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# Addressing Tanzania's Health Workforce Crisis Through a Public-Private Partnership: The Case of TTCIH

In early 2015, Senga Pemba was in his eighth year as director of the Tanzanian Training Centre for International Health (TTCIH), a public-private partnership between the Tanzanian Ministry of Health and Social Welfare (MoHSW), the Novartis Foundation, and the Swiss Tropical and Public Health Institute in Ifakara, a small town in rural Tanzania. The founding organizations had created TTCIH to address the lack of well-trained rural health care workers in Tanzania, which was short 90,722 workers in 2014.

Pemba had invested in the organization's protocols, procedures, and physical infrastructure and spent significant time mentoring and training staff members. TTCIH was now attracting over 500 students and graduating 50 assistant medical officers annually, and it was generating 80% of its own revenue.

With his mandatory retirement approaching in two years, Pemba thought about his succession plan and what should come next for the organization amid a changing health education landscape. The TTCIH partners wanted the training center to be an independent enterprise, and Pemba had to think about how to position the organization for success.

## Overview of Tanzania

The United Republic of Tanzania is located in Eastern Africa (see **Exhibit 1** for map) and divided into 30 administrative regions. Less than one-third of its 51.8 million people lived in urban areas in 2014.<sup>1,2</sup> In 2010, only 14% of the population had access to electricity,<sup>3</sup> and 88% lacked access to improved sanitation in 2014.<sup>4</sup>

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Tanzania’s population grew at around 2.8% annually, over twice the global growth rate. About 45% of the population was between 0 and 14 years in 2014;<sup>5</sup> the median age was 17.4.<sup>6</sup> Thirty percent practiced Christianity, 35% were Muslim, and the remaining 35% followed indigenous beliefs (excluding the island of Zanzibar, a semi-autonomous part of Tanzania, where 99% of the population was Muslim). The two official languages were English and Swahili, although Arabic and local dialects were spoken widely.<sup>6</sup>

## History

After World War I, the British were given the land known today as Tanzania; they invested minimally in the region. Swiss missionaries—including the Capuchin Fathers and the Baldegg Sisters—became active in the area in the 1920s. In 1961, the United Republic of Tanzania formed, independent of the United Kingdom. While the nation’s capital moved from Dar es Salaam to Dodoma in 1996, Dar es Salaam remained the largest and most populous city and home to Tanzania’s executive offices.<sup>7</sup>

Tanzania’s first president, Julius Nyerere, was popularly called *Mwalimu*—“teacher” in Swahili—a reference to his profession before becoming president. Under his rule, Tanzania was defined by African socialism, and the country suffered from economic decline, corruption, and shortages of basic commodities. When Nyerere stepped down in 1985, the country was one of the poorest and least developed in Africa, heavily relying on foreign assistance.<sup>7</sup>

In 2014, the Chama Cha Mapinduzi (CCM) Revolutionary Party held the most seats in the National Assembly, and Tanzania’s President Jakaya Kikwete acted as both chief of state and the head of government.<sup>1</sup>

## Economy

Tanzania’s GDP ranked 84 out of 194 countries in 2014.<sup>8</sup> However, its annual growth of 7% ranked 22nd in the world owing to gold production and tourism.<sup>7</sup> Growth was primarily occurring in urban areas.

About 90% of the country’s poor lived in rural areas.<sup>9</sup> Despite low productivity and low-paying jobs, agriculture was the main economic driver in rural areas,<sup>10</sup> comprising over a quarter of GDP and employing approximately 80% of the workforce. The government owned all land in Tanzania and leased it for up to 99 years at a time. The government also had a presence in the telecommunications, banking, energy, and mining sectors, though the country had mostly transitioned to a liberalized market economy.<sup>7</sup>

**Basic Socioeconomic and Demographic Indicators\***

INDICATOR		YEAR
UN Human Development Index ranking	159 out of 187	2014
Population (thousands)	51,822.62	2014
Urban population (%)	31	2014
Population using improved drinking water sources (%)	75	2015
Poverty (% living under USD 1.90 per day, 2011 international prices)	46.6	2011
Gini index	37.6	2013
GDP per capita, PPP	2,591.2	

\* Compiled by case writers using data from World Bank, UNDP, UNICEF, and UNECSO.

† Compiled by case writers using data from WHO, the World Bank, the UN, the WHO, and Kaiser Family Foundation.

‡ Currency conversions were performed using average annual exchange rates provided by <http://www.oanda.com/currency/historical->

(current international dollars)		2014
<b>INDICATOR</b>		<b>YEAR</b>
<b>GDP per capita (current USD)</b>	998.1	2014
<b>Literacy (total/female/male)</b>	80.3/75.9/84.8	2015

## Health in Tanzania

Malaria was the leading cause of death in people over five in Tanzania, comprising 22% of all deaths. HIV/AIDS accounted for 17% of deaths; cardiovascular disease for 11%; tuberculosis, 5%; respiratory diseases, 4%; cancer, 3%; and diabetes, 2%. Late Caesarean sections were a significant cause of maternal mortality. Tanzania spent 11.2% of its total budget on health in 2013, compared with the Abuja Declaration's recommended 15%.

### Health System and Epidemiologic Indicators<sup>†</sup>

<b>INDICATOR</b>		<b>YEAR</b>
<b>Average life expectancy at birth (total/female/male)</b>	63/65/ 61	2013
<b>Maternal mortality ratio (per 100,000 live births)</b>	410	2013
<b>Under-five mortality rate (per 1,000 live births)</b>	49	2015
<b>Infant mortality rate (per 1,000 live births)</b>	35	2015
<b>Vaccination rates (% of DTP3 coverage)</b>	97	2014
<b>Undernourished (%)</b>	35	2013
<b>Adult (15–49 years) HIV prevalence (per 100,000)</b>	2,437	2013
<b>HIV antiretroviral therapy coverage (%)</b>	43	2014
<b>Tuberculosis prevalence (per 100,000)</b>	172	2013
<b>DOTS coverage (%)</b>	100	2013
<b>Malaria cases (per 1,000)</b>	173	2012
<b>Government expenditure on health as % of total government expenditure</b>	11.2	2013
<b>Government expenditure on health per capita (PPP international dollars/USD)</b>	46/18	2013
<b>Total health expenditure per capita (PPP international dollars/USD)</b>	126/49	2013
<b>Physician density (per 10,000)</b>	0.31	2012
<b>Nursing and midwifery density (per 10,000)</b>	4	2012
<b>Number of hospital beds (per 10,000)</b>	70	2012

### *Tanzanian Ministry of Health and Social Welfare*

The president of Tanzania reorganized the Social Welfare Commission and the Ministry of Health to form the Ministry of Health and Social Welfare (MoHSW) in 2005 to better align health issues with social problems.<sup>11</sup> The MoHSW coordinated Tanzania's public health care system. It was responsible for

<sup>†</sup> Compiled by case writers using data from WHO, the World Bank, the UN, the WHO, and Kaiser Family Foundation.

formulating health-related policies as well as providing hospital services, preventive services, chemical management services, forensic science services, food and drug quality, reproductive health services, promotion of traditional medicine, inspection of health services, participation in international health and medical organizations, and development of human resources.<sup>11</sup> Tanzanian public expenditure on health was USD 1.2 billion.<sup>‡</sup>

In accordance with Nyerere's socialist vision, Tanzania had introduced free medical services for all in 1960. The country developed a multi-tiered, decentralized health system prioritizing primary care.<sup>12</sup> Health facilities ranged from community health posts at the village level to regional hospitals and specialized referral hospitals (see **Exhibit 2** for tiers of health facilities). About 90% of people in Tanzania lived within five kilometers of a primary health facility, but terrain and lack of reliable transport (especially in the rainy seasons) were significant barriers to access.<sup>13</sup>

During Tanzania's economic recession in the 1970s and 1980s, the International Monetary Fund (IMF) and the World Bank instituted structural adjustment policies, including the reintroduction of private medical practice in 1991 following a 10-year ban; introduction of cost sharing (user fees) in 1993; establishment of national health insurance for government employees in 1999; and formation of community health funds (local insurance schemes) in 2001. User fees burdened the poorest patients, who often delayed accessing services, even though women and children under five technically qualified for free treatment.

Most people first sought care from either a village health worker at a community health post or a traditional healer before being referred as needed to a dispensary (see **Exhibit 3** for the numbers and training requirements of different health care workers in Tanzania). Two clinical assistants and two nurses ideally staffed each dispensary, according to MoHSW recommendations, and some offered basic laboratory services.<sup>14</sup> Health centers, staffed by clinical officers (COs) offered the next level of care. Some health centers did not perform any Caesarean sections, and others had low rates (around 3% of all deliveries, meeting 10–20% of the need).<sup>15</sup> COs had completed three years of postsecondary education and could perform basic outpatient procedures and administer medications for common illnesses. They earned about USD 500 per month.<sup>16</sup> Health centers often had a shortage of nurses, leaving untrained staff to perform nursing duties.

District hospitals, staffed and run by medical doctors (MDs, also termed medical officers, or MOs) or assistant medical officers (AMOs), offered secondary care.<sup>12</sup> Most Tanzanians considered AMOs equivalent to MDs. AMOs completed clinical officer training followed by three years of clinical work before they could begin the additional two years of AMO coursework and clinical rotations (OB/GYN, pediatrics, internal medicine, surgery, and community/public health). The starting salary for AMOs and MDs in the public sector was around USD 400 and 600 per month, respectively, in 2012.<sup>17</sup>

AMOs usually worked independently, with limited supervision, and were certified to practice medicine, surgery, and midwifery. AMOs performed 85% of emergency obstetric surgeries in rural areas, yet most AMOs had performed fewer than five Caesarean sections at the time of graduation. Research indicated that quality and outcomes of Caesarean sections performed by AMOs and MDs were comparable.<sup>15,18</sup> Since AMOs had worked in remote rural areas as COs, they were accustomed to the conditions such areas presented.

While the MoHSW in collaboration with the National Council for Technical Education (NACTE) offered AMO diplomas, the Ministry of Education and Vocational Training certified medical degree programs through the Tanzanian Commission for Universities.

<sup>‡</sup> Currency conversions were performed using average annual exchange rates provided by <http://www.oanda.com/currency/historical-rates/>. From 2006 to 2015, the average annual exchange rate for USD 1 ranged from Tsh 1,178 (2008) to Tsh 1,996 (2015).

## ***Human Resources for Health***

Tanzania had a human resources for health (HRH) shortage of 56% in 2014.<sup>19</sup> It fared worse than neighboring countries; it had one-third the skilled HRH density of Kenya.<sup>20</sup> In 2014, the estimated 35,202 professional health workers in the public sector represented 90,722 fewer than what was needed, according to government estimates based on norms and population size (see **Exhibit 4a** and **Exhibit 4b** for staff shortages in public and private health care facilities and **Exhibit 5** for estimates of practicing health care workers by cadre and region).<sup>21,22</sup> The Tanzanian government believed the HRH shortage limited the country's ability to meet the Millennium Development Goals (MDGs) addressing maternal and child mortality.

Estimates of the size of Tanzania's health care workforce varied. The government excluded AMOs in the official physician count, but it included physicians not practicing clinical medicine. The MoHSW reported the country had 1,339 physicians in 2007, mostly in Dar es Salaam, which had six times the national doctor-to-patient ratio. In 14 out of 26 regions, there was one or fewer doctors per 100,000 people (the WHO recommendation was one doctor per 10,000 people).<sup>12</sup>

In the 1990s, global pressure to restructure, cut costs, and implement new policies such as the Retrenchment Policy of 1993 had led Tanzania to freeze hiring and downsize the civil employment apparatus. The limited investments in infrastructure, training, and retention in the public health and medical sectors led to long-term consequences.

The MoHSW first declared the HRH shortage a crisis and implemented a five-year strategic plan in 1996. The plan suggested decentralizing the health care system and emphasized primary health services. Aims included improving the quality of the workforce, strengthening continuing education, and reducing the number of unskilled health sector staff. The plan was underfunded and did not address private providers.

The workforce shortage reached emergency levels in 2005.<sup>23</sup> Only 3,836 out of a total 23,474 health care professionals trained over the last decade (16%) had been hired to work for the government.<sup>24</sup> Some had taken jobs outside the country, others worked outside the health field or in the private sector. One 2011 study of medical school graduates showed that 15.5% were pursuing further studies, 13.7% were working for NGOs, 0.7% were working in a non-health industry, and 13.1% were not working or suspended.<sup>25</sup> Another study found that 30% of all health care workers trained in the country left within a year after completing their training. In 2010, fewer than 4,000 people were trained per year.

Rural staffing challenges included lack of attractive retention schemes, poor remuneration, and insufficient equipment and medicines to do the work.<sup>19</sup> Physicians preferred practicing in urban settings where they could "moonlight," or work at multiple hospitals and clinics, to supplement low salaries.

Many new physicians simply did not show up: only 63% of doctors reported to their assigned station, and of those who went to their post, 13% left within one year due to quality of life, delays clearing hardship claims, moving costs, bad roads, and lack of social services.<sup>26</sup> Tanzania had a diffuse system of monitoring health care workers and limited information on where trainees actually went.<sup>27</sup>

Between 2005 and 2008, the President's Office of Public Service Management approved over 12,000 new health positions to try to recruit these workers back to Tanzania's public sector. Many positions remained unfilled.<sup>28</sup> Filling vacant health care posts involved bureaucratic processes across several ministries, with complex and unwieldy coordination between local and central government bodies that prolonged the process (see **Exhibit 6a** and **Exhibit 6b** for estimates of Tanzanian-trained physicians outside of Tanzania in 2013).<sup>29</sup>

In 2006, the government increased salaries for physicians and other public health care workers. This drew many private-sector physicians back to the public sector and exacerbated private-sector human resource shortages, raising concerns about the quality of care at private facilities.<sup>30</sup>

The MoHSW implemented a second five-year HRH strategic plan in 2008, involving renewed efforts in planning, policy development, education, training, workforce management and utilization, partnership creation, research and development, and promotion of adequate financing and leadership.<sup>31</sup> The plan recognized midlevel cadres, such as AMOs, as critical for “task-shifting” duties from MDs or taking on some of their work.

## ***Training Institutions***

Tanzania had about 116 national health training institutions in 2010, hosting various class sizes and cadres of health care workers. Established in 1963, Muhimbili University of Health and Allied Sciences in Dar es Salaam was Tanzania’s only public medical school until the late 1990s. Students attending Muhimbili received Tsh 1.8 million (USD 901) per year from the government to cover tuition, as well as a living allowance for meals and accommodation in exchange for five years of medical training.

Tanzania’s other four medical schools were private schools that derived most of their income from student tuition and fees. For example, the St. Francis University College of Health, founded in 2010 in Ifakara in collaboration with St. Francis Regional Referral Hospital, charged Tsh 2.6 million (USD 1,302) a year for tuition. The Tanzanian government began to offer students of private medical schools loans and grants, which enabled more students to afford tuition.<sup>32</sup> One university administrator estimated that about 95% of students received government loans, with interest rates of 6% per year; however, loans were capped at less than the cost of one year’s tuition, and caps were not expected to increase, given low repayment rates. Loans for midlevel diploma or certificate programs were not readily available.<sup>33</sup>

A 2009 report by the International Training & Education Center for Health (I-TECH) looking at five Tanzanian training institutions found they were overcrowded, with inconsistent water supply and sewage buildup in dormitory bathrooms, and that students were living in spaces such as vacant hospital laundry rooms.<sup>28</sup> Three of the five schools did not have any computer laboratories or adequate Internet access.

In an assessment of 39 schools that same year, the Muhimbili School of Public Health and Social Sciences identified six major constraints: lack of qualified students, shortage of faculty, inadequate nonclinical infrastructure, subscale clinical infrastructure, and limited financial capacity. The researchers recommended multiple solutions, including: subsidizing student housing; encouraging faculty members to teach beyond the national retirement age of 60 years; incentivizing MD students to teach in exchange for financing their medical specialization; shortening CO training from three years to two years; increasing training capacity with technology; and increasing student fees so that training schools could be “increasingly self-financing.”<sup>24</sup> Another idea was to train multiple cadres simultaneously in each institution (not just nurse midwives, or COs, for example, but both).

In 2010, the MoHSW asked all 116 national health training institutions to increase their enrollment by 100% with a specific emphasis on the mid-level cadres (see **Exhibit 7** for number and types of training institutions in Tanzania). The MoHSW did not increase financial support for training institutions; it continued to budget roughly Tsh 6 billion (USD 4.2 million) annually. The total MoHSW budget declined between 2010 and 2013 (see **Exhibit 8** for annual MoHSW budgets over time).<sup>25</sup> The number of MDs graduating annually increased from less than 100 in 2000 to more than 400 by 2010.<sup>34</sup> Increased enrollment further strained institutions’ capacities. They were unable to maintain facilities, cut back computer

instruction, and relied on outdated textbooks or broken equipment. MoHSW funds often arrived very late or not at all.

The pressure to increase the number of graduates impacted training quality. For example, the government decreased the time required for a nursing degree from three years to two years. Nursing care quality declined. One NGO leader working on bolstering the quality of care at a rural, private hospital commented, "In the nursing curriculum, everything is still there, but practically to teach a student how to make a bed, how to wash the patient, how to administer drugs and injection and things like this, we need somebody with training working with students on the wards and organizing training on the wards, and we also need a skills lab where they can practice." Training of COs was similarly shortened. The same leader noted that "[the COs were] very poor quality, and it costs a lot of money because they just prescribe anything, and they don't know how to insert a catheter so they use three or four pieces [instead of one]." Many hospitals were not capable of training medical interns because they lacked qualified, specialized senior staff.<sup>34</sup> The required one-year internship for physicians at a government-accredited hospital lacked proper monitoring and evaluation, and there were no national requirements for continuing medical education (CME) thereafter. The Tanzania Commission for Universities accredited both public and private institutions; other Sub-Saharan African countries reported inconsistent accrediting practices even among public schools.

Despite new attention to increasing human resources for health, the percentage of skilled health workers did not dramatically increase between 2008 and 2012 (see **Exhibit 9** for health workers per population in 2008 and 2012). The MoHSW encouraged new schools to open, and a sixth private medical school opened in 2015.

### ***Public-Private Partnerships***

In 2010, the government passed the PPP Act to encourage more public-private collaborations.<sup>35</sup> It was already relying on private hospitals. Prime Minister Mizengo Pinda, who served from 2008 until 2015, described a model PPP as:

An arrangement between the public- and private-sector entities whereby the private entity renovates, constructs, operates, maintains, and/or manages a facility in whole or in part, in accordance with specified output specifications. The private entity assumes the associated risks for a significant period of time and in return, receives benefits and financial remuneration according to agreed terms.<sup>36</sup>

The Abbott Fund, a US philanthropic foundation funded by the Abbott pharmaceutical and health company, had formed a partnership with the Government of Tanzania to strengthen the health care system.<sup>37</sup> Between 2001 and 2011, Abbott invested over USD 100 million. It helped with health infrastructure and supported trainings for more than 20,000 health care workers in the areas of HIV, laboratory equipment operation, hospital information technology, and hospital management.

The International Medical and Technological University, the first private university in Dar es Salaam, began in 1995 as a collaboration between the government and an India-based educational trust with graduate programs for medicine, nursing, and dental sciences.<sup>38</sup> There was minimal PPP regulatory oversight. In July 2014, it was revealed that the university had been disposing of bodies used for anatomical dissection in unofficial city dumps; the MoHSW shut down the university hospital "due to lack of qualified staff."

# **The Tanzanian Training Center for International Health**

## ***History of Ifakara and Rural Health Endeavors***

In 1944, Rudolf Geigy, a relative of the Geigy Pharmaceutical Company founders in Basel, traveled to Ifakara, a small town 450km from Dar es Salaam, at the invitation of the Capuchin Fathers, the Swiss monks who established themselves there after WWI and later helped found St. Francis Hospital.<sup>39</sup> Geigy was interested in tropical diseases and parasitology, and the Fathers offered him a hospital wing to use as a field laboratory known as the Swiss Tropical Institute Field Laboratory (STIFL) for the newly created Swiss Tropical Institute (STI) that would train Swiss scientists. Ifakara intrigued Geigy because of its high prevalence of infectious and parasitic diseases—Ifakara meant “the place to die” in local dialect because of the high burden of malaria and its related mortality.

Upon being asked by President Nyerere to invest in training “in the periphery,” in 1959 Geigy urged the Basel Foundation for the Advancement of Developing Countries, which had ties to his family’s company, to support a training program in Ifakara.

The STI oversaw the implementation and construction of the training center, which it named the Rural Aid Centre in 1961. The center offered a three-month basic first aid training to prepare locals to work in village dispensaries. Starting in 1967, medical students from Dar es Salaam were assigned to STIFL and the Rural Aid Centre for three-month research rotations. Students protested being sent to “the bush,” but the requirement persisted.

In 1973, with the success of the Rural Aid Centre, the Ministry of Health and the faculty at Dar es Salaam asked the Basel Foundation to help upgrade the center to a Medical Assistant Training Centre (MATC). The Foundation agreed to support the MATC for five years, including financing new infrastructure (e.g., new lecture halls and dormitories), and then transition it to local ownership. Geigy explained, “For the continuing effectiveness of a development project of this kind ... it must also be made clear that the presence is temporary and that the initiators are prepared to retreat and hand over responsibility for the task.”<sup>39</sup>

In 1978, the Tanzanian government took responsibility for the MATC. Heavy seasonal rains and inadequate maintenance left the MATC in disrepair. The head of another local health institution recounted, “The MATC was really starting to go down. Not enough funding, poor management, no innovation and leadership. The ministry did not do anything about it. They asked to bring the MATC’s big generator to the city [when the MATC had no money to fuel it].” In 1991, the Basel Foundation funded facility renovations, but the contractors’ work was of poor quality.

In 1994, the MATC upgraded to again to become a clinical officer training center (COTC). The Novartis Foundation, the STI, and the Tanzanian MoHSW later came together to address the decaying physical infrastructure and re-envision the center as a self-sufficient PPP.

## ***Novartis Corporation and the Novartis Foundation***

Novartis Corporation (“Novartis AG”) was founded in 1996 after Ciba Corporation and Geigy Corporation merged with Sandoz Corporation. Novartis AG generated USD 58 billion in FY2014 and was the number-one pharmaceutical company in global sales. Its best-selling drugs were for cancer, multiple sclerosis, and eye care, with a robust generic contribution. The Novartis AG Corporate Responsibility office noted, “Medicines can help, but only if people can actually get them. Limited availability of trained health professionals represents a significant barrier to healthcare access.”<sup>40</sup>



The Novartis Foundation was part of Novartis AG's Corporate Responsibility effort from the start and had two strategic foci as of 2013: disease elimination (including leprosy and malaria) and innovating health service delivery. The website claimed:

We work hand-in-hand with our local and global partners to catalyze scalable and sustainable healthcare models to improve access and health outcomes, and to accelerate efforts to eliminate leprosy and malaria by focusing on interventions that aim to interrupt transmission. Everything we do is grounded in evidence and innovation, and our work is a continuous cycle of evaluation, adaptation and application.

Dr. Klaus Leisinger, a sociologist and economist who had spent several years as the CEO of the Ciba-Geigy Foundation in Basel after working in East Africa as a regional business director, was the director of the Novartis Foundation from 1996 until 2013, when Dr. Ann Aerts took over. Before becoming the head of the Novartis Foundation, Aerts had worked for Novartis AG, directed the Lung and Tuberculosis Association in Belgium, and held senior leadership positions in the International Committee of the Red Cross. Fewer than a dozen people, officially Novartis AG employees, staffed the Foundation with an operational budget of almost USD 12 million in 2014 to pioneer several innovative health service delivery models to address hypertension and interrupt the transmission of leprosy and malaria.

The Novartis Foundation also continued to support different initiatives in Tanzania, including a program using an electronic tool to improve the quality of health care, the national roll-out of the e-learning for Integrated Management of Childhood Illness, as well as the Tanzanian Training Center for International Health.

### ***Swiss Tropical and Public Health Institute and Ifakara Health Institute***

The STI, renamed Swiss Tropical and Public Health Institute (Swiss TPH), worked "to improve the health of populations, internationally, locally and nationally, through excellence in research, services and teaching and training."<sup>41</sup> Its field laboratory, STIFL, became an independent entity eventually known as the Ifakara Health Institute (IHI) in 1996. Marcel Tanner, the director of the Swiss TPH for 18 years, had been the director of STIFL previously. He believed strongly in "mutual learning for change" between the Swiss and the local Tanzanians, as well as between local institutions. He recalled, "No one could do anything alone, so you were really dependent on each other in a good way, in a positive way." Tanner saw the benefits of having teaching, research, and service all offered in Ifakara.

The Swiss TPH grew in size and prestige over the decades, with over 700 people employed in over 40 nations by 2015. Its work included interdisciplinary efforts between biologists, epidemiologists, and health systems experts working on diverse topics, such as malaria vaccine clinical trials, rabies elimination, and basic infectious disease research. Research grants and service department earnings accounted for about 80% of the Swiss TPH budget; the remaining 20% came from the Basel municipality, the Swiss government, and European bilateral agencies.<sup>42</sup>

As "an independent, nonprofit organization registered in Tanzania and led by Tanzanians," IHI grew to have several offices in Tanzania and oversee USD 25 million in fiscal year 2010–2011. It had received an international award for its service as well as national awards. In 2013, IHI staff authored over 90 peer-reviewed publications. The institute employed 25 PhDs and graduated about 8–10 PhD-level professionals annually.

### ***Early Plans for the Training Center: 2000–2004***

Alexander Schulze, health project manager at the Novartis Foundation, was surprised by his first visit to the training center, in which he found a "dark black hole" of a kitchen and the absence of working toilets.

It had taken him 10 hours by bus on poorly maintained roads to get there. Again, in 2000, the Ifakara COTC needed renovations, and Leisinger, the Novartis Foundation's director, was frustrated. The MoHSW—barely able to cover operating costs—could not afford to maintain the school. The Novartis Foundation commissioned an Ifakara-based Swiss NGO to do the repairs.

In 2002, the Novartis Foundation and the MoHSW discussed options for the COTC: strengthening it, upgrading it to an AMO training center, or converting it into a polytechnic institute.

Hassan Mshinda, head of the IHI since 1997, had adopted Tanner's belief in "mutual learning for change" and thought training AMOs would elevate both the training center as well as the other Ifakara health institutions by bringing specialists to the area. There were no MDs currently on staff at the COTC. An AMO led the center. St. Francis Referral Hospital down the road had just two specialists, including the director.

The COTC staff worried a curriculum change would put their jobs at stake. Leisinger was hesitant about the costs involved in upgrading the center, and some at the MoHSW were wary of foreign involvement in Tanzanian affairs.

Mshinda promoted the IHI as a model for what an AMO training center could be: a trust with diversified funding sources and a positive international reputation. He suggested that private corporate involvement in the training center aligned with Tanzanian goals of decentralization, decreasing government expenses, and increasing autonomy of institutions. He told MoHSW officials, "You don't have resources. The Novartis Foundation and others are very interested in making sure this institution is sustainable. Give them room," and eventually they were convinced an AMO training center would best address the public health need and the demand among professionals. At the time, there were four AMO schools, 598 AMOs working, and 1,601 AMOs needed in the country.

Mshinda and the MoHSW established a governance committee that would meet twice yearly. The committee included representatives from Novartis Foundation, the existing COTC, the Swiss TPH, IHI, and St. Francis Hospital as well as local religious leaders and the local district and regional medical officials. The Novartis Foundation, Swiss TPH, and the MoHSW signed a tripartite Memorandum of Understanding (MOU) in 2004 outlining their roles and commitments.

### ***The Birth of TTCIH***

In 2005, the Novartis Foundation announced a public-private partnership to renovate and reimagine the health training center as an East African flagship, "international, financially self-reliant institution" that would help Tanzania address its HRH crisis and educate the wider world about international health. The governance committee chose the name the Tanzanian Training Centre for International Health (TTCIH) to reflect "all aspects of the different target markets of the center."<sup>43</sup> TTCIH would receive donor money after completion of mutually agreed-upon performance-based milestones (see **Exhibit 10** for sample milestones).

Klaus Leisinger wanted the center to develop a strong reputation and become financially sustainable. He hired consultant Lothar Jakab to set up the accounting system and financial management procedures. Jakab had a background in business administration but no prior experience in developing countries.

Schulze developed the first strategic plan with input from TTCIH, Swiss TPH, and others. The plan emphasized the importance of the "perfect trifecta"—a co-location of training, clinical practice, and health research facilities—"in a typical rural African region facing diseases [such as] HIV/AIDS, malaria and TB."<sup>44</sup> TTCIH leadership hoped to benefit from and build upon the strong reputations of IHI and St. Francis Hospital.<sup>43</sup> Its business plan included bringing in short international health courses and renting the space

out and eventually offering unique health course content to international guests. Potential clients reported they expected the field of international health to grow and felt that East Africa was a stable and safe location. TTCIH's first step would be improving the quality of its services and becoming the cost leader in the field. The next step would be to attract new courses to Ifakara through direct marketing.

The planning team suggested that the center needed new leadership that was familiar with "introducing useful business principles in institutions that produce public services and goods in order to be more efficient."<sup>43</sup> The team hired an on-the-ground project manager to turn over existing staff and worked to recruit new staff, including a director, at least five medical specialists, a financial controller, and a marketing expert. They wanted staff with technical skills and "crosscutting expertise in the areas of quality management, team work, communication."<sup>43</sup>

The team planned to introduce a performance target and appraisal system for all employees and offer opportunities for professional development. They wanted new employees to feel a sense of ownership for TTCIH's vision. Dr. Angelo Nyamtema, an ob-gyn tutor and deputy director at TTCIH, recalled, "I was purely a medical doctor without any concept of leadership, so I just knew how to handle a pregnant woman. I never knew about strategic plans or developing policies for financial management and human resources."

The plan anticipated the center's financial contribution would increase annually, along with the MoHSW's support, and that donor contributions would phase out by 2011 (see **Exhibit 11** for TTCIH financial targets 2005–2011). Without a marketing budget and a combined communication and staff travel budget of USD 10,000, TTCIH initially relied on word-of-mouth marketing to attract clients. The Swiss TPH agreed to host one or two courses a year to guarantee TTCIH some income.

TTCIH planned to build a state-of-the-art campus to attract international clientele and compete with hotels and conference centers in Kenya and other East African countries as a low-priced event space. While one expert consulted by the Board of Governors argued that potential course participants needed to feel the real Africa, with "no Western comfort," his position was singular. The governance committee agreed to provide "a different [higher] level of service" to international guests. They envisioned pristine manicured gardens, wireless internet in the bedrooms, and easy access to nearby facilities. The dormitories for local trainees would remain simpler, with shared bathrooms. There was a large budget for grounds and facilities, including funds for planting flowers.

### ***The Arrival of Professor Senga Pemba***

Gilbert Mliga, director of human resource development at the MoHSW and a TTCIH board member, was in charge of finding the new TTCIH director. Mliga proposed Senga Pemba. Pemba was working for Uganda's Ministry of Education and Sports at the time but had worked for Mliga previously at the MoHSW.

Pemba had all of the qualities that the Board had envisioned: impeccable medical education credentials, international education, and experience working on the ground in East Africa. He had earned his PhD in medical education at Dundee University in Scotland, where he learned the use of the Objective Structured Clinical Examination (OSCE), a standardized tool to evaluate medical students that had become used worldwide. Pemba had introduced the OSCE, clinical skills laboratories, mentoring programs, and other innovative pedagogical tools as an instructor in Kenya and Uganda. He had worked in the MoHSW's human resource development division for 20 years.

Pemba's wife and children lived in Dar es Salaam, and he felt some trepidation about living and working in "the bush." "I knew Ifakara as being a very small institution," he said. "I did not realize that

over the years, the center had grown. So I visited the center to see what it was actually trying to achieve. From there I was fully convinced there was a lot of potential here.”

Pemba’s contract in Uganda was ending, and at the end of 2007, he accepted the job at Ifakara, which entailed a significant pay cut. Pemba’s TTCIH contract included a year-end bonus for meeting individual performance-based milestones and milestones in the strategic plan’s logical framework, including income that TTCIH self-generated (see **Exhibit 12** for the logical framework). TTCIH directly employed Pemba and the business and other administrative staff, while most of the tutors were on the MoHSW’s payroll, receiving a top-up from TTCIH as per the Novartis Foundation’s recommendations.

In early 2008, TTCIH had approximately 20 staff, including three full-time tutors and a maintenance unit. The Board of Governors actively supported Pemba and his team to implement the strategic, multiyear plan to achieve the goals in the logical framework. The Novartis Foundation also worked with the financial director to institute a double-entry accounting system and an administration manual. It helped create an investment plan to project needs until 2050 factoring in the cost of repairs, including roofs, electrical systems, and generators. Part of TTCIH’s plan to attain financial autonomy from external donors included generating income from new revenue streams, including renting property to nearby institutions and operating a maintenance/woodworking shop. With guidance, Deputy Director Nyamtema and Pemba established additional human resource procedures. The Novartis Foundation’s Project Manager Schulze visited Ifakara several times a year to check in, which motivated staff to meet performance targets.

Pemba was glad to have the strategic plan to guide him and looked forward to implementing training innovations. He embraced the vision of hosting external courses as well as creating original TTCIH courses to make the center self-sustaining.

### ***AMO Training***

Pemba aimed to improve the AMO course quality—his strategic priority. “I’ve always said better teaching starts with faculty development,” he commented. He sent current instructors to trainings on teaching methodology. He also sought accreditation from the National Council of Technical Education (NACTE), the government body that oversaw AMO, CO, and nursing/midwifery schools. In 2009, NACTE gave TTCIH provisional accreditation. Full accreditation was not possible without the MoHSW creating a national AMO curriculum.

In addition, Pemba instituted what he called a “competence-based curricula” organized around learning goals. TTCIH evaluated students continuously and through final exams, including an OSCE that assessed their ability to implement course content.

TTCIH believed its emphasis on quality gave it a competitive edge over the existing schools and priced itself accordingly. The private Kilimanjaro Christian Medical Center in Moshi charged Tsh 1.6 million (USD 1,320) a year for AMO students, while government-owned AMO training center Tanga charged Tsh 400,000 (USD 330). TTCIH charged Tsh 1,560,000 in 2007, with plans to increase to Tsh 1.8 million (USD 1,485) by 2011. After two years, employers began sponsoring TTCIH applicants, making it easier for students to afford the increased tuition.

TTCIH tried to encourage the MoHSW to send more physicians to tutor the students. Nyamtema and Pemba also aggressively pursued individuals who seemed qualified, including physician interns completing their clinical rotations at St. Francis. They were successful in getting at least two specialists to stay.

## ***Internal Courses***

Beyond AMO training, TTCIH offered a refresher course for COs planning to take the AMO entrance exam. The course was immediately popular; enrollment cost Tsh 450,000 (USD 208).

To help address Tanzania's inability to meet Millennium Development Goals (MDGs) related to infant and maternal mortality, Pemba worked with two TTCIH and St. Francis Referral Hospital obstetricians, one pediatrician, two family physicians, and a senior AMO to design a Comprehensive Emergency Obstetrics Care (CEmOC) course. Over three months, the course addressed how to differentiate between uncomplicated and complicated labor; how to determine the need for a Caesarean section; and how to take care of select infant pathology. Students in the course participated in newborn resuscitation, management of postpartum hemorrhage, normal Caesarean sections, and laparotomies for ectopic pregnancies. They also trained on manikins in the clinical skills laboratory at TTCIH. Pemba and the team also developed a complementary course for nurse-midwives and COs on the most widely available and easy to use forms of anesthesia, which was necessary for Caesareans.

Three cohorts of AMOs, COs, nurse-midwives, and anesthetists came from throughout Tanzania to train in teams each year with St. Francis Hospital obstetric staff. (St. Francis staff performed 4,987 deliveries annually, 25% of which were Caesareans.) During the first year of CEmOC, June 2009–2010, 45 participants performed 278 major obstetric surgeries and 1,161 anesthetic procedures. Their results aligned with other data showing that performance of obstetric surgeries by non-physician clinicians, or AMOs, was comparable to results of medical doctors.<sup>15</sup> The MoHSW approved and supported the CEmOC course.

With funding from the World Lung Foundation, staff from many health centers in the Kigoma, Morogoro, and Pwani districts had trained in CEmOC at TTCIH by 2014. Maternal mortality rates subsequently decreased by 22% in Morogoro and by 25% in Pwani; there was no change in the Kigoma region.<sup>45</sup>

TTCIH, IHI, and St. Francis Hospital began including the Edgar J. Maranta School of Nursing in their cooperative efforts and then the newly created St. Francis University College of Health and Allied Sciences (SFUCHAS) when it opened in 2010. The institutions met regularly to discuss pertinent issues and signed bilateral MOUs. They shared facilities and personnel: the nursing school and the medical school used TTCIH's extensive library and clinical skills facilities to practice procedures on manikins, while IHI used some of St. Francis Hospital's local water supply. Pemba was the nursing school's chairperson in the school government, and one of TTCIH's tutors became a dean at the medical school. These arrangements allowed staff to augment their salaries, increase their professional networks, and gain prestige.

They also worked together on externally funded projects. TTCIH participated in training over 100 community health workers as part of a research project by Columbia University Mailman School of Public Health and the Doris Duke Foundation, for example. The organizations had approached IHI to study the impact of community health agents in 50 villages to help achieve MDGs 4 and 5.<sup>46</sup> TTCIH provided the nine-month training to the agents while IHI studied the impact.

## ***Hosted Courses***

The majority of international clients discovered TTCIH serendipitously through its website; some visited before reserving space. A Swiss client working closely with TTCIH noted, "Tanzanian management is driven by opportunities, by chances, by accidents, but not by consistent knocking on the same doors. It's not the mentality of how Tanzanians do business."

Pemba successfully used his diplomatic skills in courting potential clients for the renovated facility. The center offered a feedback form for guests' recommendations, and staff organized weekend trips to the local game parks and tourist attractions. "It's the easiest place to be once you're here," one client commented.

TTCIH priced its courses based on Novartis Foundation's 2005–2006 evaluation of potential competitors such as Kilimanjaro Christian Medical Centre in Moshi or the African Medical and Research Foundation in Nairobi. It charged roughly Tsh 10 million (USD 8,250) for 20 participants per week, including travel packages.

TTCIH was not able to consistently provide all services. One international client who had run a course there for three years noted that internet was once unavailable for a week, and participants struggled to contact their families or answer work e-mails. Faculty whose courses relied on internet connections often had to quickly modify their agendas. The connectivity problem stemmed from disruption of the fiber optic broadband cables in the nearby game park. Other logistical issues, including paying participants' per diems, posed challenges to the local bank, which could not get sufficient cash to the rural site. One client complained that the 10-hour drive from Dar es Salaam to TTCIH was so bad that he might not return to the center.

Nevertheless, many institutions from North America and Europe continued to use the site and visit St. Francis Hospital regularly, including medical and nursing programs. One frequent visitor, Dalhousie University from Nova Scotia, also became a collaborator with TTCIH. Dalhousie professors noted TTCIH stood out from its other six African collaborators for its organizational excellence and practical engagement, which they attributed to Pemba's leadership; they recalled one instance in which Pemba had arranged for a Tanzanian newspaper journalist to spend four days at their workshop to feature their project.

Pemba selected one staff tutor to host each course with external instructors; other tutors would also lecture in these courses to gain experience and facilitation skills. TTCIH paid them for the extra work, but tutors complained the pay was not sufficient for the effort required; they were primarily paid by the MoHSW, and working on external courses was not included in their job descriptions. The MoHSW assigned tutors to TTCIH, but the tutors had no official contract with TTCIH.

International course participants provided the local tutors with feedback, including guidance on how to create a participatory learning experience for adults—"how to be less dictatorial," as one international client recalled. Bringing in visitors also boosted the local economy and increased TTCIH's ability to bargain for better infrastructure (e.g., roads) and services (e.g., electricity, water, internet) with the government. Pemba was able to convince the government to install an airstrip to accommodate small planes.

### ***E-Learning for Health***

As part of the partners' ongoing efforts to keep Ifakara on the cutting edge, they suggested TTCIH should expand its reach and impact through e-learning. The University of Geneva had already spearheaded an effort to bring online lectures and telemedicine to Francophone Africa. The MoHSW was interested in using e-learning to offer continuing medical education (CME) for AMOs and COs as a means of "maintaining and increasing professional skills and motivation of the staff."

When the Novartis Foundation and the World Health Organization (WHO) began working together to develop an electronic Integrated Management of Childhood Illness (IMCI) training tool, the Novartis Foundation shared the news with the Tanzanian partners. Pemba suggested that TTCIH be the site to "field test" the tool with on-the-ground clinicians. The IMCI Computerized Adaptation and Training Tool (ICATT) would require only 7 days of training, compared with 11 days for classroom IMCI training.

Novartis Foundation worked with WHO to get permissions and contracted and managed implementation at TTCIH starting in 2008, providing TTCIH oversight and USD 50,000. “This was the first time ICATT was out of the developer’s hands. TTCIH would be the first institution in the world to test ICATT,” Pemba explained.

The Novartis Foundation helped support Swiss TPH partners, including Joachim Pelikan who had experience developing e-learning software, in assessing the capacity for e-learning in Tanzania in 2009. They found access to broadband internet was still very limited or inconsistent, and computer literacy among the target cadre of AMOs was low. The MoHSW’s distance learning program was paper-based, and no health schools in Tanzania were using e-learning.

Tanner proposed creating the East African Telemedicine and eLearning Network Tanzania (EATEN) at TTCIH to improve the quality of clinical services in health centers using e-learning. The Novartis Foundation agreed to provide 80% of the estimated USD 100,000 needed to build the capacity to support the project. TTCIH funded the other 20% and hoped the endeavor would establish it at the forefront of new ideas.

EATEN project leaders, with tutors at TTCIH, chose to begin creating materials in maternal and child health given the in-house expertise. They planned an ambitious online 53-module schema they would load on a DVD/memory stick to supplement lectures. Pelikan saw the project as being owned locally and believed it would become part of the AMO curriculum as well as future CME courses.

Some TTCIH tutors were excited about e-learning, participating in content development. The two most active in developing the modules left the project, however, to pursue medical specializations. Other tutors did not see it as part of their job description and prioritized lecturing and clinical care; tutors did not get additional monetary compensation for developing the modules. One tutor noted, “Not only do we not have time, but the internet is not doing much. We are not delivering the materials as requested.” It took Pelikan one week to write a module from start to finish; the team in Tanzania was taking two to three months per module.

In 2012, TTCIH hired Zabron Abel, trained in information technology, to head the e-learning project to try to improve momentum. Abel recalled, “The first thing was to organize the team and lead the team. So we agreed. We developed a plan for how we would go, meeting every week and discussing the content. We started producing the modules.”

Pelikan encouraged the TTCIH tutors to use and adopt the available modules into the official AMO syllabus. He suggested they could potentially shorten the course by six months if students could complete part of the training in their home districts. This would also allow TTCIH to increase the number of students trained per year.

By 2012, 24 modules in child and maternal health had been completed. The TTCIH faculty sporadically incorporated these e-learning modules into the AMO curriculum. However, tutors were used to giving their own lectures and directly providing expertise, and unreliable networks impeded online access.

In 2012, the Novartis Foundation worked with WHO to create another new tool—the Integrated Management of Pregnancy and Childbirth training tool (IMPACt) Essential Newborn Care (ENC) building on the ICATT model. WHO again contracted TTCIH, in collaboration with the St. Francis Referral Hospital and Swiss TPH, to test to the tool.

In 2013, the Novartis Foundation project coordinator convened a planning meeting in Ifakara with representatives from key organizations to rejuvenate e-learning efforts. The group decided to rename the effort [elarning@ttcih](mailto:elarning@ttcih), and the Novartis Foundation signed a new MOU with TTCIH. The Novartis

Foundation commissioned the Swiss TPH to provide technical support. The following year, the foundation commissioned TTCIH to roll out ICATT across all training institutions in Tanzania over 2014–2015.

TTCIH aimed to establish itself by presenting at e-learning conferences in Africa. Marcel Tanner encouraged TTCIH to convert the modules into Massive Open Online Courses (MOOCs) “to create a name.” One adviser suggested a MOOC could also attract income: “Maybe one module of a 10-module course would be free to attract more people. Then, if you want to continue the course, you pay.”

## ***Assessing Success***

Novartis Foundation used the number of AMO students trained as its indicator of success for performance-based milestones. Between 1961 and 2007, TTCIH trained 1,706 health professionals for Tanzania. After 2007, TTCIH trained and graduated approximately 40 AMO students a year, although the numbers started to decline in 2013. Over 500 students altogether participated in courses at TTCIH annually. The utilization of the classrooms was still around 50–60% in 2014, however. TTCIH did not track its graduates.

Novartis AG loaned TTCIH its HR and marketing experts to bolster and build internal systems and communicate globally. Over the years, TTCIH established a reputation for quality AMO training. The website was well maintained and up-to-date, and word of mouth suggested that TTCIH was the best. One first-year AMO student recalled, “The teacher gives you notes ... other [programs] don’t have the materials.” She praised the calm and quiet environment that TTCIH fostered to help students take their studies seriously. The AMO students learned not only procedures and basic pathophysiology; they also learned to supervise others, participate in hospital and clinic management, oversee the supply chains for drugs and equipment, and manage district-level financial affairs.

In 2010, TTCIH generated USD 1 million and received approximately USD 200,000 in grants. Income from internal courses such as CeMOC generated higher revenues overall than external courses, but external courses generated a higher gross margin ratio (50% versus 20%). This was largely because foreign customers were willing to pay higher rates, and the costs of designing and coordinating internal courses were high (see **Exhibit 13** for a list of TTCIH courses and clients, including client country of origin and **Exhibit 14** for inventory of students).

TTCIH had received mixed financial support from the MoHSW. While the ministry paid all the TTCIH tutors’ base salaries, the Ministry thought TTCIH was “over privileged,” as one of the leaders explained. “It is true. We have more than five specialists, which is more than the other institutes. In the view of the ministry, this is a very small school and some of the other schools don’t even have a single specialist. They come here because of the top ups.”

At one point, the MoHSW had wanted the center to train more AMO students and pledged funds for an additional building when Pemba said he did not have enough accommodations. After several months of work on a new building and not receiving any payments from the MoHSW, TTCIH stopped construction. Two and a half years later, Novartis Foundation’s Schulze approached the Swiss Development Corporation to invest in finishing the building.

## **The Future of TTCIH**

In 2014, three years after the official end of the first strategic plan, TTCIH put its Second Five-Year Strategic Plan in place “to broaden its expertise and quality in its core thematic areas, and accordingly



expand its national, sub-regional and global network, exposure and ultimately reach.” The Novartis Foundation staff and many others worked with TTCIH on the plan.

The plan recognized the shifting landscape TTCIH faced, including the post-MDG agenda and growing concerns about noncommunicable diseases (NCDs). The prevalence of malaria in the area had decreased, in part due to an initiative Novartis Foundation, IHI, and Swiss TPH implemented to improve access to quality healthcare. Many clinical and vaccine studies were moving to Bagomoyo, which was only a one-and-a-half hour drive from Dar es Salaam.

The Tanzanian government had been in talks for several years to replace the AMO diploma with a Bachelor in Clinical Medicine degree, which only formal universities could offer. Given the long-term job stability the bachelor's degree provided, Tanzania was losing students to countries such as Malawi and Zambia, which already offered the degree. TTCIH hoped to offer the bachelor's degree in partnership with the St. Francis University College of Health and Allied Sciences, if necessary.

TTCIH's new areas for growth and development included “medical education” and “health system management.” The new strategic plan explained, “‘Medical education’ offers at national level the opportunity to target faculty members of health training institutions. Hardly any efforts have been made to adapt training curricula to new approaches and technologies ... TTCIH needs to seize this opportunity.” It also forecasted increasing demand for “health management” with the potential shift toward the concept of universal health coverage in the post-2015 health agenda. Medical education and management had the potential to be more lucrative training areas for TTCIH, as they did not require clinical training infrastructure. While TTCIH had developed roughly 40 of the 53 maternal and child health e-learning modules by 2014, a pilot study showed that although the material was strong, internet reliability continued to be a problem.

With his upcoming retirement, Pemba also wanted to think about how TTCIH could retain the rest of the team, including faculty and administration. Despite their relatively static salaries, it was job satisfaction and the ability to participate in ongoing professional development, primarily external courses, that had kept many around thus far. Pemba explained:

We are very lucky. God loves us, but you also need multiple strategies. You need leadership. I think if I weren't here, these people wouldn't have come back from their postgraduate studies. Retention starts with the leader. If you don't acknowledge you have all these brains here, forget about it, even if you give them money. They always find ways out because they are very clever people. It's only you who can actually tell him or her, 'Look, we need you here,' and I keep on repeating that.

The question of TTCIH's capacity for complete financial autonomy was a point of contention among the partners (see **Exhibit 15** for TTCIH student and financial growth over time). In 2014, the Novartis Foundation gave TTCIH roughly USD 120,000; TTCIH was one of the Novartis Foundation's smallest projects in its USD 12 million 2014 operating budget. The MoHSW had not increased support, as donors had hoped. There was still hope that TTCIH would take more ownership for organizational and management decision-making, however, and rely less on the Novartis Foundation and Novartis AG volunteers for guidance. Novartis Foundation's new head, Dr. Ann Aerts, was optimistic about TTCIH's ability to become an independent enterprise while Tanner was less confident.

Pemba knew that TTCIH had a lot of strengths and held great potential for continuing to impact the health of Tanzania. He considered the options for the center in the years ahead. How could he best set it up for success?

**Exhibit 1** *Map of Tanzania*



Source: University of Texas at Austin, Perry-Castañeda Library Map Collection  
<http://www.lib.utexas.edu/maps/tanzania.html>

**Exhibit 2** *Tiers of Health Services Provided in Mainland Tanzania*

Administrative Level	Service Level	Number of Hospitals	Services Available	Ideal Staffing
National Level	Referral/Specialized Hospital	4	Psychiatry, orthopedics, cancer, TB	Specialist MDs
Zonal Level	Zonal Hospital	8		MDs/AMOs
Regional Level	Regional Referral Hospital Services	25 (1 per 1,000,000 people)	Internal medicine, pediatrics, obstetrics and gynecology, surgery, psychiatry, and public health	MDs/ AMOs
District Level	District Hospital Services	219 (1 per 250,000 people)	Limited surgery, obstetrics, full-spectrum primary care, laboratory tests, x-rays	2 MD or AMOs
Divisional Level	Health Centre Services	711 (1 per 50,000 people)	16 inpatient beds, +/- emergency obstetric surgery, minor surgeries, preventative care, reproductive services	4 COs, 9 nurses
Ward Level	Dispensary	5,913 (1 per 10,000 people)	Some limited medications, triage	2 nurses, 1-2 medical assistants
Village Level	Community Health Post	N/A	Triage only, preventative services at home	Village health workers

Source: United Republic of Tanzania, Ministry of Health and Social Welfare, Human Resource for Health & Social Welfare Strategic Plan, 2014–2018.

**Exhibit 3** *Health Care Worker Roles, Training Requirements, and Numbers in Tanzania, 2013*

Cadre	Level of Education/Training	Number in Tanzania
Medical Doctor (MD)	Five years training + one-year internship	1,135
Assistant Medical Officer (AMO)	Clinical officer + two additional years of rotations/coursework	1,741
Clinical Officer (CO)	Secondary school + three years of medical training	5,950
Nurse/Nurse Midwife (NMW)	Secondary school + two years of nursing training	14, 096
Clinical Assistant/Medical Assistant	+/- Secondary school + basic triage skills	1,096
Village Health Worker/Medical Attendants	Short courses on health education, often no formal schooling	19,666

Source: Ministry of Health and Social Welfare. Human Resource For Health Country Profile, 2012/2013; Dar es Salaam, July 2013.

**Exhibit 4a** *Human Resource Supply, Shortages, and Projections in Public Health Facilities*

Facility	Health Facilities			Health Staff						Required Staff to Fill the Existing Gaps, Including PHSDP (2007–2017)
	Available Facilities	New Facilities PHSDP (2007–)	Total	Required for Establishment 2005	Required for Existing Facilities	Medical Professional Staff Available 2006	Shortage 2006	ShortageE %	PHSDP Requirement (2007–2017)	
Referral and Specialized Hospitals	8	-	8	-	8,546	4,477	4,069	48%	-	4,069
Regional Hospital	21	-	21	346	7,266	2,481	4,785	66%	-	4,785
District Hospitals	95	19	114	197	22,458	7,364	15,094	67%	3,743	18,837
Health Centers	331	2,074	2,405	36	11,916	4,908	7,008	59%	49,776	56,784
Dispensaries	3,038	3,108	6,146	10	30,380	9,384	20,996	69%	31,080	52,076
Training Institutions	72	4	76	-	1,711	449	1,262	74%	-	1,262
<b>TOTAL</b>	<b>3,565</b>	<b>5,205</b>	<b>8,770</b>		<b>82,277</b>	<b>29,063</b>	<b>3,214</b>	<b>65%</b>	<b>84,599</b>	<b>137,813</b>
Attrition Rate—0.5% per year									4,230	6,891
<b>TOTAL NEW STAFF REQUIRED (2007–2017)</b>									<b>88,829</b>	<b>144,704</b>

Note: PHSDP = Primary Health Services Development Programme.

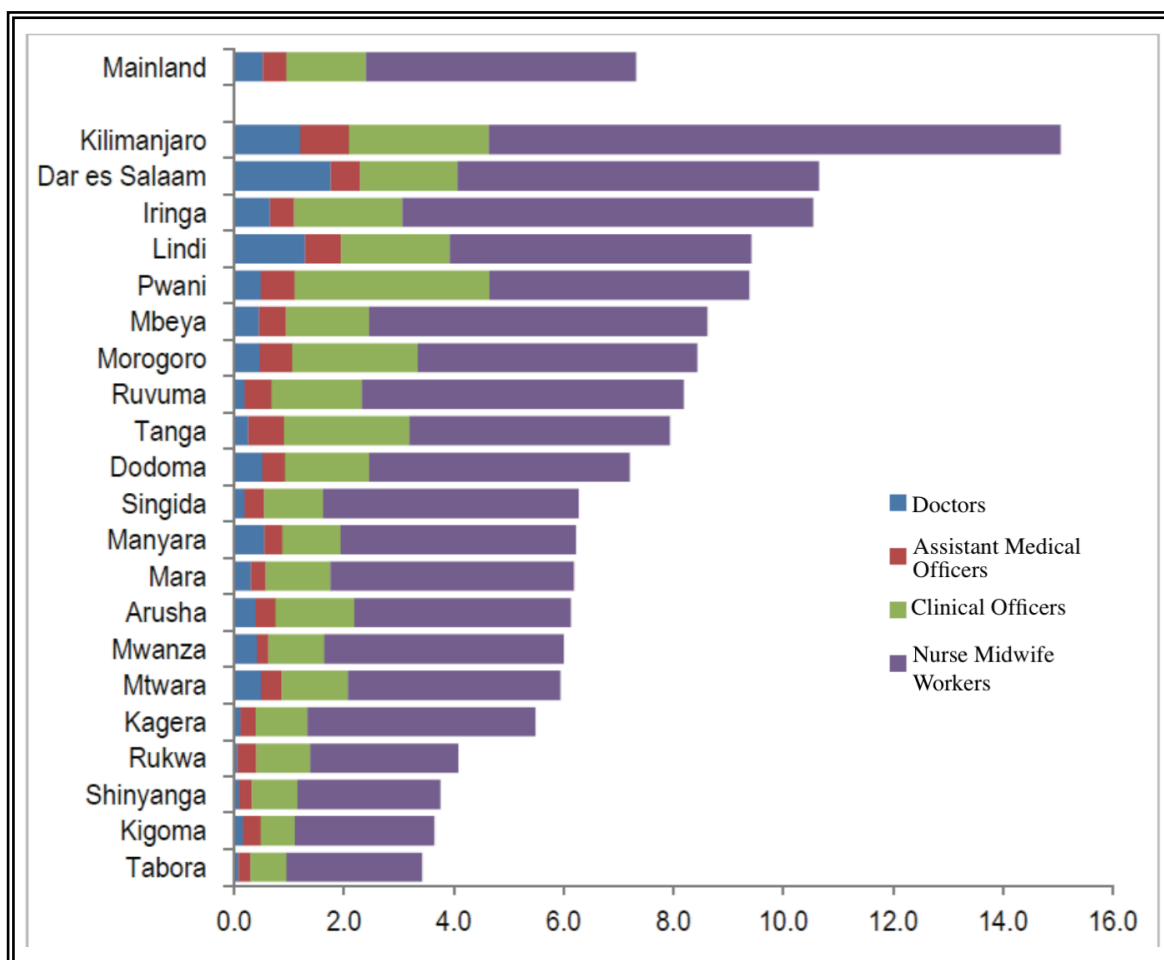
Source: Ministry of Health and Social Welfare. *Human Resources for Health Strategic Plan, 2008*.

**Exhibit 4b** *Human Resource Supply, Shortages, and Projections in Private Health Facilities*

Facility Level	Available Health Facilities	Health Workers				Staff Shortage %
		Required Staff Per Establishment 2005	Required Staff For Existing Facilities	Available Staff 2006	Staff Shortage 2006	
Hospitals	132	197	26,004	3,251	22,753	87.5%
Health Centers	150	36	5,400	758	4,642	86.0%
Dispensaries	1,641	7	11,487	1,842	9,645	84.0%
Training Institutions	36	(varied)	756	288	468	61.9%
<b>TOTAL</b>	<b>1,959</b>		<b>43,647</b>	<b>6,139</b>	<b>37,508</b>	<b>85.9%</b>
Attrition Rate—0.5% per year					<b>1,875</b>	
<b>TOTAL NEW STAFF REQUIRED FOR PRIVATE HEALTH FACILITIES</b>					<b>39,383</b>	

Source: Ministry of Health and Social Welfare. *Human Resources for Health Strategic Plan, 2008*.

**Exhibit 5** *Health Care Workers per 10,000 by Region and Cadre*



Note: Mainland refers to all of Tanzania excluding the island of Zanzibar. Kilimanjaro and Dar es Salaam are primarily urban centers; the remaining regions are rural or small towns.

Source: MOHSW Human Resource for Health and Social Welfare Strategic Plan, 2014–2019: p. 13.

**Exhibit 6a** *Medical Doctors Trained in Tanzania Who Reported Practicing Clinical Medicine in 2012*

Practicing Clinical Medicine?		
Yes	1,356	60.4%
No	890	39.6%

**Exhibit 6b** *Locations of Tracked Medical Doctors Trained in Tanzania*

Country/Region	Total
Tanzania	2,068 (91.83%)
Dar es Salaam	725
No work station	871
Southern Africa (Botswana, Namibia, South Africa, Zimbabwe)	30
Eastern Africa (Kenya, Uganda, Rwanda)	56
Other Africa	2
Middle East and India	4
Far East (Japan, China, Korea, Singapore)	8
Europe	27
North America	38
Australia/New Zealand	6
Unknown location	13
<b>Total abroad</b>	<b>184 (8.17% abroad)</b>

Source: Sikika and the Medical Association of Tanzania. *Where Are the Doctors? Tracking Study of Medical Doctors*. Available at: <http://sikika.or.tz/wp-content/uploads/2013/11/Practice-Status-of-Medical-Graduates-FINAL.pdf>.

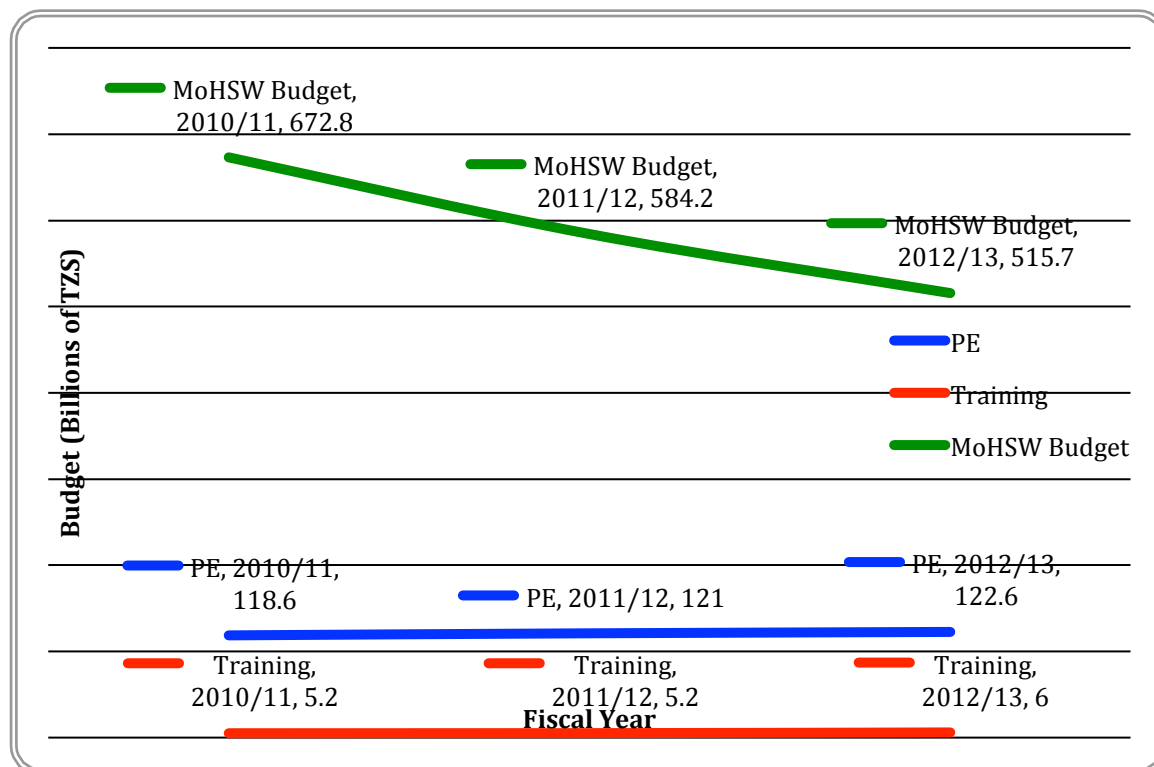
**Exhibit 7** *Health Training Institutions in Tanzania, 2013*

Type of Training Institution	Type of Ownership			Total
	Public	Private Nonprofit, Faith-Based Organizations	Private For-Profit	
Medicine	2	6	2	<b>10</b>
Clinical Officer	5	3	5	<b>13</b>
Clinical Assistant	6	0	0	<b>6</b>
Dentistry	2	1	0	<b>3</b>
Pharmacy	2	1	0	<b>3</b>
Nursing and Midwifery	31	35	2	<b>68</b>
Paramedical (Laboratory)	4	4	0	<b>8</b>
Paramedical (Radiology)	0	1	0	<b>1</b>
Paramedical (OT/PT)	4	0	0	<b>4</b>
Paramedical (Optometry)	1	0	0	<b>1</b>
Environment and Public Health	6	0	0	<b>6</b>
Health Record	1	0	0	<b>1</b>
Assistant Medical Officer	5	1	0	<b>6</b>
Assistant Dental Officer	1	0	0	<b>1</b>
<b>Total Number of Courses</b>	<b>70</b>	<b>52</b>	<b>9</b>	<b>131</b>

Source: United Republic of Tanzania Ministry of Health and Social Welfare. Tanzania Human Resource for Health Country Profile, 2012/2013; July 2013: p. 30.



**Exhibit 8** Ministry of Health and Social Welfare HRH Budget, 2010–2013



Note: PE = personnel emoluments (salaries); TZS is an alternate abbreviation for Tanzanian shilling.

Source: United Republic of Tanzania Ministry of Health and Social Welfare, Human Resource For Health and Social Welfare Strategic Plan, 2014–2019; Sept 2014.

**Exhibit 9** Health Workers per Population in Tanzania: Comparison of 2008 and 2012

Human Resources for Health Cadre	2008	2012
Medical Officer (MO)	0.3	0.5
Assistant Medical Officer (AMO)	0.4	0.4
Nurse/Midwife	2.6	4.8
Pharmacist/Pharmacy Technician	0.15	0.13

Note: Health worker per 10,000 population.

Source: United Republic of Tanzania Ministry of Health and Social Welfare, Mid Term Review of the Health Sector Strategic Plan III, 2009–2015: Main Report; October 2013; p. 30.

**Exhibit 10** *Proposed TTCIH Performance-Based Milestones Developed by Novartis Foundation, Swiss TPH, and the MoHSW in 2008*

In the frame of the TTCIH Strategic Plan Implementation 2007-2011				
NO.	Description of the Milestones	Means of Verification	Expected Time Period of Achievement	Monetary Value (USD)
1	Logical framework of Strategic Plan revised and further developed; annual work plan and budget derived from logical framework	Annual work plan and budget 2008 document	April 2008	50'000
2	MoU between three Ifakara-based institutions on areas of collaboration developed and signed by TTCIH, SFDDH and IHRDC	Copy of signed MoU	June 2008	60'000
3	Innovative teaching and assessment methods (OSCE) for AMO students fully introduced at the centre	Workshop report and established assessment tools (written documents)	July 2008	15'000
4	One new external course provider other than STI attracted and recruited	Course report and copy of MoU with external course provider	August 2008	40'000
5	TTCIH profile developed and thematic areas for course curriculum development identified	Final report on TTCIH profile	September 2008	20'000
6	NACTE accreditation obtained	Copy of NACTE letter of accreditation	November 2008	5'000
<b>Total value of all milestones 2008:</b>				<b>190'000</b>

Source: Novartis Foundation.

**Exhibit 11** *TTCIH Financial Targets, 2005–2011 (USD)*

Financial sources	2005	2006	2007	2008	2009	2010	2011
TTCIH income from services on own account	35'000	170'886	317'457	350'000	470'000	550'000	620'000
Total cost (from 2006 on including AMO unit)	Not calculated	164'396	580'000	600'000	620'000	650'000	680'000
Operating result before grants	Not calculated	-6'490	-262'543	-200'000	-150'000	-100'000	-50'000
MoHSW	Not calculated	10,383	41'600	50'000	50'000	50'000	50'000
NFSD	Not calculated	98'718*	200'000*	150'000	100'000	50'000	0
<b>TOTAL</b>	<b>Not calculated</b>	<b>115'591</b>	<b>-20'943</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>

\*without costs for renovation and construction, consultancy (financial management, marketing etc.)

Source: TTCIH Five-Year Strategic Plan, 2007–2011; August 2007: p. 33.

## Exhibit 12 TTCIH Logical Framework, 2007–2011

### Important Assumptions: External Factors

- Adequate provision of health infrastructure, equipment, and supplies is maintained
- Rate of HIV infection continues downward trend
- Terms and conditions of employment enable attraction and retention of sufficient HRH in each category and offer incentives for good performance
- Sufficient political will and administrative flexibility exist at all levels to gear HRH development and deployment to health and HRH planning requirements

Summary of Objectives and Results	Objectively Verifiable Indicators	Means of Verification
<b>Overall Goal:</b> Strengthen human resources for health development in Tanzania and beyond		<ul style="list-style-type: none"> <li>• MOHSW reports</li> <li>• Reports from HMIS unit</li> </ul>
<b>Project Purposes</b> <ul style="list-style-type: none"> <li>• Provide and sustain quality training programs, facilities, and services in order to contribute to the strengthening of human resource and development in Tanzania and beyond</li> <li>• Achieve a higher institutional and financial self-reliance</li> </ul>	By end of 2009: <ul style="list-style-type: none"> <li>• TTCIH has its own first program (apart from AMO) that attracts international participants</li> </ul> By end of 2011: <ul style="list-style-type: none"> <li>• TTCIH is fully self reliant as regards income (0% dependency from donor grants)</li> <li>• Facilities at TTCIH are fully utilized (80% utilization rate)</li> </ul>	<ul style="list-style-type: none"> <li>• TTCIH annual reports</li> <li>• Client satisfaction surveys</li> <li>• Financial statements</li> </ul>
<b>RESULTS</b>		
<b>(1) Offer AMO Course that meets national and international demand and standards</b>	By the end of 2008: <ul style="list-style-type: none"> <li>• AMO program accredited</li> <li>• New teaching and assessment approach introduced</li> <li>• Occupational profiling of AMO cadre conducted</li> </ul>	<ul style="list-style-type: none"> <li>• NACTE report</li> <li>• Self-evaluation report</li> <li>• Letter of accreditation</li> <li>• Documentation relating to teachers' performance and students' performance</li> <li>• Workshop reports</li> <li>• TTCIH prospectus</li> </ul>
<b>(2) Qualified teaching faculty in place and new courses designed</b>	By end of 2008: <ul style="list-style-type: none"> <li>• Qualified teaching faculty in place, one qualified PH specialist recruited</li> <li>• TTCIH profile developed</li> <li>• Pricing strategy for national courses developed</li> <li>• Capacity of local facilitators for short courses improved</li> </ul> By end of 2009: <ul style="list-style-type: none"> <li>• One short course, meeting international quality standards, developed at TTCIH</li> </ul> By end of 2011: <ul style="list-style-type: none"> <li>• Number of national and international short courses increased from year to year</li> </ul>	<ul style="list-style-type: none"> <li>• Organograms/lists of established posts</li> <li>• Progress reports</li> <li>• Interviews with clients</li> <li>• Pricing list</li> </ul>
<b>(3) Establish effective and efficient administrative, financial, and management structure and processes</b>	By end of 2008: <ul style="list-style-type: none"> <li>• Appropriate financial system in place</li> <li>• Human resource development plan developed and implemented</li> <li>• Administrative procedures revised and updated</li> <li>• Performance targets and assessment system finalized and fully implemented</li> </ul>	<ul style="list-style-type: none"> <li>• Strategy document</li> <li>• Annual operations plans</li> <li>• Performance appraisal reports</li> <li>• Immigration records</li> <li>• Audit reports</li> <li>• Administration manual</li> <li>• Organogram and description</li> </ul>

	<ul style="list-style-type: none"> <li>• Horizontal and vertical assignment of responsibilities and competencies finalized</li> <li>• Establishment procedures to deal with immigration issues in place</li> </ul>	of job profiles and responsibilities
(4) Strengthen collaboration and exchange between TTCIH, IHRDC, and SFDDH	<p>By end of 2008:</p> <ul style="list-style-type: none"> <li>• Strategic partnership established with several higher learning institutions (e.g., universities)</li> <li>• Standard procedures for collaboration developed (e.g., with a steering committee)</li> <li>• Memorandum of understanding (MOU) signed by the three centers</li> <li>• Number of common activities increased</li> </ul>	<ul style="list-style-type: none"> <li>• Meetings</li> <li>• Minutes of approval</li> <li>• MOU and signed contracts</li> </ul>
(5) Develop and maintain infrastructure and facilities of TTCIH	<p>By end of 2008:</p> <ul style="list-style-type: none"> <li>• Maintenance and repairs carried out in a sustainable manner with no major breakdowns</li> <li>• Annual update of the infrastructure development concept/master plan conducted</li> </ul>	<ul style="list-style-type: none"> <li>• Supervision reports</li> <li>• Master plan document</li> </ul>
(6) Position TTCIH nationally and internationally as a well-recognized center for international health in its target groups	<p>By end of 2008:</p> <ul style="list-style-type: none"> <li>• Three-year Marketing Plan for TTCIH developed</li> <li>• Number of external short course providers increased</li> </ul> <p>By end of 2009:</p> <ul style="list-style-type: none"> <li>• Collaboration with like-minded institutions around the globe attained</li> </ul> <p>By end of 2011:</p> <ul style="list-style-type: none"> <li>• Adequate number of foreign students (15 each year) recruited in the AMO Program</li> <li>• New donors are available to support TTCIH</li> </ul>	<ul style="list-style-type: none"> <li>• Profile document</li> <li>• Marketing plan document</li> <li>• Students records</li> <li>• List of donors and like-minded organizations</li> <li>• documentation of approval</li> </ul>
(7) Facilitate implementation of operational activities at TTCIH to function as an internationally recognized center for international health	<p>By end of 2008:</p> <ul style="list-style-type: none"> <li>• Office supplies procured</li> <li>• Transport system operational and well maintained without breakdowns</li> <li>• Internet and communication system functional without any breakdowns (excepting those caused by power cuts)</li> <li>• Water and electricity supplies well maintained without any breakdowns</li> <li>• Administrative and operational costs fully met without negative financial balance at the end of the year</li> </ul>	<ul style="list-style-type: none"> <li>• Invoices</li> <li>• Logbook</li> <li>• List of supplies</li> <li>• TTCIH annual report</li> <li>• Inventory</li> <li>• Supplies and equipment in place</li> </ul>

Source: Adapted from the first TTCIH Strategic Plan, 2007–2011.

**Exhibit 13** *TTCIH Client and Course List*

Country of Client	Client	Course Title	Topics Covered in Course
Australia	University of Queensland	Maternal Neonatal and Child Health	Maternal, neonatal, obstetric, or child health
Australia	AusAID	Maternal Neonatal and Child Health	Maternal, neonatal, obstetric, or child health
Canada	Dalhousie University	Primary Healthcare, IMCI Computerised Training, Microresearch	Primary healthcare
Greece	University of Athens	Disaster Medicine, Health Crisis Management	Disaster medicine or health crisis management
Puntland, Somaliland	Health Poverty Action	Comprehensive Emergency Maternal and Obstetric Care	Maternal, neonatal, obstetric, or child health
Somaliland	Tropical Health & Education Trust (THET)	Clinical Officer Competence-Based Education Training Curriculum Design Course	Training or management
Switzerland	Swiss TPH	Clinical Priorities in Tropical Countries, Rational Management of Medicine, District Health Management, Parasitology in the Tropics and Malaria (online)	Training or management
Switzerland	Swiss Dental Association	<i>Data not available</i>	<i>Data not available</i>
Tanzania	United Nations Population Fund (UNFPA)	Comprehensive Emergency Maternal and Obstetric Care Course	Maternal, neonatal, obstetric, or child health
Tanzania	Christian Social Commission Service (CSSC)	Competence-Based Education Training Curriculum Design Course	Training or management
Tanzania	Benjamin Mkapa Foundation	Comprehensive Emergency Maternal and Obstetric Care Course	Maternal, neonatal, obstetric, or child health
Tanzania	SolidarMed	Support Unit Community Health Workers Course	Training or management
Tanzania	Ifakara Health Institute	Community Health Workers Course	Training or management
Tanzania	World Lung Foundation	Comprehensive Emergency Maternal and Obstetric Care Course	Maternal, neonatal, obstetric, or child health
Tanzania	Jhpiego	Maternal Neonatal and Child Health	Maternal, neonatal, obstetric, or child health
UK	Tony Blair Foundation	Primary Healthcare	Primary healthcare
USA	Wayne State University School of Medicine	Primary Healthcare, MD Student Elective	Primary healthcare
USA	Mailman School of Public Health-Columbia University and Doris Duke Foundation	Averting Maternal Death and Disability, Community Health Workers	Maternal, neonatal, obstetric, or child health

Source: Compiled by case writers using materials from TTCIH.

**Exhibit 14** *TTCIH Course Inventory, 2010–2013*

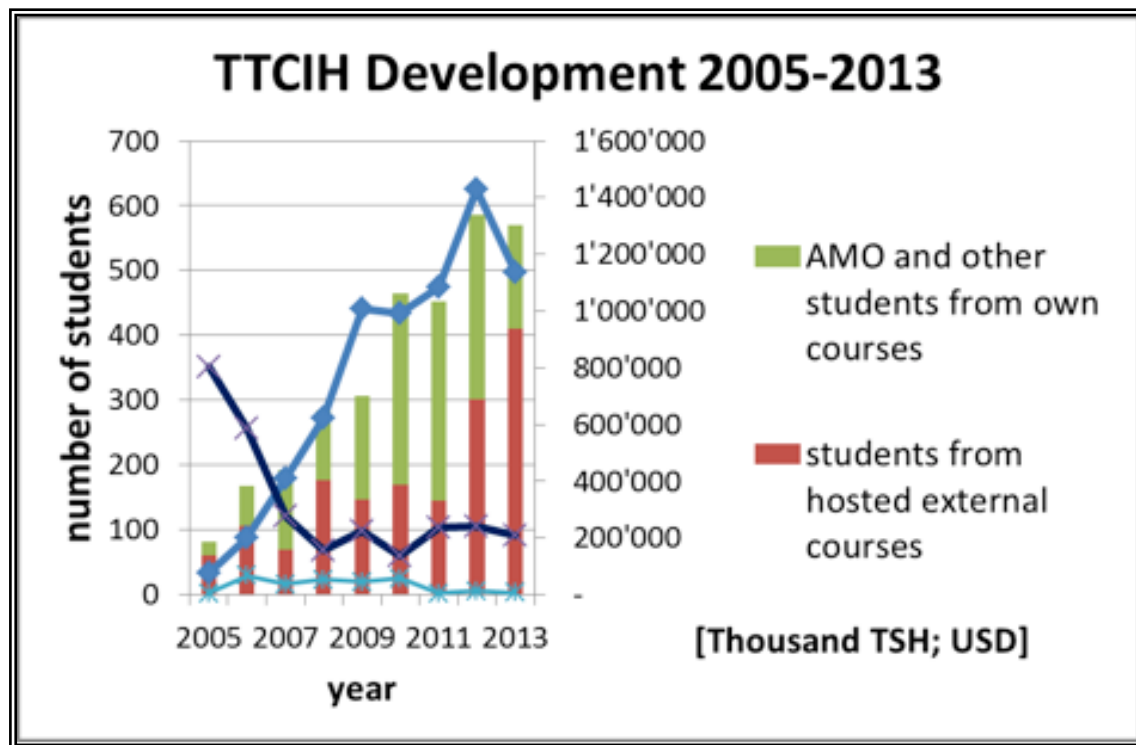
Course Name	Type of course	Context	Year 2010	Year 2011	Year 2012	Provider
<b>Clinical Courses</b>						
Assistant Medical Officer (AMO) Training	Resident Training Program (2 years)	Regional	83	85	84	TTCIH
Clinical Officer Refresher Course	Resident Short Course	Regional	32	43	57	TTCIH
Parasitology in the Tropics	Hosted	Regional	9			Swiss TPH
Clinical Priorities in Tropical countries	Hosted	Regional	25			Swiss TPH
Malaria Online	Hosted				19	Swiss TPH
Anesthesia	Hosted	National			45	University of Lausanne
<b>Community Health</b>						
Community Health Agent	Resident Training Program (9 months)	Regional	58	56	30	TTCIH
Water and Sanitation	Hosted	National			19	MSABI
<b>Maternal and Neonatal Health</b>						
EMOC (Maternal)	Resident Short Course	Regional	18	(12 + 6) +16 +16	16 + 24	TTCIH
EMOC+ (Maternal and management ETATMBA)	Resident Short Course	Regional		18	18	TTCIH
IMCI Computerized Adaptation and Training Tool (ICATT)	Resident Short Course	National	40 (free for AMO)	43 (free for AMO)	42 (free for AMO)	TTCIH
IMPACCT	Test Workshop				30	TTCIH
<b>Medical Education</b>						
Teaching Methodology	Resident Short Course	National	45	45		TTCIH/Dalhousie
Capacity Building for Selected Mission Institution	Hosted	National		100	100	ETC-CSSC
<b>Health Management</b>						
District Health	Hosted	Global	21	21	21	Swiss TPH

Management						
<b>Global Health (incl. Travel Medicine and Health Research)</b>						
Global Health (incl. Health Research)	Hosted	Global			36	CARTA
Medical students visiting TTCIH to learn about tropical diseases	Hosted	Regional	12	12	10	Wayne State University
Travel Medicine	Hosted	Global	35		33	University of Athens
Enhancing Collaboration to Health Institutions in East African	Hosted	Regional	58			Association of Principals of Institutions in Uganda
Micro Research	Hosted				45	Dalhousie

Note: ETATMBA = Enhancing Human Resources and Use of Appropriate Technologies for Maternal and Perinatal Survival in sub-Saharan Africa.

Source: TTCIH Second Strategic Plan, 2014.

**Exhibit 15** *TTCIH Income and Number of Students, 2005–2013*



\*The figures for 2013 do not include the month of December 2013.

The top line represents self-generated income. Bottom lines represent other private and public sources.

Source: TTCIH Second Strategic Plan, 2014.

## **Appendix *List of Commonly Used Abbreviations***

AMO	Assistant Medical Officer
CME	Continuing Medical Education
CEmOC	Comprehensive Emergency Obstetrics Care
CO	Clinical Officer
COTC	Clinical Officer Training Centre
EATEN	East African Telemedicine and eLearning Network Tanzania
EMOC	Emergency Obstetrics Care
HRH	Human Resources for Health
IHI	Ifakara Health Institute
ICATT	IMCI Computerized Adaptation and Training Tool
IMCI	Integrated Management of Childhood Illness
IMPACTt	Integrated Management of Pregnancy and Childbirth training tool
I-TECH	International Training & Education Center for Health
MATC	Medical Assistant Training Centre
MD	Medical Doctor
MDG	Millennium Development Goal
MoHSW	Ministry of Health and Social Welfare
NACTE	National Council for Technical Education
OSCE	Objective Structured Clinical Examination
PPP	Public Private Partnership
STI	Swiss Tropical Institute
STIFL	Swiss Tropical Field Laboratory
Swiss TPH	Swiss Tropical and Public Health Institute
TTCIH	Tanzania Training Center for International Health
WHO	World Health Organization



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