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eHealth strategy development: a case study in Tanzania

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Many developing countries have used different frameworks, some ad hoc and some more formal, to develop their national eHealth strategies. There is increasing interest in eHealth strategy in developing countries, as well as a move to a more integrated and less fragmented set of eHealth solutions that contribute to health objectives and outcomes. Developing a national eHealth Strategy from the national health sector priorities should lead to implementation of sustainable eHealth solutions. Some existing frameworks for developing national eHealth strategies can be difficult to implement effectively. This paper presents how an alternative country eHealth Strategy framework was applied in Tanzania to develop the Tanzania eHealth Strategy 2013–2018. This alternative framework begins with reviewing Tanzania's Health Sector Strategic Plan III (2009–2015) priorities and goals, from which the eHealth strategy's priorities and goals are developed. The process is informed by the current state of eHealth and the proposed future state of eHealth. It defines the vision, mission, and guiding principles, well-defined strategic objectives and actions, a high-level roadmap, and an appropriate monitoring and evaluation (M&E) framework. The application of this alternative eHealth strategy development framework is based on theories of business process re-engineering, strategy development, and complex systems analysis.

Background and Purpose: There is increased interest by national and local governments, partners, and private institutions to invest in global and national eHealth initiatives [1]. These investors recognize that eHealth can transform health care delivery by enabling information access and supporting health care operations, management, and decision making. However, without a clear national plan and coordination, this transformation will not materialize. The successful application of eHealth requires eHealth strategies that are aligned with stakeholders' respective health priorities.

Materials and Methods: This case study presents the practical application of this alternative eHealth Strategy framework in Tanzania to develop the Tanzania National eHealth Strategy 2013–2018. The alternative eHealth Strategy framework was presented at the American Medical Informatics Association 2014 Annual Symposium [2]. The Tanzania eHealth Strategy development process applied this framework, with iterations that integrated stakeholders' feedback into revised Tanzania National eHealth Strategy versions during a period of 1 year.

Results: The eHealth strategy development framework was applied in Tanzania, starting with a 1-week key stakeholders' workshop (health sector and information and communication technology /eHealth experts) in September 2012. Continued Ministry of Health and Social Welfare (MoHSW) and stakeholder review and input resulted in final Tanzania National eHealth Strategy 2013–2018 publication and adoption in September 2013 and launch of the National eHealth Steering Committee (NeHSC) by the Government of Tanzania. The eHealth Strategy was used to develop a detailed costed eHealth action plan to understand the resources needed for implementation, and allow funders to determine which areas they could support.

Discussion and Conclusion: Tanzania developed an eHealth Strategy that is currently being implemented in a phased approach. Completely implementing this strategy under the guidance of the NeHSC should assist Tanzania to achieve its health sector goals. This strategy development process can be used by institutions or national and subnational governments who need to develop a multi-year eHealth Strategy or revise their existing eHealth strategy.

1   Introduction

The Tanzania mainland's healthcare system, through its ongoing health sector reforms, aims to improve health outcomes. As part of these reforms, the Ministry of Health and Social Welfare (MoHSW) developed its strategic plan, *Health Sector Strategic Plan III* (HSSP III) [3], to guide priority setting and deployment of resources in the health sector. The MoHSW recognizes the potential of information and communication technology (ICT) to transform healthcare delivery by enabling information access and supporting healthcare operations, management, and decision making. However, the Tanzanian health sector is characterized by a fragmented landscape of ICT pilot projects and numerous data and health information system (HIS) silos, with barriers to the effective sharing of information among healthcare participants [4, 5]. Although the government, partners, and private institutions continue to invest in various ICT initiatives, without a national plan and coordination, duplication of HIS, ineffective expenditure, and the creation of new solutions that cannot be integrated or scaled across the continuum of care [3, 6] will continue.

Often, there is a missing causal link between health sector priorities and how technology can be applied to these priorities [4, 7]. For example, because eHealth strategies are often developed by technologists, these strategies are very ICT focused and difficult for health systems actors to understand and use [6, 8], or these strategies do not comprehensively address the roles and responsibilities of many different stakeholders [6, 9]. The World Health Organization (WHO)/ International Telecommunication Union (ITU) National eHealth Strategy Toolkit can be used by countries to develop their national eHealth Strategy. The Pan American Health Organization recommends that national eHealth strategies should be developed from health sector priorities and that ICT can be used to expand access to health services and improve the quality of those services, but gave countries the ability to choose their own eHealth Strategy framework to use [10]. Australia and Rwanda published their eHealth strategies referencing their own country priorities without specifically detailing the strategy development framework followed [11, 12, 13].

Another eHealth Strategy Development Framework [8] proposes a model that adapts a Telehealth Strategy Development Framework and embeds more business strategy and cognitive process theory and approaches. WHO and the ITU developed the WHO eHealth Strategy Toolkit [14] to enable countries to adapt and use the latest ICT in health for the measurable benefit of their citizens. The Business Motivation Model [15] provides a scheme or structure for developing, communicating, and managing business plans in an organized manner, focusing on the Ends and Means of business plans and influencers that shape business plans and strategies. The Ishikawa Fishbone Diagram [16] uses a causal diagram to show the causes of specific events, and is often used in strategy development to develop business strategies to achieve overall business goals. Elements from these frameworks were combined in the alternative eHealth Strategy framework that was presented at the American Medical Informatics Association 2014 Annual Symposium [2].

The Tanzania eHealth Strategy was developed over several years. During 2008–2009, a MoHSW-appointed Steering Committee oversaw the participatory process consisting of five formal meetings along with numerous informal sessions and technical consultations. The committee incorporated inputs and produced a draft eHealth Strategy. However, the MoHSW did not adopt this strategy, which led to the MoHSW taking a revised approach to the eHealth strategy development in August 2012. This paper focuses on the eHealth Strategy development, which started in August 2012, using the alternative eHealth Strategy development framework [2].

2   Materials and methods

The MoHSW recognized the potential of ICT to transform healthcare delivery by enabling information access and supporting healthcare operations, management, and decision making. The MoHSW recognized the need for a nationally coordinated eHealth strategy and plan to meet their strategic goals, as outlined in the HSSP III [3]. The MoHSW established a core eHealth strategy development team (core team) during August 2012, which included MoHSW ICT, Telehealth, health staff, and other eHealth and monitoring and

evaluation (M&E) advisors to proceed with defining the eHealth Strategy. This core team included the six authors of this paper, and we engaged key stakeholders at different points in the process to ensure that the strategy aligned with communities' priorities and needs.

While in country and in preparation for the eHealth Strategy development workshop, the core team reviewed the WHO eHealth Strategy Toolkit. During this review, the core team considered our experience developing technology strategies in the private sector, business process re-engineering, and the HSSP III eHealth's goals and drivers. As a result, the team combined elements from the three models described in the Introduction to draft an alternative eHealth Strategy development framework that could be applied in a 1-week workshop and follow up discussions in Tanzania [2]. In addition, during the practical application and refining of this framework in Tanzania over 12 months, the core team reviewed other national eHealth strategies (e.g., Canada, Kenya, Australia, Ghana, and Rwanda) [11, 17].

Because Tanzania conducts health sector strategic planning every 5 years, this eHealth strategy was developed with a 5-year timeline. It should be noted that it is challenging for many developing countries to implement a comprehensive eHealth strategy in 5 years. In fact, some international best practices propose that 10 years is a more realistic timeframe for eHealth subsystems [8, 18]. Building in adequate M&E into the strategy will support continued evaluation of progress and identify gaps and areas that may need to extend beyond the initial 5-year timeframe.

The development of the eHealth Strategy in Tanzania was an iterative process. Key stakeholders—MoHSW management, donor and implementing partners, MoHSW technical advisors, and regional and district health management teams—were involved during the process. Figure 1 describes the eHealth Strategy development process and the key activities involved in each section.
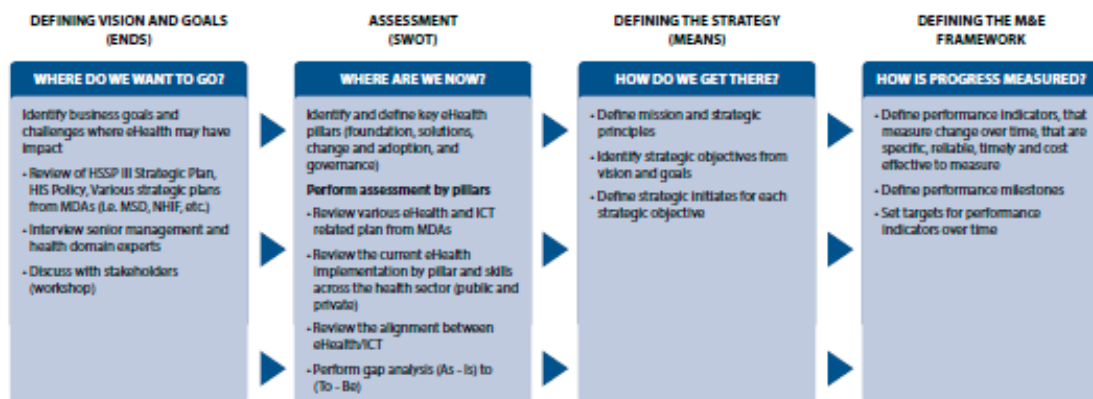

Figure 1. eHealth Strategy Development Process

The initial section of "Defining Vision and Goals (Ends)" includes conducting a desk review; convening a key stakeholders' workshop; and during the workshop, establishing the business goals, challenges, and the Vision. The *Vision* describes what the health sector aspires to achieve by applying ICT in the health sector, and the *Goals* describe health outcomes in qualitative terms that reflect a realistic focus of the health sector and its direction for achieving the eHealth mission and vision. The next section focuses on conducting a Strengths, Weaknesses, Opportunities, and Threats (SWOT) analysis and completing a gap analysis. The third section ("Defining the Strategy [Means]") focuses on defining the eHealth mission and strategic principles and refining the eHealth strategic objectives and related initiatives. The final section ("Defining the M&E Framework) focuses on measuring the progress of the eHealth strategy's implementation.

3   Results: Developing the eHealth Strategy in Tanzania

The core team led the process of developing and applying the framework in Tanzania and engaged stakeholders at different steps [2]. Then, based on the inputs gathered, the team developed the national eHealth Strategy. Stakeholder consultations included broad representation [6, 9] to ensure that the strategy took into consideration all health sector technical areas, and used both a top-down and bottom-up participant engagement approach.

3.1   Summary of Stakeholder Engagement

Table 1 provides a summary of meetings and workshops held by the eHealth Strategy core team, the key stakeholders, and results.

Workshop/Meetings	Core Participants	Results
Workshop: Oct 2012	ICT Unit MoHSW Chief Medical Officer, MoHSW Donor MoHSW Technical Advisors University of Dar Es Salaam University Computing Centre MoHSW Directorates Health District representation eHealth experts	Draft Mission, Vision, Goals, Strategic Principles, Strategic Objectives, Draft Actions, Initial M&E framework
Follow-up Meetings: Oct 2012–Dec 2012	eHealth Strategy core team	M&E Framework
Follow-up Meetings: Nov 2012–Mar 2013	MoHSW departments	Feedback and updates; Added "Change and Adoption" Pillar
Follow-up Meetings: Mar 2013–Jul 2013	Chief Medical Officer, Permanent Secretary	Feedback and updates
Launch Meeting: Sept 30, 2013	WHO, MoHSW broad representation, Minister of Health, e/mHealth projects, donors, and press	Launched eHealth Strategy Launched NeHSC

Table 1. eHealth Strategy Workshops and Meetings

3.2   Initial Stakeholder Workshop in October 2012

3.2.1   Defining Vision and Goals
The stakeholders started by reviewing the HSSP III and the business goals included in the plan to ensure that participants understood the key goals of HSSP III. The stakeholders were divided into small groups, with four people per group, and each group was given a set of business goals along with the following instructions: (1) determine the possible strategic theme(s) under each goal/challenge; (2) clearly articulate the business goal/challenge; and (3) Identify how eHealth can support the selected goal/challenge. Each group presented its results and described how its results can support the selected goals and challenges identified in HSSP III. The stakeholders were led through a process to review how to define the Mission and Vision for any strategy, and then specifically reviewed eHealth strategies from the reference countries of Kenya, Australia, Ghana, Rwanda [11], and Canada [5] focusing on each country's description of its Vision and Mission. The core team selected Australia and Canada because it presented a mature eHealth strategy; and we selected Kenya, Ghana, and Rwanda because these countries, from 2010 onwards, sought to harmonize eHealth activities. For the final small-group activity, stakeholders reviewed the MoHSW's Vision and Mission [19], developed their own versions of the Tanzania eHealth Vision and Mission, and then each group presented its results. The larger group reviewed and combined/updated to create the draft Tanzania eHealth Vision and Mission.

3.2.2   Assessment (SWOT)
The "Assessment SWOT" step focused on completing a SWOT analysis of eHealth in Tanzania, and identifying key eHealth pillars—Foundation, Solutions, Change and Adoption, and Governance—that are necessary to implement the eHealth Strategy. A gap analysis was also completed comparing the "as-is" state to the "to-be" state to ensure that the gaps were understood.

3.2.3   Defining the Strategy (Means)
The "Defining the Strategy (Means)" step focused on determining how to achieve the Vision and Goals based on the SWOT analysis, and identified what actions were needed. The actions are influenced by the

Mission (e.g., what does eHealth mean in the health sector?). From these actions and the results of gap analysis, strategic objectives were developed in the four key eHealth pillars with associated strategic actions.

Next, stakeholders reviewed the aforementioned reference country strategies focusing on their guiding principles and objectives, and then discussed what these meant in terms of implementing HIS. The stakeholders completed a group exercise, where the business goals/challenges and how eHealth can support these goals/challenges were mapped to draft eHealth Strategic Objectives (SOs). The stakeholders were divided into small groups, and assigned a set of SOs and tasked with improving the description; afterward, each group discussed strategic actions needed to implement these SOs. Each small group also started to draft its own list of guiding Strategic Principles (SP) and the strategic actions. The groups reconvened to review the SOs and the SPs and refine these further. All of these involved facilitated discussion. An example of two SPs that were selected include (1) Guarantee patient information right, integrity, and confidentiality in line with the public health access need; and (2) Cost effective, efficient, and benefit driven solutions in limited resources environment that lead to future growth potential.

3.2.4   Defining the M&E Framework, including eHealth Governance and Roadmap

Before the workshop, different discussions had been held, and research conducted on how other countries govern eHealth work [7, 11]. During the workshop, the core team facilitated discussions by sharing Rwanda's and Australia's different governance models [11, 13]. Rwanda's model recommends for its Ministry of Health to create an eHealth department to govern eHealth, whereas Australia's model recommends a National eHealth governing board that is responsible for setting overall national eHealth priorities, funding, and monitoring implementation, supported by a National eHealth Entity that coordinates and oversees execution of eHealth work reporting to the governing board. The team discussed a Tanzania National eHealth Steering Committee (NeHSC) as a possible option, which would be in line with other technically focused groups that have been convened in specific Tanzania technical areas, such as the M&E Technical Working Group. The stakeholders discussed how this might work, membership, roles and responsibilities, and frequency of meeting. The final discussion focused on regulatory issues, and the stakeholders reviewed the SPs to see if this required adding another SP. The stakeholders listed the steps needed to review existing laws, and if a law was needed to setup the NeHSC and to protect patient privacy (harmonized with managing information for public health needs). The stakeholders then developed a high level roadmap for implementation, and the M&E framework for eHealth Strategy implementation measurement. At the end of the workshop, this M&E framework was in the very early stages of development.

3.3   Ongoing Stakeholder Engagement

A series of individual meetings were held with MoHSW Department Directors to obtain additional senior-level input and review the draft eHealth Strategy [5], which assisted in building broader ownership. During each meeting, revisions and recommendations were documented and then reviewed by the eHealth Strategy core team, along with more complete M&E framework development. A key approach included working within MoHSW senior management, the Permanent Secretary (PS), the Chief Medical Officer (CMO), and other senior MoHSW Department Directors who are key to setting direction in the health sector and their engagement and approval is required to adopt any new strategy. Some members of the eHealth core team presented the draft eHealth Strategy to the MoHSW management team to ensure their feedback was integrated so the eHealth Strategy had broad MoHSW acceptance and ownership. Discussions took place iteratively about the makeup of the NeHSC. Additional discussions were held on the terms of reference for members and the role of the chairperson and secretariat.

3.4   eHealth Strategy Launch September 30–October 1, 2013

A large group of stakeholders (≥80) met during a 2-day workshop, where the MoHSW launched the eHealth Strategy (with support from the WHO), presenting on the current eHealth investments, and areas that need continued investment. Six implementing partners working in the eHealth/mHealth sector gave presentations about their projects. Discussions were held about the NeHSC and its role in achieving the vision of the eHealth Strategy. The Government of Tanzania formally adopted the eHealth Strategy, the NeHSC was formally inaugurated, and the first meeting of the NeHSC was convened for October 2, 2013. Tanzania has

invested in developing a comprehensive eHealth Strategy with the understanding that the strategy forms the foundation that will eventually aim to produce a safer, high-quality, equitable, efficient, and sustainable health system that is equipped to respond to emerging health sector cost and demand pressures.

4 Discussion and Conclusion

The eHealth Strategy was guided by Tanzania's HSSP III (2009–2015), which identifies health sector priorities. The initial background work occurred over a period of 2 years, culminating in a 1-week multi-stakeholder workshop (health sector and ICT/eHealth experts) in September 2012 that used the alternative eHealth Strategy Development framework to develop the first official version of the draft eHealth Strategy [2]. Through continued meetings with key stakeholders and revisions to the draft eHealth Strategy, the final Tanzania eHealth Strategy 2013–2018 was published on September 30, 2013.

The experience in Tanzania of developing the national eHealth Strategy informed by the country health strategic plan priorities, determining where ICT can support achieving health sector goals, and ensuring a participatory approach with key stakeholder involvement at all stages of development led to national adoption and Tanzanian ownership of the national eHealth Strategy. It is essential that members of the eHealth Strategy core development team have expertise in the following skills:

- leading and facilitating participatory workshops
- collaborating with the ministry and host country partners to identify key stakeholders
- understanding how ICT can transform the delivery of health services
- translating technology terms in plain language to successfully engage in discussions with senior health leaders.

The stakeholders engaged in the eHealth Strategy development process found the approach pragmatic, and could see immediate results from their work through iterations of the draft eHealth Strategy that was easy to understand and linked back to the national health priorities while grounded in the current situational analysis. The eHealth Strategy is also concise and user-friendly. We believe that the eHealth Strategy will lead to more sustainable development of eHealth solutions in Tanzania. Of course, the strategy is just one step in a long process to build a safer, high-quality, equitable, efficient and sustainable health system, and the goal of the NeHSC and their support is to ensure that the strategy is implemented, with ongoing M&E to measure lessons learned and also to adapt to ongoing changes in enabling technologies and M&E results.

Limitations in the application of the framework in Tanzania include the delay from the initial workshop in September 2012 to the official launch in September 2013. This was a result of resource constraints for the workshop held in September 2012, as there were limits to the number of stakeholders that could be included. Therefore, core team members had to follow up with individual MoHSW departments and leadership, which resulted in many rounds of revisions as feedback was integrated along the way; in addition, because of staff turnover within the ministry, we had to conduct orientation and engagement. Overall, the harmonization process of eHealth Strategy harmonization lasted one year, which delayed the launch and adoption of the eHealth Strategy. In addition, because this framework has only been applied in Tanzania, and the eHealth Strategy is currently being implemented, it is too early to compare the effectiveness of this strategy with other country eHealth strategies.

Institutions and national and subnational governments can apply this case study approach, specifically countries of similar size and complexity, with many disparate existing eHealth initiatives that are not co-ordinated and led from a technology perspective.

This eHealth Strategy has been shared with donors, the MoHSW Technical Working Group, the Prime Minister's Office for Regional and Local Government, Tanzania eGovernment Initiative, and regional and district health staff. This eHealth Strategy is currently being used by the MoHSW to review and coordinate across new and existing eHealth initiatives.

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Statement on conflicts of interest

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References

[1] Lewis, T., C. Synowiec, G. Lagomarsino, and J. Schweitzer. "E-Health in low and middle income countries: findings from the Center for Health Market Innovations." *Bulletin of the World Health Organization (WHO) 2012;90:332-340. doi: 10.2471/BLT.11.099820*, 21 February 2012, http:// http://www.who.int/bulletin/volumes/90/5/11-099820/en/ (accessed February 20, 2015).

[2] Elias. M, J. Mukela., H. Rulagirwa, A. Swai, H. Danford, S. Perera, and N. Darcy (2014, November). "eHealth Strategy Transforming Health Care Delivery in Tanzania." Poster presented at 2014 American Medical Informatics Association Annual Symposium, Washington, DC.

[3] The United Republic of Tanzania Ministry of Health and Social Welfare (MoHSW). 2009. Health Sector Strategic Plan III (July 2009–June 2015). http://ihi.eprints.org/970/1/HealthSectorStrategicPlan.pdf (accessed November 13, 2014).

[4] World Health Organization (WHO) Health Metrics Network. 2007. Assessment of the Country Health Information System in Tanzania http://www.who.int/healthmetrics/library/countries/HMN_TZA_Assess_Draft_2007_05_en.pdf (accessed November 13, 2014).

[5] Tanzania MoHSW. 2010. Monitoring and Evaluation Strengthening Initiative, Combined Plan, 5 Year Operational Plan and Year 1 Work Plan.

[6] van Gemert-Pijnen, J. EWC, N. Nijland, M. van Limburg, H.C. Ossebaard, S.M. Kelders, G. Eysenbach, and E. Seydel. 2011. A Holistic Framework to Improve the Uptake and Impact of eHealth Technologies. *Journal of Medical Internet Research* 13, no.4 (December 13). http://www.jmir.org/2011/4/e111/ e111. (accessed November 13, 2014).

[7] Foster, R. 2013. Assessing the development process of the eHealth strategy for South Africa against the recommendations of the WHO/ITU National eHealth Strategy Toolkit. *Journal of the International Society for Telemedicine and eHealth* 1, no 2. http://journals.ukzn.ac.za/index.php/JISfTeH/article/view/36.

[8] Scott, R.E., and M. Mars. 2013. Principles and Frameworks for eHealth Strategy Development. *Journal of Medical Internet Research* 15 no. 7. http://www.jmir.org/2013/7/e155/ (accessed November 13, 2014).

[9] Van Velsen, L., J. Wentzel, and J. EWC Van Gemert-Pijnen. 2013. Designing eHealth that Matters via a Multidisciplinary Requirements Development Approach. *JMIR Res Protocol* 2 no 1. (Jun 24) e21.

[10] Pan American Health Organization. 51st Directing Council: 63rd Session of the Regional Committee Final Report, Washington, D.C., September 2011. pp 26-30. http://www.paho.org/hq/index.php?option=com_docman&task=doc_download&gid=16913&Itemi d= (accessed November 13, 2014).

[11] International Society for Telemedicine and eHealth. National eHealth Strategies. http://www.isfteh.org/media/category/national_ehealth_strategies (accessed November 13, 2014)

[12] Government of Western Australia eHealth Strategy Frequently Asked Questions. http://www.health.wa.gov.au/ehealthwa/home/faq-strategy.cfm (accessed November 13, 2014).

[13] Australian Government Department of Health. Australia National eHealth Strategy. 2008. http://www.health.gov.au/internet/main/publishing.nsf/Content/National+Ehealth+Strategy (accessed November 13, 2014).

[14] WHO and International Telecommunication Union. 2012. National eHealth Strategy Toolkit. Available from: http://www.itu.int/pub/D-STR-E_HEALTH.05-2012-PDF-E.pdf (accessed November 13, 2014).

[15] The Business Rules Group. 2007. The Business Motivation Model. Release 1.3. http://www.businessrulesgroup.org/second_paper/BRG-BMM.pdf (accessed November 13, 2014).

[16] Mind Tools. "Cause and Effect Analysis: Identifying the Likely Causes of Problems (Ishikawa Fishbone Diagram Strategy)." http://www.mindtools.com/pages/article/newTMC_03.htm (accessed November 13, 2014).

[17] British Columbia eHealth Steering Committee. 2005. eHealth Strategic Framework. http://www.health.gov.bc.ca/library/publications/year/2005/ehealth_framework.pdf (accessed November 13, 2014).

[18] Broomhead, S., and T. Jones. 2011. eHealth Strategies for Africa: A White Paper. http://tintree.org/whitepapers/eHealth%20Strategies.pdf (accessed November 13, 2014).
[19] Tanzania MoHSW. "Mission and Vision." http://www.moh.go.tz/index.php/about-us/mission-and-vision (accessed November 8, 2014).