Technologists	1,236	6,626	5,203	1.3	1: 7,421	1: 8,177
ML Technicians	326	4,445	3,213	0.8	1: 12,017	1: 13,241
Nurses and Midwives	6,326	63,113	31,896	8.3	1: 1,211	1: 1,334
Total (All cadres retained)			**63,785**	**16.5**	**1: 605**	**1: 667**
Total Active Doctors, Clinical Officers, Nurses/Midwives			**53,118**	**13.8**	**1:727**	**1: 801**
WHO estimates for the number of physicians, nurses, and midwives per 1,000 population needed to meet the SDGs by 2030				**44.5**		

NB// the health workforce-to-population densities were calculated based on the numbers retained in the register as of December 31st 2015. This is the assumed number of active health workers practicing in Kenya. Health professionals are not allowed to practice without a valid practice certificate. Population estimates used are from the 2009 Kenya Population and Housing Census since these are the latest published figures that are authorized for use.

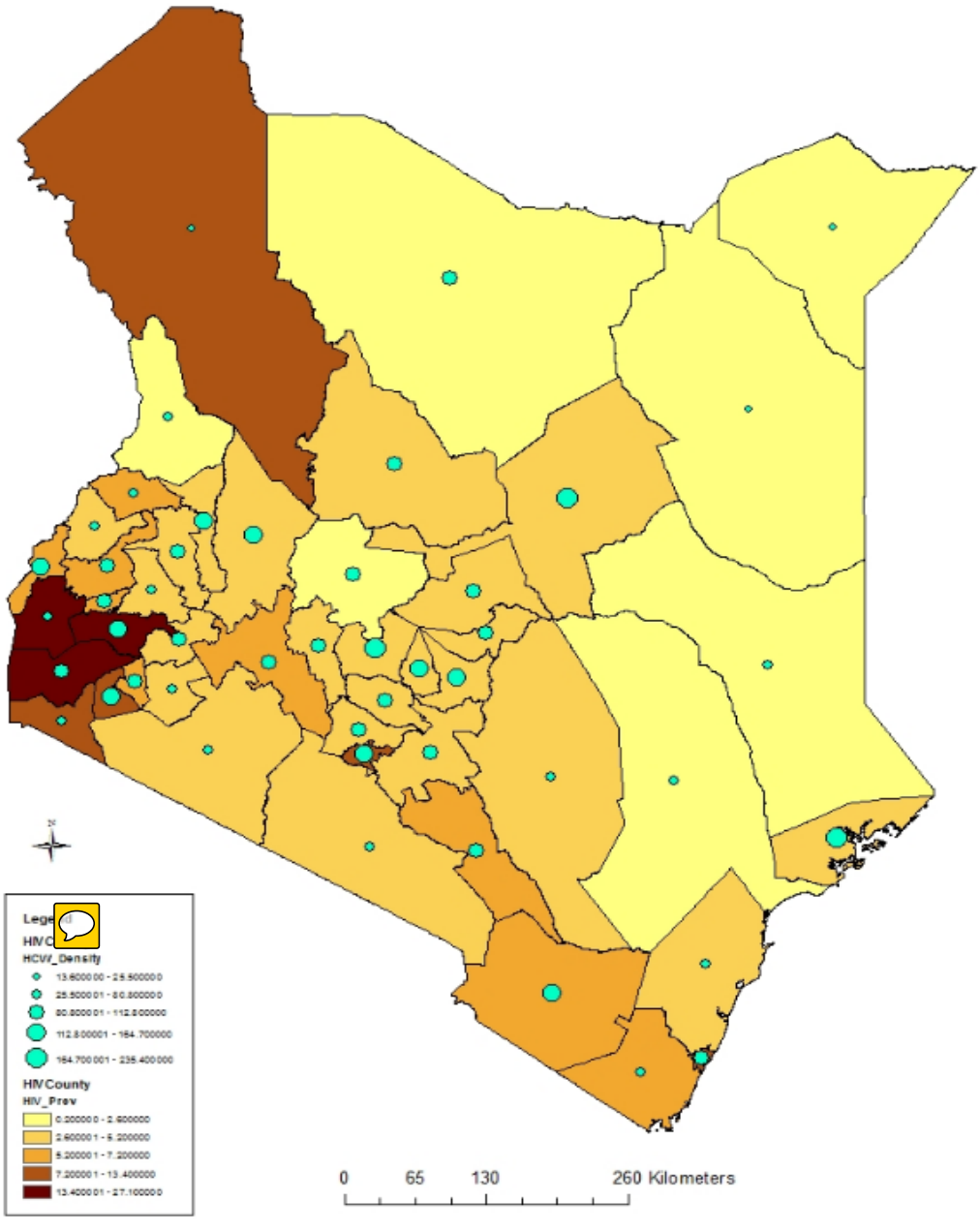
*The Kenya Population (Live) counter shows a continuously updated estimate of the current population of Kenya delivered by Worldometers' RTS algorithm, which processes data collected from the United Nations Population Division.

6.4.2 Healthcare workers distribution and HIV prevalence

Homa Bay County has the highest prevalence of HIV in the adult population of 27.1% in the year 2014, and many nurses have been recruited to address the HIV epidemic. However, it has a healthcare worker density of 9.3 per 10,000 population compared to Lamu and Nyeri counties which have prevalence of 4.1% and 4.4% with the highest healthcare worker density of 23.5 and 19.5 per 10,000 population respectively. Of the 8 counties targeted by PEPFAR for scale-up towards saturation by the end of FY17, 4 (50%) have HCW density of less than 10 per 10,000 population (Figure 6.44).

> *"Of the 8 counties targeted by PEPFAR for scale-up towards saturation by the end of FY17, 4 (50%) have HCW density of less than 10 per 10,000 population."*

FIGURE 6.44: KENYA COUNTIES MAP SHOWING HEALTHCARE WORKERS DISTRIBUTION AND HIV PREVALENCE RATES



6.4.3 Attrition

Although tracking of attrition had not been well enforced in the different boards and councils by 2015, some processes are considered as proxy measures that can account for the loss-to-follow up of some health professionals during their life cycle. These include the verification of professional certificates by NCK, and certificate of good standing/status by MPDB and PPB, which is a proxy for those professionals who intend to leave the country for various reasons.

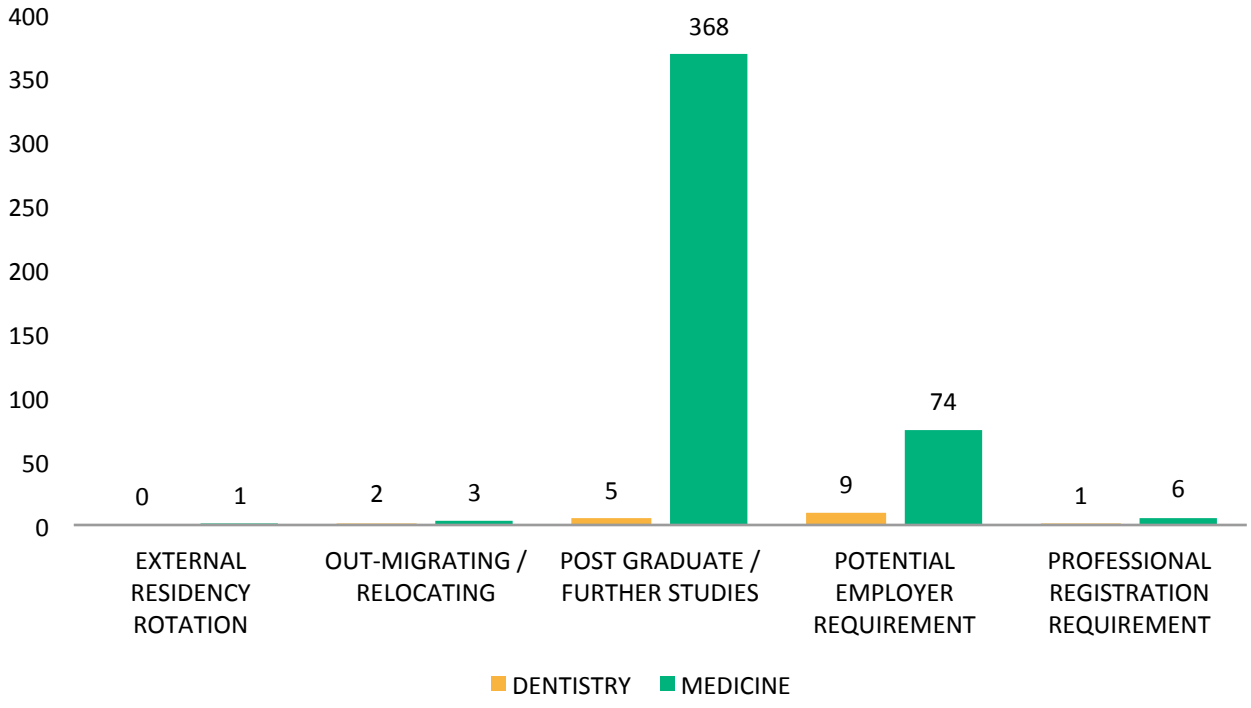
Nurses

Many nurses trained in Kenya attempt to out-migrate to other countries, contributing to the shortage of nurses in Kenya. From 1999 to 2007, 6 percent of Kenya's nursing workforce of 41,367 nurses applied to out-migrate[33]. However, with the current analysis, data showed that between 2008 and 2015, 26,941 nurses were newly registered. Of these, 482 (1.8%) nurses applied to out-migrate. The top five preferred countries were the USA (54.4%), followed by Namibia (16.2%), Australia (11.4%), Canada (3.8%), and UK (2.9%).

Medical doctors and dentists

Between 2014 and 2015, a total of 452 medical doctors and 17 dentists applied for a certificate of good standing (Figure 6.45). These numbers represent 8.0% of the active practicing doctors and 2.8% of the active practicing dentists. Most of the medical doctor applicants indicated further studies (368) as the reason for the intent, followed by potential employer requirements (74). The highest for the dentist was the requirement by the employer (9).

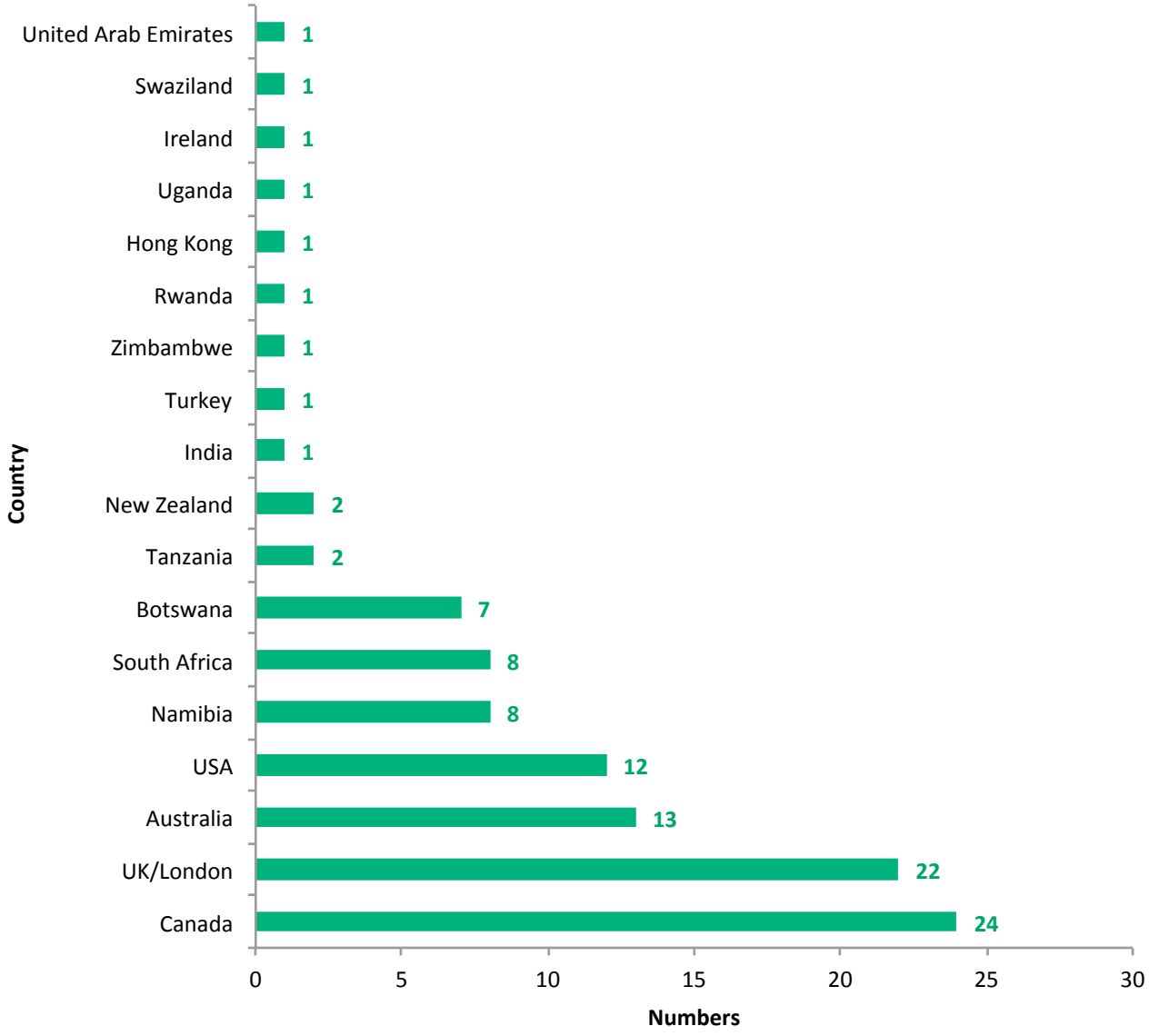
Figure 6.45: Number of applications for certificate of good conduct intention to out-migrate by cadre and reason (n=469)



Pharmacists

A total of 107 pharmacists applied for certificate of good conduct to out-migrate. The top five leading destination countries were Canada (24), UK (22), Australia (13), USA (12), Namibia and South Africa tied at 8 as shown below (See Figure 6.46).

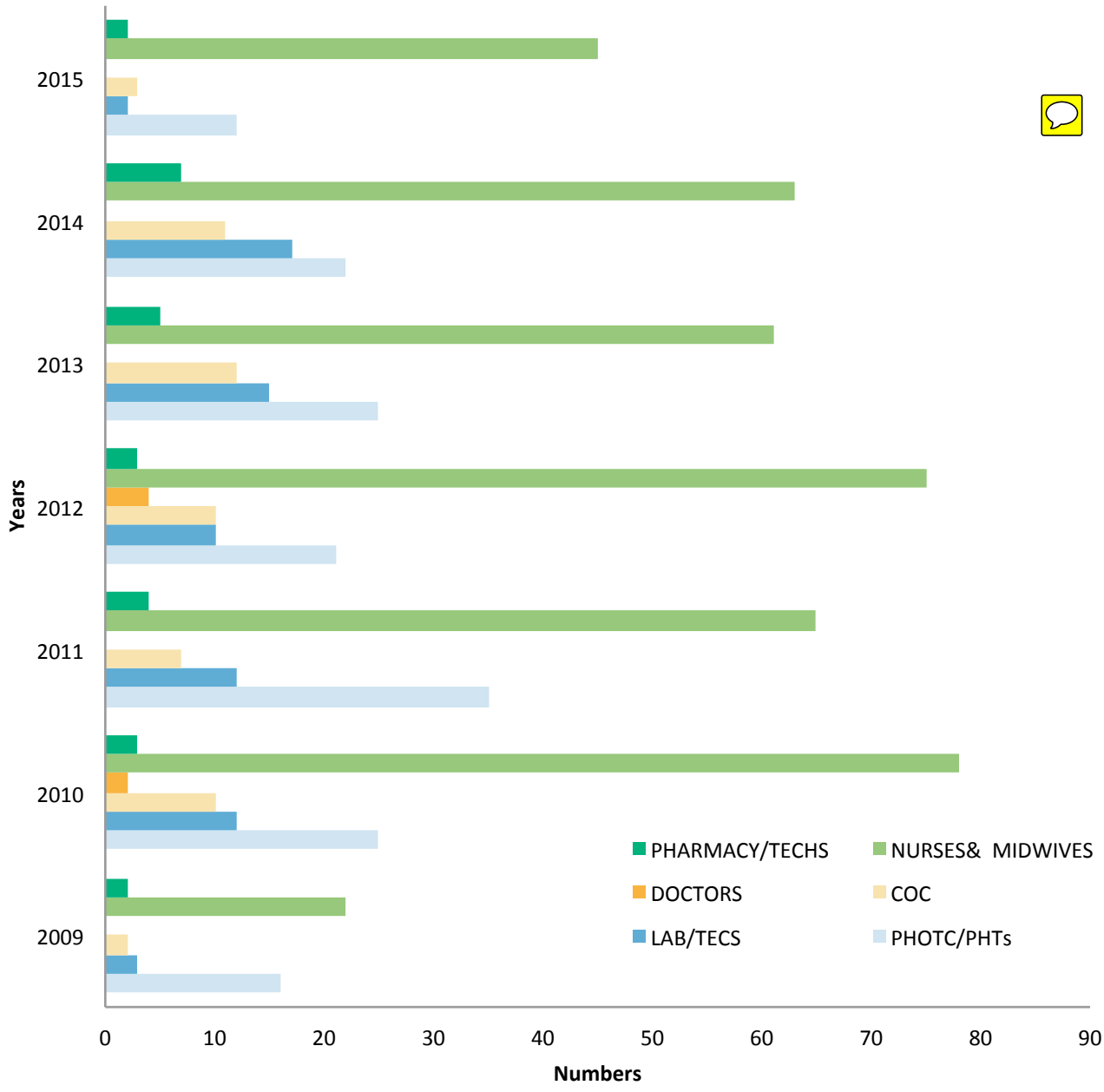
Figure 6.46: Number of applications for pharmacy practitioners by country intended to out-migrate (n=107)



6.4.4 Attrition by death

Some permanent attrition cases like death have been tracked by some health regulatory agencies although more enforcement is required. Data sourced from the Ministry of Health and some regulatory agencies explain some of the reasons for attrition in the workforce and are presented in the Figure 6.47 below

Figure 6.47: Number of attrition cases through death by cadre and year (Data sourced from Afya Sacco and harmonized with data base records) 2009–2015



7. Conclusion and discussion

This report presents the first-ever comprehensive analysis of the health professional workforce situation in Kenya based on data collected by the health professional regulatory boards and councils in the country. These data provide critical information for health workforce management, health program planning, and policy development for the heath sector.

The data analysis in this report provides evidence for several improvements that can bring Kenya's health professional workforce up to world standards. For example, the 2013 WHO report offers a useful framework for examining the health workforce based on four characteristics:

1. **Availability:** an adequate number of competent health professionals, distributed according to the needs of the population
2. **Accessibility:** equitable distribution of health professionals and facilities in terms of travel time, hours of operation, direct and indirect costs of services, and disability-friendly infrastructure.
3. **Acceptability:** a professional workforce that is respectful, flexible, and trustworthy.
4. **Quality:** a workforce that is adequately trained, has provisions for continuous training, and is perceived as competent by the population it serves.

This report provides detailed data on three of the elements: the availability (number) of health professionals, accessibility per the distribution by county, and quality based on factors like improvement of enforcement of standards and accreditation of training institutions, required license renewals, and CPD for practicing professionals in the active workforce designed to keep professionals up-to-date for quality service delivery

A key finding of this report is that of the gap between the numbers of health professionals in Kenya compared to the number required for adequate access to services. The WHO 2013 report, *A Universal Truth: No Health without a Workforce*, established that 44.6% of 186 countries with available data did not meet a minimum threshold of 22.8 skilled health professionals (midwives, nurses, and doctors) per 10,000 population as recommended by 2006 World Health Report. The Kenyan National Report found that Kenya has at present only 13.8 health professionals per 10,000 population, even when clinical officers are added to the numbers of nurses, doctors, and midwives.

> *"The findings of this report have also highlighted the gross disparities in the distribution of healthcare professionals by county."*

The findings of this report have also highlighted the gross disparities in the distribution of healthcare professionals by county. The ratio of nurses per 10,000 population varied from as high as 9.7/10,000 in Nairobi county to as low as 0.1/10,000 in Mandera county. Doctors are even more concentrated in urban areas. The ratio of doctors per 10,000 population ranged from as high as 9.5/10,000 population in Nairobi county to as low as 0.8/10,000 in Mandera county. Forty-seven percent (22) of the counties in Kenya have health workforce to population ratios that exceed the national average, whereas Nyeri and Lamu counties have more than two times that of the national. Mandera, Wajir, and Turkana counties are 86%, 73%, 73% below the national rate. respectively. The distribution of health training institutions is also skewed towards major cities and urban areas. Counties endowed with training institutions tended to have a higher health workforce-to-population ratio. Ideally, the Ministry of Health, faith-based organizations,

and private entities can use this report to invest in training institutions in areas without institutions as identified in this report. Every county has its specific health care and health workforce needs. This report can be used by respective County Public Services Boards and County Departments of Health to forecast health workforce needs within their counties.

In response to the shortage of the health workforce, the country has invested heavily in training various cadres as evidenced by the increasing number of training institutions distributed across the country and approved by various boards and councils, resulting in increasing numbers of newly registered health professionals entering the workforce. Nearly 36 (77%) of the counties now have at least one health training institution. Kenya has not only scaled up the training of the health workforce, but also has facilitated career progression for nurses and clinical officers through its system of upgrading from diploma- to degree-level training. The increase in health care training institutions, training programs, and registration of health professionals in Kenya are all positive signs. However, it is unclear whether these trends are adequate to match the growing population and healthcare needs in the country, given the rising population.

With the advent of the rHRIS electronic databases, regulatory agencies have greatly improved the enforcement of license renewals and retention. From 2006 to 2015, the number of health professionals renewing their practice licenses has been growing, giving a more accurate reflection of the active health workforce. However, not all regulatory agencies have adopted rHRIS, which is essential in management of the health workforce. Additionally, not all the information from the rHRIS could be retrieved for this report, as agencies are still improving their systems and data collection and quality. Therefore, measures to promote installation of and efficiency in utilizing rHRIS should be fast-tracked to improve the effectiveness of the health regulatory agencies.

This type of a report needs to be published and distributed widely on more regular basis so that current data are available to the healthcare sector and the public. It is important to establish a policy that will provide a forum where regulatory agencies' annual activities on regulation of the health workforce can be made public and available for use by the health sector for workforce management, program planning, and monitoring.

Despite the advances in information on the health workforce, some critical data remain incomplete. For example, attrition of the health workforce is not well captured by the various boards and councils. Such information could help to better understand patterns of the inflow of new workers and outflow of existing workers.

The Ministry of Health in Kenya has adopted the Human Resource Strategic Plan 2014–2018[32] to provide a road map for HRH interventions for improved health service delivery. It builds on the successes and lessons learnt from the first National Human Resource for Health Strategic Plan. Findings from this report and the rHRIS databases generally provide critical information for meeting several of the objectives and monitoring progress towards expected outcomes for this strategic plan. Desired outcomes include making progress towards providing an adequate and equitably distributed health workforce, making rural and hard-to-reach stations more attractive by identifying those areas that are most underserved based on the ratio of providers to population, and strengthening human resource development through strengthened CPD requirements regulated by the agencies and data on compliance.

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9. Appendices

Appendix 1: Approved nursing programs in Kenya

Table 9.1

	Nursing Programme	Code	Level of Training	Programme Type	Training Duration
1.	Kenya Enrolled Nurse* [KEN]	EB	Certificate	Basic	30 Months
2.	Kenya Enrolled Midwife* [KEM]	ED	Certificate	Post Basic	12 Months
3.	Kenya Enrolled Psychiatric Nurse* [KEPN]	EE	Certificate	Post Basic	12 Months
4.	Kenya Enrolled Community Health Nurse [KECHN]	EF	Certificate	Basic	30 Months
5.	Kenya Enrolled Community Health Nurse [Post Basic] [KECHN PB]	EH	Certificate	Post Basic	12 Months
6.	Kenya Registered Nurse [KRN]	RA	Diploma	Basic	36 Months
7.	Kenya Registered Community Health Nurse [KRCHN]	RK	Diploma	Basic	42 Months
8.	Kenya Registered Nurse Midwife [KRNM]	RQ	Diploma	Basic	42 Months
9.	Kenya Registered Nurse/Mental Health & Psychiatric Nurse [KRN/MHP]	RW	Diploma	Basic	36 Months
10.	Kenya Registered Midwife [KRM]	RC	Diploma	Post Basic	12 Months
11.	Kenya Registered Community Health Nurse [Post Basic] [KRCHN PB]	RI	Diploma	Post Basic	12 Months
12.	Kenya Registered Psychiatric Nurse [KRPN]	RJ	Diploma	Post Basic	12 Months
13.	Kenya Registered Ophthalmic Nurse [KROphN]	RM	Diploma	Post Basic	12 Months
14.	Kenya Registered Paediatric Nurse [KRPaedN]	RN	Diploma	Post Basic	12 Months
15.	Kenya Registered Peri – Operative Nurse [KRPON]	RP	Diploma	Post Basic	12 Months
16.	Kenya Registered Nurse Anaesthetist [KRNA]	RR	Diploma	Post Basic	12 Months
17.	Kenya Registered Critical Care Nurse [KRCCN]	RS	Diploma	Post Basic	12 Months
18.	Kenya Registered Nephrology Nurse [KRNN]	RT	Diploma	Post Basic	12 Months
19.	Kenya Registered Accident & Emergency Nurse [KRAEN]	RU	Diploma	Post Basic	12 Months
20.	Kenya Registered Neonatal Nurse [KRNeoN]	RV	Diploma	Post Basic	12 Months
21.	Bachelor of Science in Nursing [BScN]	RL	Degree	Basic	48 Months

Appendix 2: Approved clinical officers' training programs in Kenya

Table 9.2

	Program	Level of Training	Programme Type	Training Duration
1.	Diploma clinical medicine and surgery	Diploma	Basic	3 yrs and 1 yr internship
2.	ENT (Ear, Nose and Throat), Audiology and primary Otology	Higher National Diploma	Post basic	18 months
3.	Child health and Paediatrics	Higher National Diploma	Post basic	18 months
4.	Anaesthesia	Higher National Diploma	Post basic	18 months
5.	Cardio-pulmonary Perfusion;	Higher National Diploma	Post basic	18 months
6.	Lung and Skin	Higher National Diploma	Post basic	12 months
7.	Ophthalmology /Low vision and cataract Surgery/Optometry	Higher National Diploma	Post basic	18 months
8.	Epidemiology	Higher National Diploma	Post basic	12 months
9.	Orthopaedics	Higher National Diploma	Post basic	12 months
10.	Reproductive Health	Higher National Diploma	Post basic	18 months
11.	Dermatology and Venereology	Higher National Diploma	Post basic	18 months
12.	Mental Health and Psychiatry.	Higher National Diploma	Post basic	12 months
13.	Oncology and palliative care	Higher National Diploma	Post basic	12 months
14.	Bachelor of science in clinical medicine	Degree	Basic	4 yrs and 1 yr internship
15.	Medical Education	HND, Degree, masters, PHD		
16.	Community Health	Degree, Masters, PHD		
17.	BSc. Ophthalmology and Cataract Surgery	Degree	Post basic	4 years
18.	Family Health	Master	Post graduate	42 months
19.	Emergency Medicine	Masters	Post graduate	42 months
20.	Accident and Emergency medicine	Masters	Post graduate	42 months
21.	Corona and Forensic Medicine	Masters	Post graduate	42 months

Appendix 3: Approved pharmacists and pharmaceutical technologists' training programs in Kenya

Table 9.3		
Program (types)	Level of training (dip or degree)	Duration of training
Diploma in Pharmacy	Diploma	3 years
Diploma in Pharmaceutical Technology	Diploma	3 years
Bachelor of Pharmacy	Degree	5 years

Appendix 4: Approved medical laboratory training programs

Table 9.4			
Program type	Certificate	Level of training	Duration of training
Diploma: Medical Laboratory Sciences(MLS)	Diploma	basic	3 yrs
Higher National Diploma in MLS (Option: Clinical Chemistry)	Higher National Diploma	Post basic	12 months
Higher National Diploma in MLS (option: Parasitology and Entomology)	Higher National Diploma	Post basic	12 months
Higher National Diploma in MLS(option: Haematology)	Higher National Diploma	Post basic	12months
Higher National Diploma in MLS (option: Microbiology)	Higher National Diploma	Post basic	12 months
Higher National Diploma in MLS (option: Histopathology)	Higher National Diploma	Post basic	12 months
Higher National Diploma in MLS(Option: Blood Transfusion Sciences)	Higher National Diploma	Post basic	12 months
Higher National Diploma in MLS(option: Virology)	Higher National Diploma	Post basic	12 months
Bachelor of Medical Laboratory Sciences	BMLS	basic	4 yrs
Masters degree in MLS: Options:- Parasitology and Entomology, Clinical Chemistry, Blood Transfusion Sciences, Microbiology, Bacteriology, Epidemiology and Laboratory Management, Clinical Cytology, Haematology, Virology, Histopathology, Molecular Biology	MSc	Post graduate	2 yrs
Doctorate of Philosophy(PhD) : Options:- As above	PhD	Post graduate	3 yrs
Certificate in MLS	Certificate	basic	2 yrs

Appendix 5: Entry requirements for training medical professions in Kenya

A. Nurses

Minimum Entry Criteria: Diploma [Pre-service]
Aggregate grade: C Plain
Mandatory Subjects:

- Biology or Biological Sciences: C Plain
- English or Kiswahili: C Plain
- Grade C- in any of the following subjects: Physical Sciences, Physics, Mathematics,
- General Science, Physics with Chemistry

Minimum Entry Criteria for upgrade to Diploma [In-Service]
Aggregate of grade D+ or Division IV in the EACE exams
Nursing Council of Kenya Certificate 2 years post-enrollment working experience

Minimum Entry Criteria: Degree [Pre-Service]
KCSE aggregate of grade: C+ with:
Cluster A:

- English or Kiswahili: C+
- Mathematics or Physics: C+
- Chemistry: C+
- Biology: C+

Cluster B:

- English or Kiswahili: C+
- Mathematics: C+
- Physical Sciences: C+
- Biological Sciences: C+

Minimum Entry Criteria for Upgrade to Degree [In-Service]
Aggregate of grade C or Division II in the KCE exams
Mandatory: C in Biology or Biological Studies
Nursing Council of Kenya Basic Diploma: KRN/KRCHN/KRNM/KRN/MHN

2 years post-diploma working experience

B. Clinical officers

Degree Programs: Any one applying to degree programs must have a minimum KCSE of C plus (+) or higher in English/Kiswahili, math or physics, chemistry, and biology.

Diploma programs:

Upgrading from diploma to degree: To upgrade from a diploma to degree, the CO must have a diploma in clinical medicine, be registered with the COC and have a minimum KCSE of C (plain).

Upgrading from Clinical medicine: Holders of diploma in Clinical Medicine and Surgery qualify to train as Medical Doctors provided they are registered as Clinical officers, and have attained a minimum C+ mean grade in their KCSE. However, holders of diploma medicine do not enjoy any special exemption. They are subjected to the same curriculum as direct entry students.

c. Pharmacists

Pharmacists – Degree programs:

Minimum entry requirements: Applicants must have obtained a minimum of a mean grade of C+ and an average cluster weight of B- in the cluster subjects (Chemistry, Biology, Mathematics or Physics, English or Kiswahili) provided that no subject in this cluster shall have a grade below C+.

Pharmaceutical technologists – Diploma programs:

Applicants must have passed Kenya Certificate of Secondary Education (KCSE) with a Mean grade of C (plain) or its equivalent. Have a minimum of C (plain) in each of the cluster subjects (English or Kiswahili languages, Chemistry (or Physical Science), Biology (or Biological Science) and Physics or Mathematics).

d. Medical doctors and dentists

Degree programs:

Government sponsored direct entry: Candidates must have met the minimum university requirements, which include a mean grade of **A** at KCSE with **A** in Mathematics or Physics and **A** in English/Kiswahili.

Private self-sponsored direct entry: Candidates who aspire for direct entry to Bachelor of Dental Surgery must have KCSE aggregate **C+** and minimum **C+** in cluster subjects that include Biology, Chemistry, Physics/Mathematics and English/Kiswahili.

e. Medical laboratory technicians and technologists

Diploma level: The minimum qualifications to train as diploma level include a mean grade C in KCSE or its equivalent and mandatory **C** plain in English/Kiswahili, **C** plain in Biology/Biological Science, **C** plain in Chemistry/Physical Chemistry and **C** plain in either Mathematics or physics.

Degree level: The degree level qualifications are KCSE mean grade of **C+** in addition to **C+** in Biology/Biological Sciences, **C+** in Chemistry, **C+** in English/Kiswahili and C plain in Mathematics or Physics. To upgrade from diploma to degree, candidates must be registered diploma holders or higher diploma holders from registered with KMLTTB.

f. Public Health Officers

Certificate level: At Certificate level, candidates training in Public Health Technology have aggregate KCSE minimum of **C-** and compulsory minimum C-in English/Kiswahili, **C-** in Biology and **D+** in either Physics /Chemistry /Mathematics /Home Science / Agriculture /General Science.

Diploma level: A KCSE aggregate of **C** plain and compulsory **C** plain in English/Kiswahili, **C** plain Biology and **C-** in either Mathematics, Physics / Chemistry /Physical Sciences is required for entry at diploma level. A certificate in public health from institution recognized by PHOTC serves as an alternate requirement for entry at diploma level.

Degree level: Candidates for Public Health training at degree level must have obtained at least aggregate KCSE **C+** and at least **C+** in Mathematics/Physics, Chemistry, Biology and English/Kiswahili. A diploma in Public Health or related courses in addition to minimum two years working experience serves as an alternative entry requirement for a degree in Public Health.

g. Nutritionists

Nutritionists are trained in Kenya from certificate level, diploma level, degree level and masters.

Certificate: Entry requirements for certificate are KCSE mean grade C plain and mandatory **C-** in English/Swahili, **C-** in Chemistry and Biology, and **D+** in either physics, Mathematics or Agriculture.

Diploma: At diploma level, the minimum qualifications are KCSE aggregate grade **C** plain and mandatory **C** plain in English/Kiswahili, **C** plain in Chemistry and Biology, **C-** in either physics, Mathematics or Agriculture.

Degree: To pursue a degree in Nutrition and/or dietetics, candidates must be holders of KCSE certificate with a mean grade of **C+** and compulsory **C+** in biology, **C+** in Kiswahili/English, **C+** in Chemistry/Physics and **C+** in Mathematics or Physics. Alternatively, they must be holders of a Diploma or Higher Diploma in Nutrition and Dietetics from institutions recognized by KNDI and KCSE aggregate of **C**.

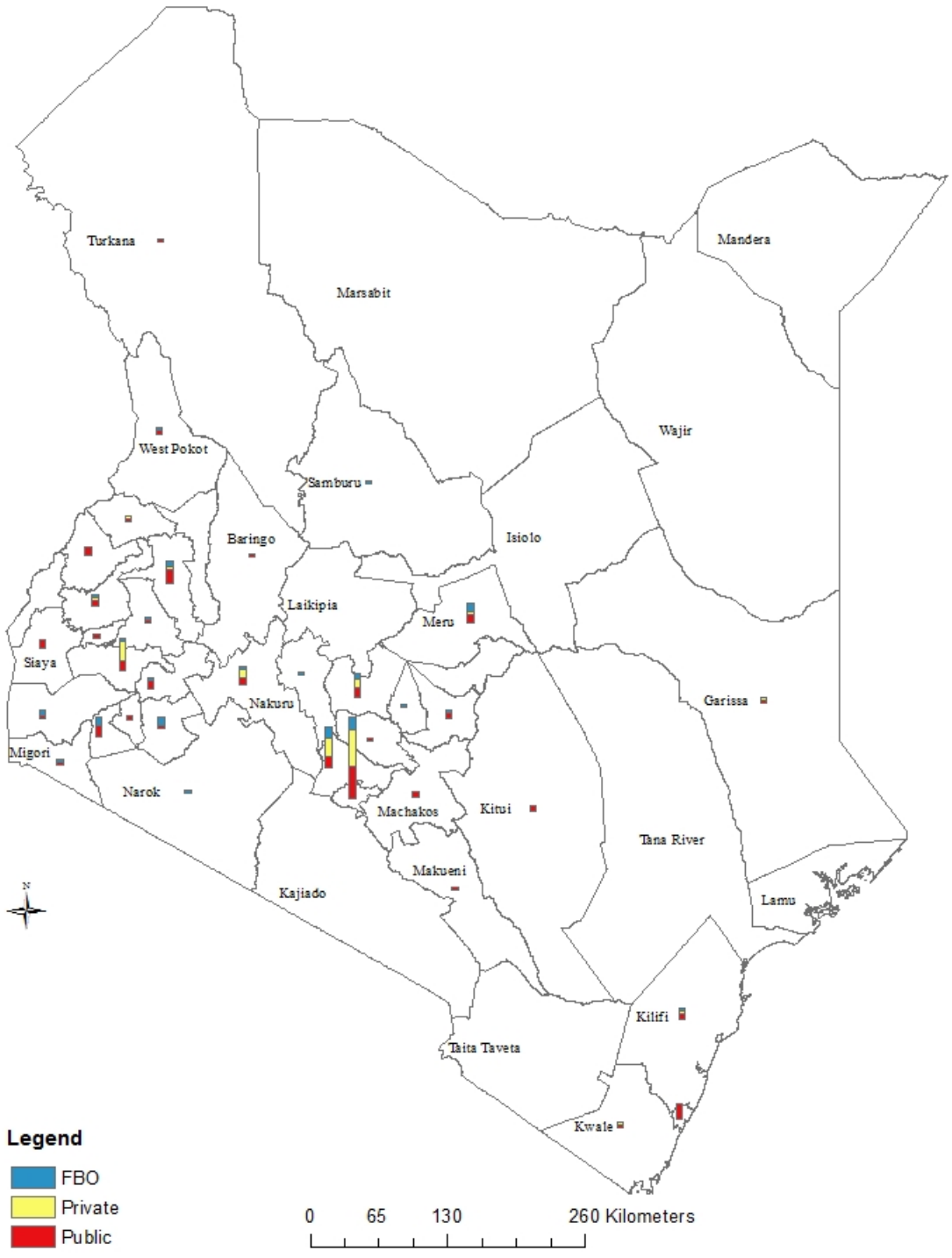
h. Radiographers are trained at diploma and degree levels.

Diploma level: At diploma level, candidates who qualify must be above 17 years in addition to aggregate KCSE **C** plain and **C** plain in Kiswahili/English, Physics, Biology and **C** in either Math or Chemistry.

Degree level: Candidates for at degree level must have at least aggregate **C+** in KCSE with **C+** in Biology, **C-** in Physics, **C+** in Mathematics/Chemistry and **C+** in English/Kiswahili. Candidates with diploma or higher diploma in Imaging Studies who wish to upgrade to a Bachelor of Science in Radiography enter at Third Year (Common known as Mature Entry).

Appendix 6: A map on distribution of training institutions by profession

Figure 9.1: A map showing the distribution of the health training institutions in Kenya by county and sponsoring agent



Appendix 7: Distribution of health workforce densities by county

Table 9.5

County	Adult HIV Prevalence 2014	Adult ART Coverage	Paediatric ART Coverage	Population 2009	Doctors	Doctor per 10, 000 population	Clinical Officers	Clinical Officer per 10, 000 population	Doctors and Clinical Officers	Doctors and Clinical Officers per 10,000 population	Nurses retained	Nurse to 10,000 population
Baringo	4.2	53%	36%	555,561	15	0.3	370	6.7	385	6.9	74	1.3
Bomet	3.5	38%	16%	724,186	25	0.3	142	2.0	167	2.3	207	2.9
Bungoma	3.5	64%	32%	1,630,934	27	0.2	346	2.1	373	2.3	521	3.2
Busia	7.1	183%	75%	488,075	19	0.4	216	4.4	235	4.8	46	0.9
Elgeyo Marakwet	3.8	38%	17%	369,998	37	1.0	192	5.2	229	6.2	172	4.6
Embu	3.7	93%	49%	516,212	22	0.4	210	4.1	232	4.5	153	3.0
Garissa	2.6	48%	10%	623,060	19	0.3	37	0.6	56	0.9	166	2.7
Homa Bay	27.1	70%	42%	963,794	15	0.2	309	3.2	324	3.4	224	2.3
Isiolo	3.8	60%	30%	143,294	30	2.1	50	3.5	80	5.6	75	5.2
Kajiado	5.0	53%	18%	687,312	53	0.8	84	1.2	137	2.0	71	1.0
Kakamega	5.6	66%	33%	1,660,651	49	0.3	584	3.5	633	3.8	360	2.2
Kericho	4.4	120%	51%	758,339	181	2.4	315	4.2	496	6.5	175	2.3
Kiambu	4.4	102%	66%	1,623,282	72	0.4	400	2.5	472	2.9	578	3.6
Kilifi	3.7	71%	44%	1,109,735	24	0.2	267	2.4	291	2.6	148	1.3
Kirinyaga	4.0	91%	68%	528,054	52	1.0	187	3.5	239	4.5	179	3.4
Kisii	8.9	48%	19%	1,152,282	151	1.3	799	6.9	950	8.2	415	3.6
Kisumu	18.7	104%	54%	968,909	28	0.3	397	4.1	425	4.4	353	3.6
Kitui	4.8	88%	64%	1,012,709	17	0.2	287	2.8	304	3.0	161	1.6
Kwale	6.2	31%	16%	649,931	38	0.6	102	1.6	140	2.2	129	2.0
Laikipia	1.3	54%	17%	399,227	6	0.2	101	2.5	107	2.7	72	1.8
Lamu	4.1	95%	61%	101,539	63	6.2	40	3.9	103	10.1	43	4.2
Machakos	4.7	74%	54%	1,098,584	36	0.3	416	3.8	452	4.1	189	1.7
Makueni	5.6	76%	61%	884,527	8	0.1	299	3.4	307	3.5	177	2.0
Mandera	1.3	4%	3%	1,025,756	11	0.1	60	0.6	71	0.7	13	0.1
Marsabit	1.0	86%	57%	291,166	8	0.3	59	2.0	67	2.3	119	4.1
Meru	3.3	82%	48%	1,356,301	66	0.5	547	4.0	613	4.5	379	2.8
Migori	13.4	89%	37%	917,170	22	0.2	191	2.1	213	2.3	122	1.3
Mombasa	11.1	98%	41%	939,370	262	2.8	174	1.9	436	4.6	463	4.9
Murang'a	5.2	45%	32%	942,581	45	0.5	283	3.0	328	3.5	186	2.0

County	Dentists	Dentists per 10,000 popln	Pharmacists	Pharmaceutical technologists (Pharm Techs)	Pharmacists to 10,000 population	Pharmtechs to 10,000 population	Medical Laboratory Technicians	Meddical Laboratory Technologists	Medical Lab Technicians to 10,000 population	Medical Lab Techniologists to 10,000 population	Health Workers Combined (Nurses+Doctors+COs)	Nurses, Doctors, COs per 10,000 population
Baringo	1	0.0	7	38	0.1	0.7	48	64	0.9	1.2	459	8.3
Bomet	1	0.0	6	38	0.1	0.5	42	56	0.6	0.8	374	5.2
Bungoma	3	0.0	88	92	0.5	0.6	97	123	0.6	0.8	894	5.5
Busia	2	0.0	16	63	0.3	1.3	3	8	0.1	0.2	281	5.8
Elgeyo Marakwet	1	0.0	10	28	0.3	0.8	61	67	1.6	1.8	401	10.8
Embu	1	0.0	33	57	0.6	1.1	68	91	1.3	1.8	385	7.5
Garissa	2	0.0	9	49	0.1	0.8	8	13	0.1	0.2	222	3.6
Homa Bay	2	0.0	13	39	0.1	0.4	17	52	0.2	0.5	548	5.7
Isiolo	3	0.2	6	16	0.4	1.1	1	6	0.1	0.4	155	10.8
Kajiado	1	0.0	24	173	0.3	2.5	2	13	0.0	0.2	208	3.0
Kakamega	4	0.0	27	105	0.2	0.6	28	83	0.2	0.5	993	6.0
Kericho	19	0.3	12	76	0.2	1.0	71	120	0.9	1.6	671	8.8
Kiambu	3	0.0	87	431	0.5	2.7	65	145	0.4	0.9	1050	6.5
Kilifi	3	0.0	20	99	0.2	0.9	2	5	0.0	0.0	439	4.0
Kirinyaga	0	0.0	13	57	0.2	1.1	60	73	1.1	1.4	418	7.9
Kisii	8	0.1	26	116	0.2	1.0	115	321	1.0	2.8	1365	11.8
Kisumu	2	0.0	62	134	0.6	1.4	35	135	0.4	1.4	778	8.0
Kitui	1	0.0	10	50	0.1	0.5	40	104	0.4	1.0	465	4.6
Kwale	1	0.0	12	56	0.2	0.9	2	3	0.0	0.0	269	4.1
Laikipia	2	0.1	13	77	0.3	1.9	17	53	0.4	1.3	179	4.5
Lamu	7	0.7	7	11	0.7	1.1	8	2	0.8	0.2	146	14.4
Machakos	0	0.0	52	140	0.5	1.3	55	210	0.5	1.9	641	5.8
Makueni	0	0.0	22	61	0.2	0.7	55	140	0.6	1.6	484	5.5
Mandera	4	0.0	7	16	0.1	0.2	6	3	0.1	0.0	84	0.8
Marsabit	0	0.0	4	15	0.1	0.5	6	5	0.2	0.2	186	6.4
Meru	6	0.0	26	112	0.2	0.8	163	171	1.2	1.3	992	7.3
Migori	0	0.0	12	69	0.1	0.8	16	41	0.2	0.4	335	3.7
Mombasa	43	0.5	90	286	1.0	3.0	0	1	0.0	0.0	899	9.6
Murang'a	4	0.0	26	81	0.3	0.9	57	99	0.6	1.1	514	5.5

County	Adult HIV Prevalence 2014	Adult ART Coverage	Paediatric ART Coverage	Population 2009	Doctors	Doctor per 10, 000 population	Clinical Officers	Clinical Officer per 10, 000 population	Doctors and Clinical Officers	Doctors and Clinical Officers per 10,000 population	Nurses retained	Nurse to 10,000 population
Nairobi	8.6	92%	74%	3,138,369	2,979	9.5	262	0.8	3,241	10.3	3030	9.7
Nakuru	5.6	62%	30%	1,603,325	140	0.9	396	2.5	536	3.3	499	3.1
Nandi	4.8	82%	39%	752,965	15	0.2	178	2.4	193	2.6	28	0.4
Narok	4.9	38%	12%	850,920	22	0.3	101	1.2	123	1.4	64	0.8
Nyamira	6.9	58%	38%	598,252	13	0.2	120	2.0	133	2.2	116	1.9
Nyandarua	3.9	77%	63%	596,268	11	0.2	163	2.7	174	2.9	80	1.3
Nyeri	4.4	99%	68%	693,558	93	1.3	506	7.3	599	8.6	262	3.8
Samburu	5.1	24%	9%	223,947	5	0.2	40	1.8	45	2.0	11	0.5
Siaya	17.8	82%	43%	842,304	23	0.3	311	3.7	334	4.0	143	1.7
Taita Taveta	6.4	52%	20%	284,657	17	0.6	119	4.2	136	4.8	143	5.0
Tana River	2.0	97%	26%	240,075	3	0.1	38	1.6	41	1.7	6	0.2
Tharaka Nithi	5.1	95%	65%	365,330	11	0.3	25	0.7	36	1.0	288	7.9
Trans Nzoia	7.2	56%	29%	818,757	31	0.4	137	1.7	168	2.1	121	1.5
Turkana	9.9	20%	19%	855,399	9	0.1	23	0.3	32	0.4	73	0.9
Uasin Gishu	4.9	144%	73%	894,179	189	2.1	193	2.2	382	4.3	758	8.5
Vihiga	6.0	97%	57%	554,622	14	0.3	162	2.9	176	3.2	107	1.9
Wajir	0.2	26%	4%	661,941	9	0.1	41	0.6	50	0.8	16	0.2
West Pokot	2.4	29%	16%	512,690	5	0.1	74	1.4	79	1.5	87	1.7
All	**6.0**	**79%**	**42%**	##########	**5,660**	**1.5**	**10,353**	**2.7**	**15,343**	**4.0**	**31,896**	**8.3**

County	Dentists	Dentists per 10,000 popln	Pharmacists	Pharmaceutical technologists (Pharm Techs)	Pharmacists to 10,000 population	Pharmtechs to 10,000 population	Medical Laboratory Technicians	Meddical Laboratory Technologists	Medical Lab Technicians to 10,000 population	Medical Lab Techniologists to 10,000 population	Health Workers Combined (Nurses+Doctors+COs)	Nurses, Doctors, COs per 10,000 population
Nairobi	357	1.1	602	1141	1.9	3.6	51	134	0.2	0.4	6271	20.0
Nakuru	11	0.1	55	229	0.3	1.4	72	134	0.4	0.8	1035	6.5
Nandi	2	0.0	12	50	0.2	0.7	13	24	0.2	0.3	221	2.9
Narok	0	0.0	10	43	0.1	0.5	8	16	0.1	0.2	187	2.2
Nyamira	1	0.0	7	21	0.1	0.4	58	33	1.0	0.6	249	4.2
Nyandarua	1	0.0	8	37	0.1	0.6	348	762	5.8	12.8	254	4.3
Nyeri	10	0.1	34	80	0.5	1.2	44	20	0.6	0.3	861	12.4
Samburu	0	0.0	4	3	0.2	0.1			0.0	0.0	56	2.5
Siaya	2	0.0	17	42	0.2	0.5	44	101	0.5	1.2	477	5.7
Taita Taveta	0	0.0	7	23	0.2	0.8	29	27	1.0	0.9	279	9.8
Tana River	0	0.0	4	11	0.2	0.5	0	0	0.0	0.0	47	2.0
Tharaka Nithi	3	0.1	11	23	0.3	0.6	33	25	0.9	0.7	324	8.9
Trans Nzoia	1	0.0	24	62	0.3	0.8	5	9	0.1	0.1	289	3.5
Turkana	1	0.0	16	9	0.2	0.1	0	1	0.0	0.0	105	1.2
Uasin Gishu	28	0.3	23	252	0.3	2.8	68	198	0.8	2.2	1140	12.7
Vihiga	1	0.0	8	21	0.1	0.4	47	105	0.8	1.9	283	5.1
Wajir	2	0.0	3	22	0.0	0.3	0	1	0.0	0.0	66	1.0
West Pokot	0	0.0	1	17	0.0	0.3	9	3	0.2	0.1	166	3.2
All	**603**	**0.2**	**1,616**	**4,671**	**0.4**	**1.2**	**1,977**	**3,800**	**0.5**	**1.0**	**47909**	**12.4**
Public sector (PPB)			**70**	**156**								
			1686	**4827**	**0.4**	**1.3**						

Appendix 8: List of contributors

The development and review of this report was facilitated by key stakeholders in the health sector, including: relevant departments in the Ministry of Health, health professional regulatory bodies and associations, and faith-based institutions. They provided key technical advice and relevant information on training, regulation and deployment processes of health professionals in Kenya. The stakeholders and affiliated organizations are listed below:

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