Health Workforce Development
Post-1990s Health Sector Reforms:
The Case of Medical Doctors in Tanzania

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The Case of Medical Doctors in Tanzania

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To my family: Jacqueline, Jan-Tristan, and Edina,  
Who are the reasons for my happiness

To my parents, Sirili and Agnes,  
Who taught me the value of education and hard work

To my brothers and sister: Thadei, Fabiola, and Alfeous  
Who have taught me practically that we are related by blood and for encouraging me to go to the top

To my friends and colleagues,  
Who have taught me that we need each other at all moments.
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Abstract

Background

Health systems in many low- and middle-income countries suffer from critical shortages and inequitable geographical distribution of the health workforce. Since the 1940s, many low- and middle-income countries have passed through different regimes of health sector reforms; the most recent one was in the 1990s. Tanzania is a good example of these countries. From the 1990s, Tanzania has been implementing the third generation of health sector reforms. This thesis analysed the health workforce development following the 1990s health sector reforms in Tanzania.

Methods

An exploratory case study employing both quantitative and qualitative research approaches was used to analyse the training, deployment, and retention of medical doctors about two decades following the 1990s health sector reforms. The quantitative approach involved analysis of graduation books and records from the Medical Council of Tanganyika to document the number of doctors who graduated locally and abroad, a countrywide survey of available doctors as of July 2011, and analysis of staffing levels to document the number of doctors recommended for the health sector as of 2012. The gap between the number of available and required doctors was computed by subtracting available from required in that period.

The qualitative approach involved key informant interviews, focus group discussions, and a documents review. Key informants were recruited from districts, regions, government ministries, national hospitals, medical training institutions in both the public and private sectors, Christian Social Services Commission and the Association of Private Health Facilities in Tanzania. Focused group discussion participants were members of Council Health Management Teams in three selected districts. Documents reviewed included country human resources for health profiles, health sector strategic plans, human resources for health strategic plans and published and grey literature on health sector reforms, health workforce training, and deployment and retention documentation.

For the training, analysis of data was done thematically with the guide of policy analysis framework. For deployment and retention, qualitative content analysis was adopted.

Results

Re-introduction of the private sector in the form of public-private partnerships has boosted the number of doctors graduating annually seven-fold in 2010 compared to that in 1992. Despite the increase in the number of doctors graduating annually, their training faces some challenges, including the erosion of university autonomies prescribed by the law; coercive
admission of many medical students greater than the capacity of the medical schools, thus threatening the quality of the graduates; and lack of coordination between trainers and employers. Tanzania requires a minimum of 3,326 doctors to attain the minimum threshold of 0.1 doctor per 1,000 population, as recommended by the World Health Organization. However, a countrywide survey has revealed the existence of around 1,300 doctors working in the health sector—almost the same as the number before the reforms. Failure to offer employment to all graduating doctors, uncertainties around the first appointment, failure to respect doctors’ preferences for first-appointment workplaces, and the feelings of insecurity in going to districts are among the major challenges haunting the deployment of doctors in Tanzania. For those who went to the districts, the issues of unfavourable working conditions, unsupportive environment in the community, and resource scarcity have all challenged their retention.

Conclusions

The development of human resources for health after the 1990s health sector reforms have to some extent been contradictory. On the one hand, Tanzania has succeeded in training more doctors than the minimum it requires, despite some challenges facing the training institutions. On the other hand, failure to deploy and retain an adequate number of doctors in its health system has left the country to continue suffering from a shortage and inequitable distribution of doctors in favour of urban areas. For health sector reforms to bring successes with minimal challenges in health workforce development, a holistic approach that targets doctors’ training, deployment, and retention is recommended.

Key words: health sector reforms, health workforce, doctors, training, deployment, retention, decentralized health sector, public-private partnership, rural, Tanzania, low- and middle-income countries
**Abbreviations**

AMOs  Assistant Medical Officers  
CHMT  Council Health Management Team  
FBO  Faith-based Organizations  
FGD  Focus group discussion  
HRH  Human Resources for Health  
IMF  International Monetary Fund  
KCMUco  Kilimanjaro Christian Medical University College  
KII  Key Informant Interview  
LMICs  Low and Middle-Income Countries  
MDs  Medical Doctors  
MEST  Ministry of Education, Science and Technology  
MUHAS  Muhimbili University of Health and Allied Sciences  
PHC  Primary Health Care  
PPP  Public-Private Partnership  
SAP  Structural Adjustment Programme  
SSA  Sub-Saharan Africa  
WB  World Bank  
WHO  World Health Organization
## Glossary

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
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<tbody>
<tr>
<td>Attrition</td>
<td>Out-migration of a health worker from a particular health system or sector [1].</td>
</tr>
<tr>
<td>Case study</td>
<td>A research method involving an up-close, in-depth, and detailed examination of a subject of study (the case), as well as its related contextual conditions [2].</td>
</tr>
<tr>
<td>Decentralization</td>
<td>A system of governance in which the power, authority, resources, and responsibility for services provision are transferred from a central government to actors and institutions at the periphery [3].</td>
</tr>
<tr>
<td>Deconcentration</td>
<td>A system of governance in which the central government hands over some of its authority for services provision to the peripheral offices of the administrative structure of the central government, such as field offices of its ministry responsible for health. These offices have some discretion to manage health-related activities without constant recourse to central government officials [3].</td>
</tr>
<tr>
<td>Delegation</td>
<td>The transfer of defined managerial or administrative responsibilities to institutions outside the administrative structure of a central government. These institutions include semi-autonomous agencies such as a regulatory commission or a community health committee, and the central government ministry responsible for health can indirectly control them [3].</td>
</tr>
<tr>
<td>Deployment</td>
<td>Ensuring the availability of the appropriate health workforce to perform the assigned tasks in the health system. The deployment process involves identifying the pool of available staff (numbers, qualifications, and available jobs); recruitment of the identified staff; and their placement in workplaces [4].</td>
</tr>
<tr>
<td>Devolution</td>
<td>The transfer of responsibility for services provision to autonomous administrative structures or governments. In principle, these structures, such as districts, municipals, regions, and city governments, are independent of the central government with respect to a defined set of responsibilities.</td>
</tr>
<tr>
<td>Term</td>
<td>Definition</td>
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<tr>
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</tr>
<tr>
<td>Health system</td>
<td>Organisation of people, institutions, and resources that deliver health-care services to meet the health needs of target populations [5].</td>
</tr>
<tr>
<td>Health workforce or Human resources for health</td>
<td>All people engaged in actions whose primary intent is to enhance health [6].</td>
</tr>
<tr>
<td>Primary health care</td>
<td>The essential health care based on practical, scientifically sound, and socially acceptable methods and technology made universally accessible to individuals and families in the community through their full participation and at a cost that the community and country can afford to maintain at every stage of their development in the spirit of self-reliance and self-determination [7].</td>
</tr>
<tr>
<td>Public-private partnership</td>
<td>A collaboration between the public and private-sector organisations where there is pooling together of resources (financial, human, technical, and information) from public and private sources to achieve a commonly agreed social goal [8].</td>
</tr>
<tr>
<td>Recruitment of health workforce</td>
<td>The process of searching for and obtaining a pool of potential candidates with the desired knowledge, skills, and experience to allow an organisation to select the most appropriate people to fill job vacancies against defined position descriptions and specifications [9].</td>
</tr>
<tr>
<td>Retention of health workforce</td>
<td>Keeping health workers within a particular health system or sector [10].</td>
</tr>
</tbody>
</table>
Original papers

This thesis is based on the following four papers, referred to as papers I–IV:


II. Sirili N, Frumence G, Kiwara A, Mwangu M, Goicolea I, Hurtig AK. Public private partnership in the training of doctors after the 1990s health sector reform: The case of Tanzania (Submitted)

III. Sirili N, Frumence G, Kiwara A, Mwangu M, Goicolea I, Hurtig AK. “Doctors ready to be posted are jobless on the street…” the deployment process and shortage of doctors in Tanzania (Submitted)

Introduction

Human resources for health (HRH), or health workforce development in Tanzania after the launching of the 1990s health sector reforms, is the focus of this thesis. The situation in Tanzania mirrors that of many low- and middle-income countries that, for decades, have suffered from a critical shortage and inequitable geographical distribution of their health workforce [6]. As adopted by Tanzania, the reforms were characterized by re-introducing a mixed (private-public) health system and decentralization. The private sector, which was banned in 1977, was re-introduced after amendments to the private hospitals regulation act of 1977 [11]. The re-introduction of the private sector this time emphasized public-private partnerships (PPP) [8].

Following the re-engagement of the private sector, the government has been working hand in hand with the private sector in training, deployment, and retention of the health workforce. For instance, the government has been sponsoring the training of medical doctors, even those admitted in private medical training institutions. In deployment, the government has special arrangements with faith-based organisations whereby the government seconded doctors to the hospitals owned by these organisations.

Administratively, the centralized health-sector administration was changed to decentralization by devolution. The decentralization by devolution system made the districts focal points for planning and implementation of healthcare programs [12]. Thus, districts were given mandates to recruit, incentivize, and fire the health workforce at their jurisdiction.

However, more than two decades later, even though there has been an increase in the number of health training institutions, Tanzania is still suffering from an acute shortage of the health workforce coupled with inequitable geographical distribution throughout the regions. In 2008, the country ranked 201st out of 229 countries in terms of their available health workforce [13]. The available workforce accounted for only 44% of the actual required workforce in the health sector according to the staffing level. By 2012, while 75% of the total Tanzanian population resided in rural areas [14], only 55% of the skilled health workforce was available for this population [15]. The distribution of doctors was worse than for other cadres in the health sector. By 2013, for instance, only 31% of the doctors were in rural areas [16]. Furthermore, the training institutions that serve as a portal for the production of the health workforce were overwhelmed by an acute shortage among their academic staff, while their capacity to engage part-time staff was declining annually [17].

The aim of this thesis is to analyse the health workforce development following the 1990s health sector reforms in Tanzania. According to Walt and Gilson, it is recommended that for fruitful analysis of an outcome of a
policy change at least one decade should have passed before the analysis [18]. Therefore, it is high time to examine the health workforce development in Tanzania after the introduction of the reforms. This thesis focuses on medical doctors for two major reasons. First, training of doctors is costly, and in Tanzania as for many other low-income countries it is still funded by the state [19]. Secondly, despite the huge cost of training of doctors, their retention in rural areas remains a major challenge facing many health systems of low-income countries.

The thesis begins by presenting an overall picture of health workforce development, starting from the global perspective and proceeding to our case country, Tanzania. In the overall presentation of health workforce development, a comparative perspective across the continents on the global distribution of the health workforce and projected future shortages is highlighted. A chapter on the conceptual framework applied in this thesis follows. The conceptual framework takes into account the stages of health workforce development, health labour market dynamics, and the health sector reforms in Tanzania. This is then followed by a chapter on study objectives, and a chapter on the methodology. This thesis adopted an exploratory case study in which both quantitative and qualitative approaches are used to gather and analyse information. A chapter of findings follows. The findings are organised to reflect the stages of health workforce development, workforce entry (training and deployment), the available health workforce (deployment and distribution of doctors), and the exit (with emphasis on retention). The findings are then discussed, and conclusions and recommendations are given.
Health workforce development: global and regional overview

Health workforce is among the six building blocks of the health system, along with service delivery; health information systems; medical products, vaccines, and technologies; health care financing; and leadership and governance (stewardship) [6]. Although all blocks of the health system are important, health workforce is the centrepiece for the functioning of the whole system, because every block of the system relies on the availability of a skilled health workforce for it to function properly [20]. Sousa [21] added that without an adequately trained, deployed, and retained health workforce, it would be difficult to attain universal health coverage. Universal health coverage is a state where 'all people and communities can use the promotive, preventive, curative, rehabilitative and palliative services they need, of sufficient quality to be effective, while protecting them from exposure to financial hardship when using these services' [22]. The 2006 World Health Report by the World Health Organization (WHO) highlighted that although the world had enough financial resources and technology to combat its health challenges, life expectancy in some countries had gone down, and the gap in life expectancy between high- and low-income countries had widened. The report added that weak health systems due to shortages in the health workforce was the major impediment to the achievability of good health outcomes. Furthermore, the WHO stated that the existing health-training institutions globally were not capable of producing the required level of health workforce [6]. In 2013, the WHO reinforced the conclusion that good health outcomes cannot be achieved in the absence of an adequate health workforce [20].

To strengthen the health systems, an adequate health workforce with the agility to respond to the changing dynamics of health care is needed [23,24]. The WHO stated that health workforce development should target the lifespan of health workers. The health workforce lifespan is summarized as entry–workforce–exit [6]. The entry stage involves the training and deployment of new health workers. The available workforce stage deals with enhancing workers' performance, and the exit stage deals with managing attrition from different causes [6,25].

In an effort to ensure the availability of a health workforce, many countries have increased the number of health training institutions and subsequently have increased the number of health workers graduating in these countries [26,27]. Ethiopia, for instance, has increased the number of doctors graduating annually from fewer than 150 in early 2000 to around 3,000 in 2015 [27]. Some countries have used the strategy of importing skilled health workers from other countries [28,29]. This has had a negative impact on many health systems in low and middle income countries (LMICs), which often fail to provide a better working environment and remuneration to their health workforces [30,31]. Within countries, in attempting to ensure an
equitable distribution of the health workforce between urban and urban areas, many countries have tried different strategies, including financial incentives, compulsory services, and non-financial incentives [24,32,33]. These changes in many countries have occurred through a series of reforms—the health sector reforms.

**Health sector reforms**

Health sector reforms refers to sustained, purposeful, and fundamental changes in the health sector. Health sector reforms aim at strengthening health systems and thus yielding better health outcomes for the population. Although there is no precise definition on what constitutes reforms, there is widespread agreement that reform is a process of change that involves the what, who, and how of health sector action [34]. From the 1940s until now, there have been three major regimes of health sector reform [35]. The international community, through the World Health Assembly, has championed all three regimes [35]. The three generations of reform have involved ideological, organisational, managerial, and financial transformation in the health sector [36]. Although not specific and explicit for the health workforce, globally, the health sector reforms have affected and are affected by health workforce development [37].

**The three generations of health sector reforms**

From the 1940s until the 1960s, the world implemented the first generation of health sector reforms. The first generation emphasized hospital care, and thus countries invested in the foundation of health care systems by building health facilities to ensure their population’s access to health care services [35]. However, by the 1960s, many health care systems were under great stress due to the rising costs of care resulting from the increased volume and intensity of hospital-based care. In places where systems were nominally universal, coverage for the poor was still limited. Most of the health facilities were built in urban areas, and only better-off people could afford the cost—thus leaving the majority of the poor and disadvantaged rural population without access [35,38]. Furthermore, around 50% of all inpatient spending went towards treating conditions that could be managed by ambulatory care [35].

After policymakers realized that hospital care had failed to address most of the health challenges, beginning in the 1970s a second generation of reforms was designed to address the health challenges through primary health care (PHC) [35]. PHC is guided by the key principles of universal access to care, coverage that is need driven, health equity, community participation in defining and implementing health agendas, and intersectoral approaches to health [39]. However, the implementation of the PHC strategy faced many challenges. Among the main challenges were low funding by the states, increased population needs, and shortage of adequately trained health
workers [35]. Therefore, the second generation of health sector reforms did not live long, lasting only to the early 1980s.

By the early 1980s, many LMICs were in critical economic situations, and they had failed to adequately fund their health sector budgets [40]. Conditionally, the International Monetary Fund (IMF) and World Bank (WB) initiated the implementation of a third generation of health sector reforms in LMICs as a way to support these countries in dealing with economic downfalls [40].

Implementation of the third-generation health sector reforms required a sector-wide approach. This involved structural adjustment programs (SAPs) in the LMICs. SAPs involved monetary and fiscal policies as well as institutional reforms. The aim of SAPs was to make LMICs reduce their spending on the social sector, get rid of excess government control, and encourage market competition [35].

Despite the need for health sector reforms in LMICs in the 1980s, following the failure of the previous reform regimes due to different reasons including economic downfalls, the 1990s health sector reforms in many LMICs were not demanded or driven locally [40]. The reforms followed those from high-income countries. The literature shows that the initial reform efforts were carried out in Europe [41]. Ideologically, in welfare states of Western Europe, the reforms were driven by changes in demographic profiles—mainly the increasingly aged population and thus changes in health care needs and demands [41–43]. In other countries, the transformation in economies was the main driver for the health sector reforms. For instance, in Eastern Europe, especially in the republics of the former Soviet Union, restructuring of the economies from centrally planned to market economies drove the health sector reforms [41,42]. The WB and the IMF [44] pushed many LMICs into reforms unwillingly due to their economic downfalls. Therefore, unlike in many high-income countries, where the design of the reforms involved many local stakeholders and was accepted by their governments [45,46], many governments in LMICs were reluctant to accept these reforms [40,44].

The third generation of reforms emphasized a sector-wide approach in addressing health challenges [35]. Although as for the previous generations of reforms the main objective of the third-generation reforms was to improve the performance of health systems and hence respond to population needs, perhaps the major driver for these 1980s reforms was the global economic depression from the late 1970s to the early 1980s [40].

Although many governments resisted implementing SAPs, conditions established by the IMF and WB that led to massive reduction of donor support to these countries rendered many LMICs unable to achieve even 50% of their health sector budgets [40,44,47]. Therefore, many governments reluctantly involved the private sector to fill in the gap [44]. By the early
1990s, many developing countries had launched the third generation of health sector reforms.

**Health workforce distribution overview**

Regardless of the efforts in health workforce development following the 1990s health sector reforms, the world has continued to suffer from a critical shortage and geographical imbalance of the health workforce. For instance, by 2013 the world had 27.2 million health workers, which was 7.2 million short of the actual required health workforce [20]. About 65% (18 million) of the available health workers are serving about 2 billion people, leaving around only 35% (8.9 million health workers) for 4.7 billion people [20]. Furthermore, projections reveal that by 2035 this shortage will shoot to 12.9 million if serious measures are not instituted [20]. Asia and Africa are the two most affected regions by both the current and the projected shortages (Table 1).

*Table 1. Regional health workforce shortage, 2013, and projections to 2035*

<table>
<thead>
<tr>
<th>Region</th>
<th>Deficit in 2013 (in millions)</th>
<th>Proportional deficit in 2013 (%)</th>
<th>Projected deficit in 2035 (in millions)</th>
<th>Projected proportional deficit in 2035 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Africa</td>
<td>1.8</td>
<td>25</td>
<td>4.3</td>
<td>34</td>
</tr>
<tr>
<td>America</td>
<td>0.3</td>
<td>4</td>
<td>0.6</td>
<td>5</td>
</tr>
<tr>
<td>Asia (South-East)</td>
<td>3.4</td>
<td>47</td>
<td>5</td>
<td>39</td>
</tr>
<tr>
<td>Eastern Mediterranean</td>
<td>0.8</td>
<td>11</td>
<td>1.6</td>
<td>12</td>
</tr>
<tr>
<td>Europe</td>
<td>0.07</td>
<td>1</td>
<td>0.1</td>
<td>1</td>
</tr>
<tr>
<td>Western Pacific</td>
<td>0.8</td>
<td>11</td>
<td>1.3</td>
<td>10</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>7.17</strong></td>
<td><strong>12.9</strong></td>
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</tr>
</tbody>
</table>

*Source: WHO Universal Truth [20]*

Within Africa, the most affected region involving health workforce shortages is sub-Saharan Africa (SSA). SSA, home to 11% of the global population, harbours 25% of the global burden of diseases but has only 3% of the global health workforce [28]. Within SSA, rural areas suffer more from this shortage. For instance, many rural parts of SSA have only 38% of nurses and 25% of doctors while accounting for over 60% of the population [28]. The magnitude of the shortage and geographical imbalance varies from country to country and within countries.
Health workforce development in Tanzania

Health workforce development in Tanzania, as with the situation globally, has passed through different regimes of reform (Table 2). Starting in the early 1990s, Tanzania began implementing the third generation of health sector reforms [48]. Before the 1990s health sector reforms, Tanzania, like the rest of the world, had passed through two reform regimes [48]. The reforms involved administrative issues, organisation of health care services provision, and the health care financing system. Although the reforms were not specific to the health workforce, the change in administrative structure, health care system financing, and organisation of the health sector have accomplished presumed effects for health workforce development [37].

The colonial regime

Before the independence of Tanganyika, from the 1920s to 1961 the health sector was under an indirect (decentralized) administrative system. During this era, from the 1940s to the early 1960s Tanganyika like the rest of the world adopted the first generation of health sector reforms. The disparity in the availability of resources between rural and urban areas resulted in disparities in health care services provision. The rural health sector grew very slowly due to scarce resources available to rural authorities. Thus, the rural areas suffered from limited access to quality health care services. The urban health sector experienced healthy growth, due to the availability of resources provided by the central government [38]. During this period, both the government and private providers (mostly faith-based organisations) were providing health care services. Thus, both the public and private sector offered employment to the available health workforce in the country. The colonial government involved itself mainly with the development of lower-level cadres to ensure that they could provide basic health care services, while the services that required highly skilled personnel were provided by foreigners. For instance, from the 1930s to the 1960s, the colonial government introduced the training of non-physician clinicians [49].

Immediate post-independence to the 1970s

Immediately after independence, from 1961 to the early 1970s, the new Tanganyika government implemented the first generation of health sector reforms, noting the disparities in health care services provision between urban and rural areas. Although the government maintained the decentralized administrative system, the districts were empowered to collect tax revenue and run health services [38]. This period was accompanied by an appraisal of the health system that aimed at building 200 health centres and 2,000 dispensaries by the 1980s to ensure that all citizens were able to receive health care services within walking distance, and to integrate local
government health services with those under the central government [38]. It is again in this phase when the Arusha Declaration came into place. The Arusha declaration came into being in 1967 and it emphasized on self-reliance as an important strategy to achieve social development, including in the area of health. As in phase one, limited resources and low district management capacity called for change in the administrative arrangement [50]. As for the regime before independence, the private sector continued to provide health care services parallel to the government [38,51], thus playing a role in the employment of the available health workforce. It is in this phase when training of high-skilled clinical personnel achieved a boost when the government established the Dar es Salaam Medical School under the Ministry of Health [52] in 1963. The medical school started by training mid-level providers, the assistant medical officers (AMOs). AMOs are advanced associate clinicians who have received three years of training to acquire a diploma in clinical medicine (clinical officers) and two years of training to acquire an advanced diploma in clinical medicine for at least three years as clinical officers [53].

The medical school was upgraded into a faculty of medicine in 1968 and started to enrol medical students in 1969 [52]. The faculty of medicine remained the only medical training institution in the country until the late 1990s. Throughout this period, the government was the sole financier of the training of medical doctors in the country. It is this faculty of medicine that later grew into the current Muhimbili University of Health and Allied Sciences (MUHAS).

1970s to early 1990s

Starting from the 1970s to 1983, Tanzania like the rest of the world adopted the second generation of health sector reforms. During this period, the health care services administrative system changed to a centralized system. This aimed to facilitate the achieving of the then predominant political vision of increasing access to health care in rural areas through community participation and self-reliance [54]. This was consolidated by the Arusha Declaration and the Ujamaa Villages Act [54], which gave villages the authority to define their own destiny, independent of district governments. Ujamaa villages were the villages that were communally organised to facilitate the Nyerere government’s socialist ideology. In these villages people lived together and owned the means of production together, and social services were organised and planned by the government along with these villages [54]. In 1977, the government enacted a private hospitals regulation act, banning private, for-profit health care services in the country [55]. This was accompanied by special agreements with faith-based organisations, by which the government provided personnel and beds through governmental funding [56]. Therefore, the government became the sole provider of health care services and employer of the health workforce. However, the centralized system faced many challenges, including overlapping central and local government functions, poor integration at the
district level, communication breakdown between ministries and districts, and limited resources due to a worsening economic situation in the country [38]. The worsening economic situation was attributed to both external and internal factors [44].

Externally, the major global economic depression from the late 1970s to early 1980s resulted in a reduction of donor support, which left the economies of many poor countries, including Tanzania, in unfavourable states. The WB and the IMF wanted the governments of these countries to restructure their economies by implementing SAPs [35,44]. Among other effects, implementation of SAPs required the countries to allow market forces to determine the production and allocation of health care resources [43]. In tandem, SAPs called for the reduction of government spending on social services, including health.

Internally, particularly in the 1970s, implementation of major political changes in Tanzania included restrictive government policies on private investment, confiscation of private property, and the forceful evacuation of people from their homes to resettle them in government-established settlements popularly known as Ujamaa villages. These factors, together with mismanagement of public properties and a war that broke out between Tanzania and neighbouring Uganda (the Kagera war), made the country rely heavily on donors [44].

Due to mismanagement and lack of accountability in the public sector, donor aid was grossly reduced, thus worsening the economic situation of the country. By the early 1980s, the country was suffering from poor social services, including failure to adequately fund free health care services to all [56]. By the mid-1980s, the government had failed to adequately train, employ, or retain enough doctors in its health system. This pushed some doctors to leave the country to work in higher-income countries—"greener pastures". It is estimated that between 1984 and 1989 around 200 doctors left the country [57]. In attempts to overcome some of the challenges brought by the centralized administrative system, in 1984 the government introduced decentralization by a deconcentration administrative system in the health sector. This lasted until the early 1990s, before the major 1990s health sector reforms.

**The 1990s health sector reforms**

Following the shortfalls of the previous reform regimes and growing pressure from both the external and internal communities, Tanzania adopted the third regime of health sector reforms in the early 1990s [56].

In Tanzania, as in many other LMICs, the reform agenda was not accepted readily at its introduction in the early 1980s, and the Nyerere’s government tried different measures in attempts to resist implementing the SAPs proposed by the WB and the IMF [44]. However, as was the case in other
places, reduction of donor funds, a worsening economic situation, and an increased disease burden forced the government to implement reforms [44]. The reforms implied that the government had to reform its overall economy from a centralized planned economy to a market economy. Furthermore, the introduction of reforms meant that the consumption and production of health services was to be left to market forces, which the Ujamaa philosophy and the government of the day did not endorse. This might have partly contributed to the reluctance of the government to accept the reforms, especially in the health sector, which is viewed as a responsibility of the state according to the socialist perspective [58].

The major aims of the 1990s health sector reforms were to bring health care services closer to the people and make the health system responsive [59]. The other health reform regimes were supply oriented, with the demand side not included, and thus they failed to make the health system respond to people’s needs [35]. Specifically, the 1990s health sector reforms aimed to (i) improve equity in health and health care, (ii) increase and improve management of health resources, (iii) improve the performance of the health system and quality of care, and (iv) create and sustain greater satisfaction among consumers and providers of health care. To attain these aims, the health sector reforms involved a reform of the health care administrative system, health care system financing, and health care system organisation, as well as a transformation of the then prevailing ideology [48].

The health care administration system reverted to decentralization [60], a system that was banned in the late 1970s [55]. However, this time the decentralization system adopted was decentralization by devolution. The health sector was then organised to reflect the new administrative structure following this decentralization. In the new system, the districts became the focal points for health care program planning and implementation [12]. The district authorities were given mandates to plan, implement, and manage all health care programs under their jurisdictions. This included the responsibility for health workforce development [12]. Immediately after the launching of the reforms in the early 1990s, the districts were mandated to carry out health workforce needs assessments, identify vacancies, advertise the vacancies, and hire and fire health workers as for other civil servants [61]. However, as for the previous regimes of decentralization, resources’ disparity across districts, left some disadvantaged districts in poor health workforce situation. Therefore, in 2006 a new system called a partial centralized system was introduced, whereby the districts identified the vacancies and the central government, through a chain of at least four ministries, filled these vacancies [17]. This system went hand in hand with the provision of financial incentives like on-call allowances and housing allowances, per the resource capacity of the districts, and non-financial incentives like promises of sponsorship for further education for those working in rural and remote areas [15,17,62].
Ideologically, the reform involved the transformation of the mind-set of individuals from free services to cost sharing [48]. This aimed to transform the people from a socialist ideology—whereby social services are funded by the state—to a market ideology, where the market is the driver of both production and consumption of health services.

Reforms in health care financing involved the introduction of cost sharing in the form of user fees or pre-payment through insurance schemes [48], and these reforms brought back the private sector. However, to regulate the private sector, the government resolved to work with the sector in the form of public-private partnerships. A public-private partnership (PPP) is a collaboration between public and private-sector organisations where there is a pooling of resources (financial, human, technical, and information) from public and private sources to achieve a commonly agreed social goal [8]. Through PPPs, the government paved the way for opening up private health facilities to include training institutions that produce medical doctors (MDs).

Starting in the late 1990s, new private medical training institutions were established [63]. The opening of private training institutions and health facilities led to increased enrolment of medical students and opened up employment opportunities to the graduating MDs, among other changes [63]. The increase in private training institutions went hand in hand with expansion of the oldest medical school—MUHAS—which had been enrolling fewer than 50 students annually for many years but grew to enrol around 100 medical students in the late 1990s [64]. To implement the PPP policy, the government sponsored a number of medical students in private institutions by providing grants and loans through the Higher Education Students Loans Board.

The 1990s health sector reforms were not without critiques. Some scholars argued that the introduction of the private sector would weaken the public sector, reduce the commitment of the government to health, and thus deprive poor people of access to better health services. With regards to decentralization, some of the critiques included the fear of fragmentation of the health sector, which thus would lead to a poor coordination system, maldistribution of the health workforce as poor resource areas would be avoided by the skilled health workforce, and an increase in administrative costs [36,65–67].
<table>
<thead>
<tr>
<th>Period</th>
<th>Training</th>
<th>Deployment</th>
<th>Retention</th>
</tr>
</thead>
<tbody>
<tr>
<td>Colonial regime (1940s–1960) (hospital-based care)</td>
<td>No local university No information exists on natives trained abroad Foreign doctors were brought by the colonial government and missionaries</td>
<td>Decentralized system of administration in the health sector Deployment was done by the colonial government and the private sector (missionaries owned health facilities)</td>
<td>No information found on how the colonial government and missionaries retained their health workforce</td>
</tr>
<tr>
<td>Immediate post-independence to the 1970s (hospital-based care)</td>
<td>Few locals were sent abroad Establishment of school of medicine in 1963 Establishment of faculty of medicine in 1968 Enrollment of first cohort of medical students in 1969</td>
<td>Decentralized system of administration in the health sector Deployment was done by the independent government of Tanganyika (later Tanzania) and the private sector (mostly missionary-owned health facilities)</td>
<td>The government and missionaries were responsible for retention of the health workforce through different incentives</td>
</tr>
<tr>
<td>1970s to early 1990s (primary health care)</td>
<td>Few locals were sent abroad One local medical school Fewer than 50 graduates per annum</td>
<td>Centralized system of administration in the health sector Deployment was done by the independent government of Tanzania Private (for-profit) sector was banned</td>
<td>Central government retained its health workforce</td>
</tr>
<tr>
<td>1990s health sector reforms (hospital-based and primary health care)</td>
<td>Few locals were sent abroad Around 10 medical schools Both public and private medical schools existed PPPs through sponsorship of students in private institutions by the government through the Higher Education Students Loans Board</td>
<td>Decentralized system of administration in the health sector Deployment by both the government and the private sector PPPs in employment with not-for-profit organisations</td>
<td>Early after reforms, districts were solely responsible for the retention of the health workforce Later, combined efforts by both the districts and central government on retention of the health workforce</td>
</tr>
</tbody>
</table>
Study objectives

Main objective

Analyse the health workforce development following the 1990s health sector reforms in Tanzania

Specific objectives

1. Analyse the training and deployment of MDs in Tanzania (papers I, II, and III) and thus to
   
i. Document the number of doctors graduating from local universities from 1992 to 2010
   
ii. Document the number of Tanzanian doctors graduating abroad and registered with the medical council of Tanganyika from 1992 to 2010
   
iii. Analyse the gap between the number of doctors required and the doctors available in Tanzania by 2011
   
iv. Analyse stakeholders’ experiences with PPPs in the training of MDs in Tanzania

2. Analyse the retention of MDs at the district level under the decentralized health system (papers I, III, and IV) and thus to
   
i. Map the distribution of doctors in Tanzania as of 1 July 2011
   
ii. Explore doctors’ and health managers’ experiences on retention of doctors across districts with different resource capacity
Conceptual framework

Development of the conceptual framework for this study was guided by the three stages of health workforce development by WHO [6], the health workforce labour market dynamics for universal health coverage by Sousa et al. [21], and the 1990s health sector reforms in Tanzania [48].

According to the WHO, development of an adequate, skilled, and responsive health workforce should take into account three stages: entry, available health workforce, and exit. For this thesis I focus on training, deployment, and retention and relate them to the three stages in the following way: entry (training and deployment), available health workforce (deployment and distribution of doctors), and exit (emphasizing retention). The entry stage is a product of pre-service training and deployment (recruitment and placement) of the health workforce. In the second stage, performance of the available workforce is contingent on both deployment and retention. Performance should also take into consideration supervision, compensation, systems supports, and lifelong learning. In the third stage, efforts should target retaining the health workforce within the system and thus reduce the exit from all possible causes. Some of the common causes for exit are death, migration, retirement from all causes, and change of job. Therefore, in managing attrition, the WHO recommends the presence of a succession plan and motivation schemes. Deployment and retention have to ensure equitable geographical distribution of the health workforce.

*Figure 1. Conceptual framework*
Sousa et al. [21] posed another important dimension in attaining universal health coverage, which is in a way a product of a responsive health system. According to Sousa et al., health workforce development should be informed by policies that will ensure that an adequate skilled health workforce is trained and deployed in the available health workforce labour market, and that attritions are minimized. Therefore, policies should target the production of the health workforce, inflows and outflows in the health sector, maldistribution and inefficiencies, and last but not least the regulation of the private sector.

The conceptual framework (Figure 1) takes into account the three stages of health workforce development: entry (training and deployment) addressed by sub-studies S2 and S3, available health workforce (sub-study S1) and the exit stage (retention issues) (sub-studies S3 and S4). The four sub-studies are carried out in the context of health labour market dynamics and are described later in this thesis (see Table 4). Health labour market dynamics is concerned with policies on training, deployment, and retention of the health workforce. This reflects how many pre-service students should be recruited, the provision of available space in the health labour market for their deployment, how performance of the workforce should be improved to ensure equitable distribution, and the development of policies to ensure their retention within the health system. The 1990s health sector reforms introduced policy changes that affected both health workforce development and health labour market dynamics. Therefore, the 1990s health sector reforms serve as the broad context for this conceptual framework.
Methods

Study setting

Tanzania is an east African country within the African Great Lakes region located between longitudes 29° and 41° east, and latitudes 1° and 12° south. It borders Kenya and Uganda to the north; Rwanda, Burundi, and the Democratic Republic of Congo to the west; Zambia, Malawi, and Mozambique to the south; and the Indian Ocean to the east. Tanzania, also referred to as the United Republic of Tanzania, reflects a union in 1964 of two countries: Tanganyika (now referred to as Tanzania mainland) and Zanzibar (the islands). Tanganyika acquired its independence from the U.K. in 1961, and Zanzibar acquired its independence in 1964 following a revolution against the government by the minority Arabs, who took over from the British in 1959 (Figure 2).

Figure 2. Map of Tanzania showing its regions and boundaries
The 2012 national population and housing census estimated that the population of Tanzania in 2016 would total around 50 million, with around 48 million located on the mainland [14]. Although the country has more than 130 tribes that speak different languages, the national language of Tanzania is Swahili, spoken by around 90% of the population [68].

The Tanzanian mainland comprises seven geopolitical zones that contain 26 regions and 185 administrative districts [69]. The country has five cities located in four zones: the eastern zone (Dar es Salaam), the northern zone (Arusha and Tanga), the lake zone (Mwanza), and the southern highlands (Mbeya). The capital city of Tanzania is Dodoma, and the largest business city is Dar es Salaam.

Tanzania is among the countries with the poorest health indicators in the world, including a high maternal mortality ratio [70]. The health indicators are not uniformly distributed in the country but reflect urban-rural disparities (Table 3).

Table 3. Health indicators as of 2016

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Urban</th>
<th>Rural</th>
<th>Overall</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maternal deaths per 100,000 live births</td>
<td></td>
<td></td>
<td>556</td>
</tr>
<tr>
<td>Antenatal coverage (at least one visit)</td>
<td>98.5%</td>
<td>97.8%</td>
<td>98%</td>
</tr>
<tr>
<td>Antenatal coverage (four visits)</td>
<td>63.8%</td>
<td>45%</td>
<td>50.6%</td>
</tr>
<tr>
<td>Health facility delivery</td>
<td>86.4%</td>
<td>53.7%</td>
<td>63%</td>
</tr>
<tr>
<td>Access to caesarean section when indicated</td>
<td>11.8%</td>
<td>3.7%</td>
<td>6%</td>
</tr>
<tr>
<td>Delivery attended by skilled health personnel</td>
<td>87%</td>
<td>55%</td>
<td>64%</td>
</tr>
<tr>
<td>Neonatal mortality per 1,000 live births</td>
<td>43</td>
<td>24</td>
<td>25</td>
</tr>
<tr>
<td>Infant mortality per 1,000 live births</td>
<td>63</td>
<td>47</td>
<td>43</td>
</tr>
<tr>
<td>Under age 5 mortality per 1,000 live births</td>
<td>86</td>
<td>75</td>
<td>67</td>
</tr>
<tr>
<td>Child mortality per 1,000 live births</td>
<td>25</td>
<td>29</td>
<td>25</td>
</tr>
</tbody>
</table>

Source: Tanzania Demographic and Health Survey and Malaria Indicator Survey, 2016 [71].

Organisation of health care services provision in Tanzania

Following the 1990s health sector reforms, Tanzania has operated under a decentralized, mixed health system in which both the public and private sectors provide health care services. By 2012, the private sector owned 26% of all health facilities at all levels and 54% of all hospitals in the country. The private sector includes both for-profit and not-for-profit service providers,
with the latter forming the larger part of the sector. Faith-based organisations (FBOs) make up the largest portion of the private not-for-profit group. FBO facilities are operated under the Christian Social Services Commission and Baraza Kuu la Waislamu Tanzania (National Council for Muslims in Tanzania—BAKWATA). Of all the health facilities owned by the private sector, 61% are by the Christian Social Services Commission. Of these facilities, 78% are hospitals: two zonal referral hospitals, two specialized hospitals, 37 district designated hospitals, and 59 voluntary agency hospitals [15].

The organisation of health services provision in Tanzania follows the pattern of hierarchical government leadership structures. The hierarchy includes primary, secondary, and tertiary levels (Figure 3). In the primary level are health posts at hamlets, dispensaries at villages, health centres at wards, and the district hospital, which is the top referral facility and overseer of all facilities at the primary level. The primary level is governed by the Council Health Management Team (CHMT)—eight members who are heads of sections and programs within the health department at the districts, the district medical Officer, and the district health secretary. Sometimes the CHMT invites other members for specific issues. The CHMTs are responsible for district health services planning and budgeting, which includes planning and budgeting for staffing (identifying recruitment needs, performance of the health workforce, and incentives for their retention). The CHMT is under the supervision of the regional health management team, which oversees the secondary level. Some districts have no single public health facility that is well enough developed to carry out the responsibilities of the district hospital. In these districts, the government has arranged with FBOs to use one of their hospitals as the district designated hospital.

The secondary level, comprising regional and regional referral hospitals, is governed by the regional health management team, under the supervision of the ministry responsible for health.

The tertiary level includes the zonal referral hospitals, consultant hospitals, and the national hospital. The ministry responsible for health is the overseer of the health sector in the country.

Following this pyramidal organisation of the health sector in Tanzania, MDs work at the lowest level, in health centres. However, due to the historical shortage of doctors in Tanzania, the backbone of the primary-level health care system, from the dispensary to the district hospital, has been assistant medical officers (AMOs). AMOs were introduced as a task-sharing strategy to compensate for the shortage of medical officers in districts.
The case study

Training, deployment, and retention of doctors in the Tanzanian mixed health system is analysed as a case study to understand the health workforce development in LMICs following the 1990s health sector reforms. A mixed health system, in this context, is one whereby both the public and private sectors are involved in the provision of health services to the community. The case study design helps in understanding the interactions in health workforce development following the introduction and implementation of the policy changes by the 1990s health sector reforms [2].

According to Yin, a case study is relevant for gaining an in-depth understanding of a phenomenon in its real context. A good case study must be informed by pre-defined boundaries that clarify what the case study constitutes—and what falls outside of it. The boundaries can be the timeline in which certain events occurred, the events that took place, the geographical location, or a social group of interest [2]. In this thesis, the case study is
bound to Tanzania; the training, deployment, and retention of doctors; the decentralization and PPP policies introduced following the 1990s health sector reforms; and the period from 1992 to 2010.

This thesis is integrated by four sub-studies referred to as papers I to IV (Table 4). The sub-studies together address the training, deployment, and retention of doctors in Tanzania following the 1990s health sector reforms. We used an exploratory case study design whereby both qualitative and quantitative approaches were used for data collection and analysis. According to Yin [2], an exploratory case study is appropriate when studying little understood real-life phenomena where the researcher has no control over the behaviours and actions of the study population. Training, deployment, and retention of doctors under PPPs and decentralization is not a linear but rather a complex phenomenon involving many actors and processes over which the researcher has no control.

The description of the methods applied in the case study is given below under three sub-headings: the training, deployment, and retention of doctors. This organisation reflects the components of the three stages of health workforce development: entry (training and deployment), available health workforce (deployment and distribution of doctors), and exit (retention issues).

Training and deployment of doctors in Tanzania

The first, second, and third sub-studies (papers I, II, and III) focused on the training and deployment of doctors in Tanzania.

Demand and supply of doctors in Tanzania (Paper I)

The first sub-study was guided by a conceptual model that was developed in reflection of demand and supply of doctors, using concepts from the literature. The conceptual model considered the demand of doctors in the country based on the population size and the capacity of available institutions/organisations to employ them. On the supply side, the model considered the capacity to train doctors and the attrition rates due to different causes.

In assessing the demand of doctors in the country, analysis was performed of the staffing level of the ministry of health. To understand the supply of doctors in the 1992–2010 period, analysis was undertaken of graduation books from all medical training institutions and available records from the Medical Council of Tanganyika to capture those doctors trained abroad who returned home or came to work in Tanzania. Finally, analysis of nationwide survey data established the number of available doctors as of July 2011 from both the public and private sector. The data were then entered into the Statistical Package for Social Sciences (SPSS) version 21, and a descriptive analysis was conducted. From the descriptive analysis, results were summarized in tables and figures to present the number of doctors required.
by the country by 2010, the total number of doctors trained by the country from 1992 to 2010, and the total number of doctors working in the country by 2011. From these findings, a gap between the required number of doctors and those available in the country was computed by subtracting those available from those required. Further, to document the gap between the number of doctors trained from 1992 to 2010 and the number of doctors required, the difference between the two was computed.

**Experience of stakeholders on the training of doctors under PPPs (Paper II)**

The second sub-study involved analysis of stakeholders’ experiences regarding the training of doctors under PPPs. This was a policy analysis that involved a documents review and 20 key informant interviews with public and private-sector individuals, to include employers and training institutions. From the public sector, four government ministries and one training institution were included. From the private sector, two training institutions and two employing organisations were involved from both for-profit and not-for-profit organisations. The aim of the interviews was to solicit information on experiences related to outcomes of the implementation process of PPPs in training MDs in Tanzania.

The documents review involved various policy documents, including the proposal for health sector reforms in 1994, a local government policy paper of 1998, the national education policy of 1999, and the draft national health policy of 2003. The review also involved the acts that established the Higher Education Students Loans Board and the Tanzania Commission for Universities, as well as the act for PPPs. The reviews aimed to capture information on the context, contents, actors, and process of the 1990s health sector reforms on the training of MDs in Tanzania.

Analysis of the information collected in this sub-study (paper II) was done using hybrid thematic analysis [72] guided by the policy analysis framework by Gagnon and Labonté [73]. This framework (Figure 4) is a modified Walt and Gilson triangle [74], with a fifth element of the impact on top of the four elements of the policy analysis triangle. As the impact that was central to this sub-study, we focused our analysis on the outcome of the policy.

In the hybrid thematic analysis, an initial codebook was developed based on the study domain, which was entered into the NVIVO 11 qualitative data analysis software. Through an iterative process during analysis, the codebook was enriched when new codes or themes emerged from the text data. Through comparisons for similarities and differences, codes were sorted into categories and aligned into themes. Finally, a scrutiny analysis was done through going back to the interview transcripts, and the documents reviewed to identify, summarize, and retain the patterns and similarities, differences, and newly emerged themes. Finally, the themes were clustered, and each was presented with the support of succinct quotes representing its underlying meaning.
Experience of doctors in the deployment process (Paper III)

In the third sub-study, doctors working at different levels of the health system were interviewed on their experience regarding how they were deployed for their first appointment to the public sector. This sub-study purposefully recruited doctors who graduated from Muhimbili University and Kilimanjaro Christian Medical University College between 2003 and 2009. To guide the analysis, the deployment of doctors was conceptualized into three stages: identifying the pool of available doctors; selection and recruitment of the doctors applying for the advertised jobs; and placement in the workplace for those selected and recruited doctors (Figure 5).

This qualitative study employed chain referral sampling [75] to recruit and thus carry out 20 key informant interviews with doctors working in district hospitals, regional hospitals, regional referral hospitals, zonal referral hospitals, specialized consultant hospitals, the national hospital, and medical universities located in eight regions and five geopolitical zones. The first doctor from each institution and in each year was identified from the graduation books of each institution before commencing data collection. From each identified doctor another colleague of the same year or preceding
year was identified and contacted. After the 20th interview, information saturation was attained and thus the data collection process was stopped.

Figure 5. Three stages of the deployment of doctors

With the aid of NVIVO 11 qualitative data analysis software, qualitative content analysis following Graneheim and Lundman [76] was adopted to analyse the interview transcripts. Condensed meaning units related to the experiences on the deployment process of doctors in the health sector in Tanzania were extracted from transcripts. Through reading and re-reading the condensed meaning units, codes were then extracted. Similar codes were grouped together, and through comparison they were abstracted into sub-categories. Through an iterative process in checking and rechecking of similarities and differences between the sub-categories, the sub-categories were sorted to form categories that reflected the manifest content of the interviews. Finally, the categories were presented with the support of suitable quotes from the transcripts.

Retention of doctors in Tanzania (Paper IV)

After analysis of the training and deployment of doctors in Tanzania in the first three sub-studies, a fourth sub-study was carried out with the aim of analysing the experiences on the retention of MDs across districts with different resources and health workforce density. This was a qualitative study, whereby data collection was done in three districts that were conventionally labelled A, B, and C. Districts A and C came from the eastern zone while district B came from the western zone. District A is a municipality in a cosmopolitan region that had the largest doctors-to-population ratio in the eastern zone. District C is one of the hardest districts to reach due to limited means of transport, and it had the smallest doctors-to-population ratio in the eastern zone. District B is an urban district with no district hospital, and its doctors-to-population ratio is on average similar to other districts in the western zone.
Data collection started with the review of incentive package plans at the districts, the staffing levels, and the national health workforce strategic plan 2008–2013. The review of documents aimed to capture information on financial and non-financial incentives across the districts—the number of available doctors versus the actual requirement and what incentives are recommended by the ministry responsible for health.

The review of documents was followed by key informant interviews and focus group discussions. The interviews and discussions aimed to solicit information on retention challenges related to financial and non-financial incentives and on how the district health managers were addressing these challenges.

This sub-study purposefully selected key informants and focus group discussants from the three districts. The key informants were doctors and health managers, and the focus group discussants were CHMT members. In districts B and C, owing to their small number of doctors, all doctors available were interviewed, while in district A, few doctors were selected based on their duration of stay. After carrying out 15 key informant interviews and three focus group discussions with 22 CHMT members (one from each district), information saturation was attained and thus data collection was stopped.

Following Graneheim and Lundman [76], the gathered information was analysed by using a qualitative content approach with the aid of NVIVO 11 qualitative data analysis software (refer to detailed content analysis on analysis of the deployment process experiences). The categories related to the retention experiences of doctors and health managers across the three districts were then presented with the support of succinct quotes from the transcripts.

Finally, the retention of doctors in the country was represented in a map. From the survey data in sub-study SI, a map was plotted to visualize the distribution of doctors in the country. The distribution is a product of all three stages of health workforce development, with the exit stage (retention issues) surfacing to show the rural-urban inequity.
<table>
<thead>
<tr>
<th>Aim of the sub-study</th>
<th>Data source</th>
<th>Number of KII/FGDs</th>
<th>Data analysis approach</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assess the achievements in training and deployment of MDs in Tanzania (paper I)</td>
<td>Field survey, graduation books from five medical training institutions, records of doctors graduated abroad and registered in Tanzania from Medical Council of Tanganyika and staffing level for the Ministry of Health and Social welfare and its units</td>
<td>N/A</td>
<td>Descriptive analysis guided by conceptual model on demand and supply of health workforce</td>
</tr>
<tr>
<td>Analyse stakeholders’ experiences regarding PPPs in the training of MDs (paper II)</td>
<td>Key informant interviews with officials from Medical training institutions (one public, one not-for-profit (faith-based) and one for-profit Ministries responsible for health, higher education, and civil service, and local government authorities Two umbrella associations for health employment in the private sector Review of documents</td>
<td>20 KII</td>
<td>Hybrid thematic analysis guided by policy analysis framework by Gagnon and Labonté</td>
</tr>
<tr>
<td>Analyse MDs’ experiences regarding the deployment system of the health workforce (paper III)</td>
<td>Key informant interviews with MDs graduated from two medical schools (MUHAS and KCMUCo) between 2003 and 2009 working in different levels of the country’s health-care system</td>
<td>20 KII</td>
<td>Qualitative content analysis guided by a conceptual model on health workforce deployment</td>
</tr>
<tr>
<td>Explore the experiences on retention of MDs at the district level under the decentralized health system (paper IV)</td>
<td>Key informant interviews with MDs working at districts and district health managers</td>
<td>15 KII and 4 FGDs</td>
<td>Qualitative content analysis</td>
</tr>
</tbody>
</table>
Ethical issues

Muhimbili University of Health and Allied Sciences (MUHAS) through its Senate, Research and Publications Committee granted ethical clearance for this study. Permission to collect data was obtained from permanent secretaries of the government ministries involved, regional medical officers, district medical officers, heads of the institutions, and directors of the hospitals involved. Written informed consent was obtained from each informant before commencing the interview or focused group discussion. The consent form detailed the objectives of the study, what was expected of the participant during the study, confidentiality, anonymity, the right to withdraw, risks and risk mitigations, and the dissemination of findings.

Dissemination of findings

Findings from this study have been disseminated through conference presentations, papers published in peer-refereed journals, presentations in workshops and symposia, newspaper articles, and a thesis (Figure 6). In newspapers the articles were synthesized into lay language. Dissemination is an ongoing process and relevant forums such as radio talks, TV sessions, Conferences, workshops and any other found suitable will continue to be used for dissemination of the findings of this work.

Figure 6. Summary of some dissemination events
Summary of findings

This section presents the findings of the study, organised into three sections: the training of doctors, deployment of doctors and retention of doctors in the decentralized health sector in Tanzania. This organisation reflects the components of the three stages of health workforce development: entry (training and deployment), available health workforce (deployment and distribution of doctors), and exit (with emphasis on retention).

Training of doctors in Tanzania (papers I & II)

In sub-study I, it was found that from 1992 to 2010, the number of medical training institutions increased from one public training institution to five medical training institutions including four owned by private entities. This resulted into an increased annual output of MDs from fewer than 50 to more than 350. During that period, the country continued to send some students abroad for medical training; thus 317 doctors graduated from medical schools overseas, returned to Tanzania, and registered with the Medical Council of Tanganyika by 2010. Therefore, the cumulative number of MDs graduating from training institutions both locally and abroad rose from 1,265 in 1992 to 3,770 by 2010, taking into account an attrition rate of 3%.

Although in total the private sector contributed only 33% of all doctors graduated from 1992 to 2010, the contribution of the private sector in the training of doctors grew from 7% in 2001, when the first private medical training institution produced its first cohort of graduates, to around 60% in 2010, when four private training institutions produced MDs (Figure 7).

*Figure 7. Number of MDs graduated from local training institutions, 2001 to 2010*
Stakeholders’ experiences with PPPs in the training of doctors (paper II)

After noticing the growing number of medical graduates in both public and private institutions, an analysis of stakeholders’ experiences with PPPs was carried out in another sub-study (II). In sub-study II, it was revealed that mixed experiences existed for the growing number of MDs from public and private training institutions. Stakeholders interviewed stated that the growth of mutual trust between the public and private sector was a good experience. They added that most of the private medical training institutions have limited space for teaching their students, especially in clinical rotations, and thus the partnership with the government has helped them to use public health facilities for the training of their medical students. Not only that, but the stakeholders also stated that the tendency of the government to sponsor students in private training institutions was a sign of government commitment in fostering the growth of PPPs.

Our teaching hospital is small, and being a private hospital we have a limited number and type of patients.... we have arrangements with nearby public hospitals where we take our students for bedside teaching....they access many patients with different conditions there. (KI-1—private training institution)

Despite the growth of mutual trust, the majority of the informants complained about an erosion of university autonomy in some mandates prescribed by law to be under the universities. They added that the erosion of university autonomy is exemplified by frequent government invasion on matters that are under university control, even with private universities that have their own governance systems. Accordingly, universities were sometimes coerced to admit an exceedingly large number of students—greater than their capacity. This put pressure on the under-equipped training institutions and thus threatened the quality of the graduates. Furthermore, the informants expressed that the erosion of university autonomy regarding student enrolment was partly attributed to lack of coordination among the trainers and the government units in planning the number of doctors required in the country and how they will be trained.

We do not have a database on how many students will finish high school in the next five years, how many we want to join medical schools, and how many doctors we will need as a country in ten to twenty years. ...everyone is moving in his/her direction and there is no linkage among trainers and planners in the country. (KI-MEST)

Deployment of doctors in Tanzania (papers I & III)

In sub-study I, analysis of the staffing level for the ministry responsible for health and its units revealed that the country required between 3,326 and 5,535 MDs by 2010, compared to 822 in 1999. Despite the increased cumulative number of MDs from 1,265 in 1992 to 3,770 in 2010, the number
of doctors deployed in the health sector slightly increased from 1,265 in 1992 to 1,299 in 2011. The number of doctors available was equivalent to 34.5% of the cumulative number of doctors (3,770) trained by the country, having considered an attrition rate of 3% from all causes. The doctors available were reaching only 39% of the minimum number of doctors required in the country (Figure 8).

**Figure 8. Number of available, trained, and recommended doctors by 2011**

![Graph showing the number of available, trained, and recommended doctors by 2011]

**Challenges facing the deployment of doctors in Tanzania (paper III)**

Having realized the available number of doctors in Tanzania to be low compared to the number of graduates, analysis of challenges facing the deployment of doctors in Tanzania was conducted (sub-study III). This showed that the deployment of medical doctors in the public sector suffers from many challenges. The deployment process was termed complex, bureaucratic, and cumbersome. The informants attributed this to the existence of many players in the deployment process of doctors in the public sector compared to that in the private sector. Post-internship, doctors sometimes were waiting up to a year before securing a job post in the public sector. In comparison, in the private sector, which has little capacity to absorb the doctors, the process was perceived as quick, short, and friendly.

I applied to the ministry immediately after finishing my internship... I was ready to go anywhere and I stated that in the application letter ...After waiting for so long I applied for a job in the private sector
and within three months I was hired... and that was it, I never turned back. (KI-05-09-KCMC)

Furthermore, sub-study III revealed that the country lacked strategies for identifying the pool of unemployed doctors. Post-internship job application remained voluntary regardless of the government sponsorship in training. Employment of doctors was not linked to the number trained by the training institutions. Most of the time the number of approved employment vacancies was far below the number of graduates. Furthermore, the number of approved vacancies has continued to decrease with time due to the decreasing health sector budget.

The study also revealed that the fact that most medical training schools are based in towns partly contributes to doctors’ fear of going to rural areas for practice after training. It was further revealed that the districts have many challenges, which do not attract newly graduated doctors. The challenges at the districts manifested as unpreparedness of the districts’ authorities to receive the doctors, unorganised reshuffles that affect the preparation towards specialization for these doctors, and territorial protectionism from the long-serving AMOs in fear of losing their managerial posts.

I was the only MD. AMOs viewed me as a threat to their positions and they thought that after some time I would be their boss... there was a time they decided to remove me from the list of on-call doctors so that I am not paid the on-call allowances. (KI-04-03-MUHAS)

Lastly, although the government provides room for doctors to propose their workplace destination preferences, most of the time the preferences were not respected. We found that if the preference was due to family reasons and it was not respected, the majority of the applicants did not pick up that post.

There was a room of giving three options of where you wished to work, so I applied through the district I wanted in order to stay with my family ... Surprisingly after long waiting time they posted me to M (was not among my options). Therefore, I did not go. I decided to seek another job in a nearby place so as I stay close to my family. (KI-04-09-KCMC)

Retention of doctors in decentralized health sector (paper IV)

Paper IV presents the findings of experiences from districts health managers and medical doctors on retention of medical doctors from three districts that have different contexts. The retention of the doctors in the decentralized health sector is challenged by a frustrating work and living environment, existence of non-uniform incentive schemes, and scarcity of resources in competing priorities. The informants attributed the frustrating work environment to under-equipped health facilities, shortage of facilities,
political interference from community leaders, and poor infrastructure to enable effective referral of patients.

The informants ascribed the frustrating living environment to accommodation challenges: either a failure to secure a house for rental in the community due to lack of trust from the community to the arriving doctors or receiving less housing allowance than the actual cost of housing in the community. Informants further added that the availability of poor or missing social amenities like good schools and recreational places in some of the districts was a major drive for them to relocate to other places.

Life is very difficult here.... If you can imagine, the indigenous treat us as foreigners who are here for our own interests.... It is very difficult to rent a house here, until you have stayed here for a long period.... Just as others who were here before, I am also on my way to leaving. (health manager-District C)

The existence of different financial incentive schemes across the districts in different regions and within similar regions was another challenge facing the retention of doctors. Across the districts, the review of documents and interviews revealed the existence of three different financial incentive packages (Table 5).

Table 5. Forms and amount of allowances across three districts

<table>
<thead>
<tr>
<th>District</th>
<th>Forms and amount of allowances</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>On call (20,000 TZS per call), housing (150,000 TZS per month), uniform allowance (varies), and responsibility allowance for head of section (varies)</td>
</tr>
<tr>
<td>B</td>
<td>On call (20,000 TZS per call), housing (80,000 TZS per month)</td>
</tr>
<tr>
<td>C</td>
<td>On call (20,000 TZS per call)</td>
</tr>
</tbody>
</table>

From the interviews, only district A was capable of paying all the allowances on time, while in districts B and C there were delays of up to a year. In district B, which had no district hospital and thus its MDs were working at the regional hospital, the informants stated that they were receiving different housing allowances from those who were employed by the regional authority despite undertaking similar roles and responsibilities.

Across the three districts, the study revealed the existence of non-uniform career development plans. In district A there was an assurance of further education within the first three years of employment, while in district B there was an assurance of further education but sometimes with delays, and there was no assurance of further education in district C.

We have a plan to take our people for further studies but most of the time we fail and hence delay to fulfil this plan because of the limited financial resources. ...for instance the MD who goes this year for
training was supposed to have gone last year...I also delayed to go for further studies for years...until when money was available. (FGD member number 6-District B)

Furthermore, the study revealed that despite the existence of different strategies for retention of the doctors across the districts, scarcity of resources in many competing priorities challenged their implementation. In efforts to find alternative sources of resources, in district A, managers were planning to open avenues for private practice in their district hospitals. In this practice, the district was planning to implement an intramural-private practice, where the doctors after their normal working hours would see fast-track patients and earn extra income on top of their salaries.

We are planning to create a window for a fast-track clinic (private practice) at our hospitals in (mention of two hospitals)... This will generate income for our hospitals, but at the same time raise incentives for our health workers and hence retain them. (health manager-District A)

Having seen the training, deployment, and retention of doctors in Tanzania from the four sub-studies, the map in Figure 9 summarizes the distribution of doctors in Tanzania as of 1st July 2011. The number of doctors in this figure is a product of the analysis of survey data used in sub-study S1 (paper I). As of 1st July 2011, the country had around 1,300 doctors working across 20 surveyed regions out of 21 in the country. The inequitable geographical distribution of the doctors has persisted in the country about two decades after launching the 1990s health sector reforms. Dar es Salaam, with around 10% of the total population of Tanzania, harbours around 27% of all doctors in the country. However, even Dar es Salaam has not attained the minimum WHO recommended threshold of one doctor per 10,000 population; it has around 0.8 doctors per 10,000 [77]. Eleven regions out of the surveyed regions have between 0.05 and 0.2 doctors per 10,000 population (Figure 9).
Figure 9. Number of doctors per 10,000 population across regions as of July 2011
Discussion

The overall aim of this thesis was to analyse the health workforce development following the 1990s health sector reforms in Tanzania. Training, deployment, and retention of doctors in Tanzania was analysed as a case study to contribute to the understanding of the health workforce development in LMICs two decades following the reforms.

The findings revealed that there have been both successes and challenges in the training of MDs, and more challenges than successes in their deployment and retention in regions and districts. The findings are discussed in view of the 1990s health sector reforms under two themes: the health workforce as an input and output of the health sector reforms, and the health sector reforms and equitable distribution of the health workforce.

Health workforce as an input and output of the health sector reforms

The findings of this study have revealed that about 20 years later, although there has been an increase of around seven-fold in the number of doctors graduating annually in the country, the number of doctors working in the health sector has remained almost the same. The availability of only 1,299 doctors working in 20 out of 21 regions in the country by 2011, compared to 1,265 in the early 1990s [48], poses a big question about the success of the health sector reforms. According to Martineau and Buchan, the health workforce is not only an output but also an important input for the success of health sector reforms [37]. Therefore, according to these authors, the success of health sector reforms among many other things requires an adequate number of skilled workforce to implement the reforms. From the early 1990s [78], the population has grown from about 22.5 million to around 43 million in 2011 [14]. The number of doctors available in 2011 translates to a doctor-to-population ratio of 0.3 per 10,000 population. This ratio is below that of 0.6 per 10,000 population that was documented in the early 1990s before embarking on the reforms. However, both ratios are far below the minimum threshold recommended by the WHO. The WHO recommends a ratio of 1 doctor to 10,000 population [77]. A similar trend was noted in the Eastern Mediterranean region, where the ratio fell from 1.8 to 1.5 after the first decade of reforms [79]. The fall in doctor-to-population ratio in Tanzania may partly be explained by the fact that the implementation of PPPs has resulted in an increase in the number of doctors graduating in the country, but there has been no corresponding growth in the employment of these doctors. Conversely, immediately after embarking on the reforms, the country implemented a retrenchment and employment freeze policy in the public sector that lasted from 1993 to the early 2000s [80]. Even after this policy was rescinded, employment in the public sector, which is the main employer of doctors in Tanzania, has remained low. For instance, from 2006
to 2011 around 40% of doctors graduated between 2005 and 2010 were not recruited in the public sector due to limited slots [81].

Opening the health sector to market forces was expected to increase the efficiency in the health sector by ensuring competition among service providers [41]. However, the private sector was still weak in many LMICs, and shrinkage of employment in the public sector would mean unemployment of the skilled health workforce [82]. With a weak private sector and implementation of a retrenchment and employment freeze policy, the total health workforce in Tanzania declined significantly from 1993 to 2001 [17]. However, it is not documented how the medical doctors graduated in this period were accommodated in the country. Perhaps some of the graduated doctors left the country, as was the case for many other LMIC graduates of this era [28,31,83,84].

In some sub-Saharan countries, between 20% and 60% of all physicians trained in these countries were working abroad by 2006 [28]. Although the international brain drain of doctors is not a very popular thought in Tanzania, studies show that there is a considerably large number of doctors who were born and raised in Tanzania who now are working in high-income countries [29,85]. For those who have stayed in Tanzania, anecdotal information reveals that a significantly large number of them are not working in the health sector, nor are they engaged in activities related to the health sector. The international brain drain of doctors is among the major impediments for the performance of many health systems in LMICs [28].

The findings of this thesis reveal that while PPPs in the training of doctors have recorded commendable successes in raising the number of MDs graduating annually, they also have brought unintended outcomes. Among these are an erosion of the universities’ autonomy, which threatens the quality of the graduates; and lack of linkage between the trainers and employers. Sometimes the universities are coerced into admitting a large number of students, exceeding their capacity, while there is no comprehensive human resource development plan to guarantee the employment of the graduates. This is similar to what was documented by Alwan and Hornby [79] in 2002 when studying the implication of health sector reforms on the health workforce in the Eastern Mediterranean region. Alwan and Hornby stated that the progress made through health sector reforms was inhibited by many challenges in health workforce development. These challenges included a lack of coordination between the ministry of health, universities, training institutions, and the population; unrealistic admission policies that sometimes allowed enrolment of a larger number of students than the capacity of the institutions; and lack of linkage between academic programmes of the training institutions and the need of the countries. Olapade-Olaopa et al. [86] cautioned in another study that whatever efforts are made to mitigate the health workforce crisis, the quality of university medical education should not be compromised, as the doctors
play vital roles in supervision, training, and mentorship of other cadres in the health sector.

As revealed in the findings of this thesis, despite the increased number of graduates from medical training institutions, their path to employment has faced many obstacles. Limited employment opportunities in the public sector due to a limited budget; many players in the employment process, which lead to an unnecessarily complicated bureaucracy; family ties; and fear of new environments by newly graduated MDs were among the major constraints for the deployment process of doctors in Tanzania. The limited budget for employing the doctors whose training the country has sponsored challenges the realization of the health sector reform goals [37]. This failure challenges the allocative efficiency of the government in health workforce development. The existence of many players in employing the doctors by itself is not a challenge. However, lack of proper coordination among the key stakeholders is the main challenge in Tanzania [17]. As stated by Alwan and Hornby, from the Mediterranean experience, there is a need to link the trainers and employers in order to ensure synergy between the training and employment of the graduates [65,79].

Health sector reforms and equitable distribution of health workforce

One of the aims of the 1990s health sector reforms was to ensure equity in accessibility of health care services for all [48]. Therefore, equitable geographical distribution of the health workforce is an important vehicle in the realization of that goal. In a country where there is a good number of graduating health workers annually, equitable distribution is a question of both deployment and retention.

Among the workforce deployment challenges, the fear of going to rural areas and the family ties expressed by the newly graduated doctors brings another dimension that may exacerbate the inequities if not addressed in timely fashion. The decentralized administration system that gave districts the power to recruit, incentivize, and fire doctors was expected to ensure the availability of doctors across districts [12]. However, the failure to attract new doctors through financial and non-financial incentives has contributed to worsening the situation across districts [17,87–89], despite the increased number of doctors in the health labour market resulting from increased output from universities. A similar situation of training many doctors and failing to employ them is experienced in many LMICs [26,90]. Only a few countries have implemented policies that have assured the employment of their doctors. Ethiopia is a good example of a LMIC that has recorded success in both training and employment. By 2001, only 120 doctors were graduating from the local training institutions in Ethiopia, when the doctor-to-population ratio was 1:30,000 [27,91]. By 2015, the number of doctors graduating annually in Ethiopia had increased to about 3,000 and the ratio had increased to 1:1,000 [27].
As revealed in the findings of this thesis, the retention of doctors across districts suffers from unfavourable working conditions, unsupportive environment in the community, and resource scarcity for their retention. These findings have revealed that despite the aim of decentralization—bringing health care services closer to the people [12,59]—retention of the health workforce in the districts is a major impediment. One of the major challenges that faced the health sector in Tanzania, as for many other LMICs before launching of the 1990s health sector reforms, was the rural-urban divide of the health workforce [56]. Two decades after reform implementation, the country still suffers a rural-urban divide in its health workforce. Although the country has tried different initiatives, such as bonding the doctors after their graduation and supporting postgraduate training, the challenges remain. The bonding strategy is used in other countries to ensure rural retention of doctors. Examples of countries where bonding or compulsory services is practiced and has shown improved retention ranging from 20% to 68% include Australia, the United States, and South Africa [24]. However, some other studies have suggested that bonding schemes must be accompanied by incentives like career opportunities and other financial incentives for better retention of doctors [92]. These are not new concepts in Tanzania; however, as for many other low-income countries, scarcity of resources and weak management systems are among the major impediments to their success [93–96]. Tanzania in particular has recently introduced the bonding scheme to doctors working across regions and districts before going for postgraduate education. However, the major challenge that remains is that the existing district staffing level does not recognize the presence of a specialist doctor at that level [97]. This means that once the doctor goes for postgraduate training it is a loss to the district, and partly this brings in a challenge about offering permission and support for postgraduate training by the district authorities. Although the government is bonding medical students to work in Tanzania for a minimum of five years after graduation, there is no follow-up done after they graduate [19]. Despite the lack of follow-up, the bonding is not tied to any particular setting or sector, provided the doctor is working in Tanzania. This brings in more challenge if equitable distribution is to be attained in a country where good public and private health facilities are concentrated in urban areas.

Methodological considerations

This thesis used a case-study design that allowed the combination of quantitative and qualitative approaches in gathering and analysing data. In this section, discussion around the methodological considerations is organized in two main categories: in relation to the first sub-study (S1), where a quantitative approach was adopted in gathering and analysing the information; and the trustworthiness of the findings on the three sub-studies (S2–S4) that adopted qualitative approaches in gathering and analysing the information.
In S1, the staffing level used was limited to the public sector, and for only institutions and units under the ministry responsible for health. This therefore excludes other institutions not under the ministry of health, for instance the higher learning institutions that train doctors and other health professionals. In addition, the staffing level excludes staffing required for the private sector. Therefore, the projected number of required doctors in the country may be far below the actual number required. However, the conceptual model used in this sub-study brings in the concept of a holistic approach that includes other parameters like population and organisations and institutions that deal with health in the country. Therefore, the conceptual model adds strength to the overall contribution of this thesis.

The fact that the survey captured information for both the public and private sector gives strength to the findings on the distribution of doctors in the country. However, taking into consideration that in regions and districts, information on the availability of doctors in the public and private sector was captured through the public sector and the Christian Social Services Commission, the precision of the information on the number of doctors in the private for-profit sector is challenged. While the not-for-profit private sector is dominated by facilities owned by the Christian Social Services Commission, which has a well-coordinated network throughout the country, the for-profit sector is not well coordinated. Individuals in the for-profit sector surrender their documents to the districts, and the districts’ authorities may delay to update the human resources for health information at the districts to reflect even those from the private sector. Nevertheless, the comparison of the number of doctors captured by the survey with the documented number of doctors in the health country profile in 2012/2013 [15] revealed almost the same number, which adds confidence to the survey results.

For sub-studies S2–S4, which adopted a qualitative approach and techniques in gathering data and analysis, trustworthiness of the findings is assessed by using the four criteria for assessing trustworthiness of qualitative findings by Guba and Lincoln [98].

Credibility. The researcher is a medical doctor with a Master of Science degree in health systems working as an assistant lecturer at the oldest reputable public medical training institution in Tanzania. This added reassurance among the informants and thus facilitated the required cooperation. Furthermore, the familiarity of the researcher with the health system and its dynamics in the training and deployment of doctors in Tanzania added credibility to this study. The researcher was supervised by four experienced health systems researchers, with three of them having a background in medicine and health systems and the fourth having vast experience in health systems and decentralization.

Before data collection in each sub-study, a review of the literature specific to the question under study and familiarization with the context where the
study was going to be conducted was done. In addition to familiarization with the study area environment and its dynamics, a field pre-visit and reading of existing documents with regard to that particular organisation or setting was done. To ensure that credible data were collected, well-established qualitative data collection methods as revealed from the literature were used. The data collection methods included documents review, key informants' interviews, and focus group discussions using semi-structured interview guides. In addition, sub studies 2 and 3 (S2 and S3) used conceptual frameworks to guide the research process.

During data collection, before commencement of interviews and focused discussions, informed consent to participate in the study was sought from the study participants. Prior to requesting of consent, the potential study participant was provided with adequate information regarding the study, and all of his/her questions about the study and rights to participate were answered. Participants were encouraged to be honest and informed that they could withdraw from the interview or discussion at any time.

Iterative questioning using probes based on the participant’s response was done during the interview or discussion to ensure depth, consistency, and clarity of the gathered information. Close to the end of each interview or discussion, the researcher gave a summary of the gathered information as written on the field notebook and asked the participants whether it was what they had said.

Another method to ensure credibility involved the triangulation process. All three sub-studies involved triangulation of study settings and researchers. In addition, S2 and S4 involved the triangulation of data sources, which involved gathering information from different participants with different roles regarding the study question. In S2, key informant interviews were carried out with a range of employers and trainers from both the public and private sector. In S4, data collection involved key informant interviews with doctors at the district hospitals and the district health managers. Also in S4, data collection involved focus group discussions with members of the council health management teams. In addition, S2 and S4 involved documents review as a data collection method.

Lastly, the data collection process went hand in hand with data analysis, and data collection was stopped when saturation of information was attained.

Transferability. To ensure that the findings of this study are applicable to other settings with a similar context, a thick description of the study context was given. The 1990s health sector reforms that provided the context to this thesis were described. This included what drove them and how they were formulated and implemented. In the individual sub-studies, the health labour market dynamics in training, deployment, and retention of doctors in Tanzania were given. The settings for each individual sub-study, study participants, and their interaction regarding the study question were
detailed. The findings of this thesis might be applied in other settings that implemented the health sector reforms, as the question of the health workforce crisis has persisted in many countries despite many reforms, including the 1990s health sector reforms.

**Dependability.** To ensure that the findings are dependable, the overall study design, data collection methods, and processes were described in detail. For the individual sub-studies, study design, study settings, study population, data collection methods, procedures, and the data scrutiny were explained. In addition, data collection tools (semi-structured interview guides) were presented and the probes were indicated.

**Confirmability.** To ensure that the findings reflect the participants’ reflections and not the researcher’s preferences, the overall study applied a case-study design that allowed the use of multiple data collection methods and data sources. In sub-studies, the triangulation of researchers with different academic and experience background, study sites, and data collection methods helped to minimize the researcher’s bias. Last, the combination of inductive and deductive analytical approaches in the overall study was another strategy that was used to ensure that the findings reflected the participants’ experiences.
Conclusions

In this thesis, three major conclusions were drawn regarding the health workforce development following the 1990s health sector reforms in Tanzania.

First, Tanzania has recorded success in the training of doctors from local training institutions. The PPP policy change introduced by the 1990s health sector reforms has resulted in positive outcomes in training. The number of doctors graduating in the country is increasing annually. However, the training of the doctors is facing some challenges. It suffers from the erosion of university autonomy prescribed by the law; admission of a larger number of medical students than the capacity of the medical schools, which threatens the quality of the graduates; and lack of a comprehensive plan that details the number of doctors required and thus to be trained by the country.

Second, despite the recorded success in increasing the number of medical doctors graduating annually, the country has not registered much success in their deployment. Failure to offer employment to all graduating doctors, uncertainties around the first appointment, failure to respect the preferences of doctors' first appointment workplaces, and the feelings of insecurity going to districts are among the major challenges that haunt the deployment of doctors in Tanzania. Although the country requires a minimum of 3,326 doctors to attain the minimum threshold ratio of 1 doctor per 10,000 population as recommended by the WHO, a countrywide survey found around 1,300 doctors in the health sector. This number is almost the same as the 1,265 doctors documented before launching the 1990s reforms. Lack of coordination among the trainers and employers contributes to a fragmented planning process and thus results in training a larger number of doctors than the capacity of the country to employ.

Third, retention of doctors across districts has remained a major challenge despite the decentralization policy that gave powers to the districts to recruit, incentivize, and fire doctors. Unfavourable working conditions and unsupportive living conditions, linked to limited resources and weak management capacity, partly contribute to the failure to retain doctors. The deployment and retention challenges altogether have contributed to the inequitable geographical distribution of available doctors—contrary to the aim of the decentralization policy introduced by the 1990s reforms. Rural areas suffer more from the shortage of doctors compared to urban ones. However, none of the regions has attained the minimum doctor-to-population ratio threshold of 1 doctor per 10,000 population.
Recommendations

From this thesis, the following major recommendations are offered.

1. For ensuring an adequate supply of a well-trained health workforce, it is vital that stakeholders involved in training meet regularly and identify the challenges facing training and devise ways of addressing them in a timely manner. Furthermore, decisions on increasing the number of student admissions should be informed by the human and non-human capacity of the training institutions. The growth in number of students should be presided by the growth of the institution capacity in order to avoid jeopardizing the quality of medical training.

2. Increasing the number graduating from training institutions without a corresponding increase in employment will not yield positive outcomes in addressing the shortage of doctors. The number of students admitted to medical school should be informed by the need and capacity of the country to employ. For countries where the government is the main or sole sponsor of the training of MDs and still face limited employment opportunities, there is a need to revise the number of students sponsored to reflect the labour market.

3. Increasing the number of graduates and then employment should go hand in hand with devising retention strategies that will ensure that the doctors who are posted to districts are retained. Governments should champion the engagement of stakeholders to support provision of financial and non-financial incentives that will support the retention of doctors in the districts.

4. For the health workforce crisis issues to be addressed, more research that addresses all aspects of health workforce development are needed. Currently, much existing research deals only with segments of the health workforce crisis rather than taking a holistic approach.

5. For countries that adopted and are implementing the 1990s health sector reforms and have not assessed the outcomes of the reforms, it is high time to do so in view of re-focusing them for improved health system performance with the understanding that the health workforce is both an input and an output of any reform.
Epilogue

I feel that it is important to briefly describe how I came to this PhD journey and this thesis—not to showcase the milestones but to highlight my connectedness to this work.

I am my mother’s first-born, with two more brothers and one sister. Both my parents originated from Mvango village, found in Same district in Kilimanjaro region in northern Tanzania. Since the late 1970s my parents were employed in different public sector institutions and shifted to Dar es Salaam in the early 1980s.

I was born in 1984 and obtained my primary, secondary, and high school education from 1992 to 2005 in Kimanga primary, Azania secondary, and Kibaha secondary schools. During my primary and secondary education, although I was among the best performing students in the class, I had a history of falling sick regularly. Most of the time it was tonsillitis or malaria that would stop me from going to school. When I started secondary school, although I had interest in knowing why I was falling sick regularly and finding solutions, and thus had interest in biology, I was disappointed that for the first six months I had no biology teacher in my class. Therefore, I focused my interest on bookkeeping and commerce so that I could become an accountant in the future. With this I stopped completely with biology. I liked bookkeeping and commerce with all my heart and became among the top scorers in the class. It was in form two when my motivating bookkeeping teacher (Ms Patricia) passed away and all my hopes and dreams took a new shape (may her soul rest in peace). Immediately after her demise, I failed to continue to perform well and was forced by circumstance to study biology again, so that I don’t score below average at the form two national examinations. Surprisingly, a few months later, I was among the top scorers in biology. Meanwhile, I was good in mathematics and physics and thus became a good student in science.

Starting from form three, I dropped bookkeeping and commerce. After the form four national examination, I was selected to join Kibaha high school in the combination of physics, chemistry, and mathematics (PCM), in which I had scored A in each subject. However, my interest was now to join physics, chemistry, and biology (PCB) so that I could become a doctor in the future and thus requested a shift. Although I qualified for PCB as well, it was not a favoured choice by my father, as I scored grade C in biology and he feared that I would fail to perform. However, after discussions, he agreed, and I was allowed to join PCB, in which I ended being among the best students.

I joined Muhimbili University College of Health Sciences, the current Muhimbili University in Doctor of Medicine degree programme in 2006 and graduated in 2011. During my medical training I was exposed to training in both the biomedical and social determinants model of disease causation through clinical training at hospital and community fields. I graduated with great interest in working as a physician not only to cure diseases but also to spend enough time educating patients on disease prevention. I joined Lugalo General Military hospital as an intern doctor with expectations of fulfilling my dream of supporting both the cure and prevention of diseases.
Contrary to my expectations, an overwhelmingly large number of patients, shortage of doctors, and shortage of equipment and supplies forced me to focus on cure rather than prevention. However, I realized that the patients kept coming back after a short period of time with the same conditions. While facing this situation I realized it was not unique to me but rather was all over the country, due to the overwhelming shortage of doctors and other health workers. Therefore, little attention was paid to the primary causes of ill health. The knowledge on the shortage of health workers came in as a result of my engagement in a Sida-supported health systems project by Muhimbili University under Professor Kiwara, who invited me to conduct a survey on human resources for health in the country immediately after my graduation.

Having noticed the challenge of addressing primary causes of ill health partly due to shortage in the health workforce, I felt that it was a privilege for me to take the front seat in understanding the depth of the health workforce challenges and become part of the solution. While turning around to look for a master’s training opportunity in the direction of prevention, Muhimbili University of Health and Allied Sciences, through Sida, advertised funded Master of Science programmes in several disciplines, including health Systems. I directly consulted my mentor, Professor Kiwara, about this, and he fully supported applying. Later, he became my MSc and PhD supervisor. Through Professor Kiwara, I have met many people who have transformed me. Notably, in this PhD journey, through his support, I went to Umeå University in Sweden to pursue different courses during MSc training and met Professor Anna-Karin Hurtig.

Professor Hurtig also knew Professor Kiwara as they were collaborating in a health systems Sida-supported project in Tanzania. When I told her that I was a student of Professor Kiwara, she wanted to know what my research was about. After explaining, she asked as to whether I had an interest in pursuing a PhD in the same line. Professor Hurtig later became my main PhD supervisor. Through her I met Professor Isabel Goicolea and many other people who have become very inspirational and transformative in my life. Throughout this PhD journey, I have learnt the science, the research, the health workforce, and the health systems dynamics. I have learnt how to interact with the science and non-science community, from researchers and policymakers to the media. It is my great pleasure that I have gotten to understand the depth of the health workforce issues, partly contributing to advice for governments on setting forth actions to redress the health workforce crisis to achieve curative and preventive health care services delivery and ultimately universal health coverage. In a nutshell, my PhD journey was not my effort alone but rather the dynamics and interactions of many people in different contexts and times. The dedication of my supervisors and the support from many people, notably my family, deserve to be mentioned to end this epilogue.
Acknowledgements

It is from the merciful almighty God that I am writing this section to conclude this thesis. I have nothing to give back to his almighty God that can suffice for his mercifulness and blessings to me. Rather, I open my heart for thanksgiving and pray that I become what he wants me to be for the community. It is with great humbleness that I am indebted to thank many individuals and organisations. Without them, this thesis would not have become a reality. Indeed, many people have contributed to this work materially or morally, and I say thank you to all of them. I know it will be very hard and almost impossible to mention everyone, but some people deserve special attention.

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