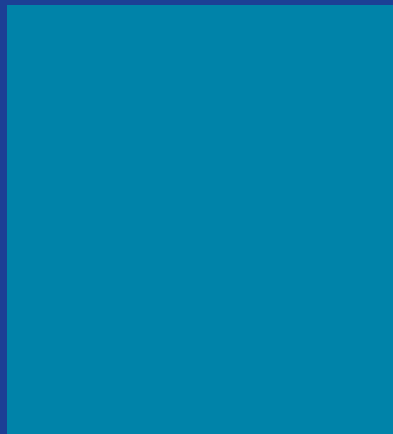
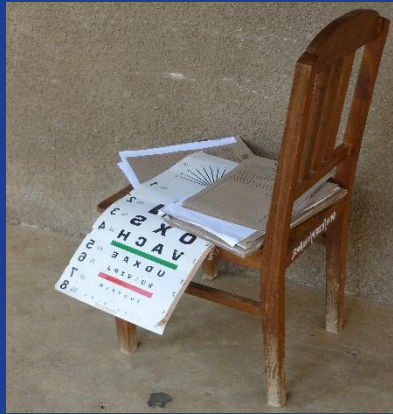


# Circumventing 'free care' and 'shouting louder': Eye health system sustainability in north-west Tanzania

## Final report to CBM



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## Abstract

As a specialist, mainly hospital-based service, eye care developed unevenly in Tanzania as a result of wider health system changes during the 20<sup>th</sup> Century. Today, eye health cadres who lead the most complex interventions in the deprived 'Lake Region' of the country (non-physician ophthalmic assistant medical officers and cataract surgeons) are concentrated in hospitals run by domestic church missions that can access financial support from faith-based international eye care donors. To improve eye health sector sustainability, however, the global VISION 2020 campaign advocates integration of non-governmental organisation (NGO)-run eye care services into national health systems. In this paper we use a mixed method, case study approach to explore how hospital eye teams define and work towards sustainability in this context, within and across mission and government systems.

By following two cataract surgical teams in the mission sector and two in the government, we identified five strategies which practitioners used to navigate government, mission and donor rules to achieve sustainability. These were: create and maintain 'sustainability funds' to retain financial autonomy over income raised by the department; avoid granting government user fee exemptions to elderly patients who are the majority of service users; maintain willingness to expand or contract outreach services as financial circumstances change; access peer support for problem-solving; and share eye data for advocacy purposes.

The extent practitioners relied on these strategies sometimes related to their sector of employment. Eye teams based in mission hospitals were granted greater freedom to increase their income from user fees by not implementing government policies for 'free care', which were widely seen as non-sustainable. The most productive team with the most diversified service delivery drew financial and social capital from both the mission and government sectors. The differences we observed between eye departments, however, could not be completely explained by their position in a particular mission or government sector. Teams in all hospitals found similar strategies to manage their programmes even when their management structures were unique, suggesting the importance of informal rules governing eye care in this pluralistic, decentralised health care system. The need for an informal system of governance was reinforced in a space of overall neglect which eye care practitioners in the Lake Region operate in.

While pluralistic health systems often encourage actors to work in isolation, we found evidence of social entrepreneurship among eye care practitioners here. Peer networks, in particular, facilitated service expansion and were perceived favourably by providers who sought to overcome isolation and 'shout louder' to improve eye health sustainability in this deprived region.

CBM's investment in this Region is positive not only in terms of the population health outcomes achieved by surgical teams they have supported in the mission sector, but also in terms of the organisational models its partners have developed. Shared through social networks such as LARESA, these alternative organisational models help to open the eyes of practitioners in other sectors about what might be possible in a pluralistic health system.

In the long term, coherence between the various governance systems in the Region will need to improve so that survival strategies of eye care providers do not endanger financial access of eye care services for populations.

The effects of neglect in eye health appear to be more complex than we commonly realise because, as the experience of practitioners in the Lake Region shows, neglect generates new dynamics that affect sustainability in unexpected ways.

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## 1. Introduction

Blindness and visual impairment have long been pre-occupations of Judeo-Christian religions as forms of human suffering particularly deserving of charity (Afek 2012; Morante 2012). With advances in science and medicine, religious charitable efforts in Europe extended from economic and pastoral support to provision of modern curative and preventive eye health services (Morante 2012). Christian medical missionary movements to Africa were in keeping with this trend, endeavouring to establish and disseminate a 'culture' of modern eye treatment and care (Ahodegnon 2012). Early ophthalmic work in Ghana (1930s), Nigeria (1940s-50s), Tanzania, Uganda and Malawi (1960s), for example, was by missionary physicians (Schram 1997). Elsewhere (South Africa 1918 onwards, Southern Sudan 1930s-50s, Nigeria 1940s-50s Kenya 1940s-60s), this work was accomplished by physicians associated with the Colonial Medical Service, government or working in private practice. Although secular international and African organisations probably dominate eye care development work on the continent today (e.g., see members list for the Africa section of the International Agency for Blindness (IAPB): <http://www.iapbafrica.co.za/partner/index/1>), faith continues to motivate engagement by several large actors (e.g., Christian Blind Mission or CBM, and Lions Club International) who describe this experience as "overwhelming: to give the gift of sight. The joy on the face of someone who can now see brings joy to the heart of a Lion" (p. 32) (Tam 2012). The continuing role of faith-based organisations and religious social development services in addressing the needs of visually impaired people was also highlighted at a 2012 meeting of international eye care organisations hosted by the Vatican (Pontifical Council 2012; Trimmel 2012).

The contribution of non-governmental organisations (NGOs, including faith-based) to eye care in Africa can be measured in several ways. According to a 2011 survey of 21 countries of sub-Saharan Africa, around 13% of all eye care practitioners (19% of eye surgeons) work in a facility run by NGOs (72% in government facilities (Palmer, Chinanayi et al. Submitted)), while many eye care programmes in the government sector are further supported by NGO eye care donors. Assessments in several African countries have shown that NGOs often provide the bulk of funding, equipment and consumables in a national eye care programme (Bozzani and Griffiths 2011; Habtamu, Eshete et al. 2013; Potter, Debrah et al. 2013; Potter, Vandy et al. 2013; Blanchet and James 2014) and, in Ethiopia, for example, increased cataract surgery productivity of surgeons was associated with the provision of financial and logistical support provided by NGOs (Habtamu, Eshete et al. 2013). Eye care NGOs work in ways that may be judged more or less sustainable, ranging from decades-long programmatic support for specific hospitals to short-term expatriate-led missions to distribute recycled spectacles (Pearce 2008; Naidoo 2012; Pearce and Pearce 2012).

A consistent critique has emerged over the last decade, however, which characterises NGOs as having developed eye health systems parallel to government structures that must be maintained through continuous external financing, "year by year" (p. 74, Trimmel 2012) (IAPB 2013). At the same time, African governments are largely characterised as having neglected eye care services (Rabiu, Al Rajhi et al. 2012; Tam 2012; Habtamu, Eshete et al. 2013), either because eye diseases do not directly lead to mortality and are not part of the MDGs (Tam 2012), or because the sector is widely covered by NGOs, themselves (Habtamu, Eshete et al. 2013). Opinion leaders have therefore called for a "paradigm shift" (p. 4) (IAPB 2013) in the way eye care NGOs work, calling for closer and better coordination at sub-regional and country levels. In particular, the IAPB and World Health Organisation (WHO)-led VISION 2020 campaign encourages development of national prevention of blindness programmes to comprehensively address and build consensus around key priority areas (V2020 2007; Trimmel 2012; IAPB 2013; WHO 2013). Under this approach, national eye health coordinators within Ministries of Health are supported by NGOs to advocate for greater, long-term

domestic support to eye care and better integration of eye care services into the national health system (Oduosote 2007; WHO 2013; Blanchet, Gilbert et al. 2014). So far, eye care NGOs have reportedly taken up this call to greater (Harper 2012; Trimmel 2012) and lesser (Pearce 2008; Pearce and Pearce 2012) extent. From the perspective of NGOs, following the VISION 2020 approach appears to require a shift in programming emphasis. If “service delivery alone will not bring about systematic change” (p. 70, Harper 2012), then NGOs must begin to engage with “society and systems” (p. 74, Trimmel 2012). And while many NGOs seek to keep a hand in direct service delivery (either to maintain financial contributions from private donor bases or to maintain credibility in advocacy work (Harper 2012; Trimmel 2012)), for others, this policy position inevitably means a reduction in support to this type of on-the-ground work, or to specific components of it, such as outreach activities.

With some exception (Courtright, Seneadza et al. 2010; Blanchet and James 2014), little literature has explored the dynamics of how hospital eye teams define and work towards sustainability in this context, across the parallel NGO and government systems that VISION 2020 seeks to bring together. In this study, we use a mixed method approach to present the strategies used by eye care practitioners in four hospitals of north-west Tanzania to navigate the government, mission and donor rules that govern eye services delivery and to achieve sustainability. We furthermore seek to understand the entry and potential contribution of a new pan-sectoral and informal eye care practitioners’ network, Lake Region Eye Care Services Association (LARESA).

Before a note on methodology, we review literature on the context of government, faith-based and secular NGO engagement in eye health in Tanzania, and define our study setting more specifically. We then examine how practitioners characterise service delivery in each sector through narratives and analyse service output across hospitals and sectors in relation to observed models of financing, service diversification, and use of social capital. We end by suggesting how actors in Tanzania can better conceptualise and contribute to eye health system sustainability to achieve equitable development across the sectors.

### Eye health development in Tanzania

Christian missionaries from Germany, Britain, Sweden and other European countries were responsible for much of the earliest modern health infrastructure in inland, rural Tanzania. While some missionaries had a specific interest in eye care, most sought to set-up small stations which served the broad health needs of rural populations (Ludwig 1999). The first cataract surgeries were probably carried out at Mvumi mission hospital in the 1930s by general surgeons (Allen Foster, personal communication) and this was also the first hospital in the country to employ an ophthalmologist in the 1960s (Schram 1997). By the time of Independence in 1961, Christian Missionary Societies owned 42% of all hospital beds in the country and 81% of the primary health care facilities, with the colonial medical service (which served as a basis for today’s Ministry of Health and Social Welfare (MoHSW)) responsible for the remainder (Leurs, Tumaini-Mungu et al. 2011). Today, faith-based organisations again run about 40% of hospitals in Tanzania but less than a quarter of lower-level facilities (22% of health centres and 13% dispensaries, as of 2008) (Leurs, Tumaini-Mungu et al. 2011) as a result of the interplay of domestic and external development aims over five decades –which also shaped the development of eye services in Tanzania.

Following an ‘African socialist’ approach to development (*ujamaa*), President Nyerere proscribed private medical practice in 1962 and nationalised many mission health facilities beginning in the late 1960s (Iliffe 1998; Leurs, Tumaini-Mungu et al. 2011). This included the mission-built teaching hospitals commissioned by Nyerere in the early 1970s to house specialist referral services including

eye care, such as Kilimanjaro Christian Medical Centre (KCMC), Mwanza Teaching Hospital in the Lake Region, and Muhimbili University Hospital in the capital (Ludwig 1999). Exemptions were granted to some private institutions but these nevertheless operated under stricter government oversight (Iliffe 1998; Leurs, Tumaini-Mungu et al. 2011); other private practitioners were driven underground such that “even cataract extractions [...] were done in people’s homes in kitchen tables” (Weekly Review 28 April 1978, quoted in (Iliffe 1998)). Some prominent expatriate missionaries supported nationalisation, including Leader Sterling, who implored government to “take the profit motive out of people’s heads”<sup>1</sup>; he was eventually appointed as Minister of Health in 1975 (Iliffe 1998). A decade and a half after Independence, the Ministry had consolidated its health development philosophy, taking a lead role at the WHO 1978 Alma Ata conference on primary health care and divesting resources from hospitals into front-line facilities (Iliffe 1998).

This broad approach may have indirectly supported community eye care services, such as through local government recognition of the eye health needs of elderly people during Nyerere’s adult literacy campaigns (Hall 1971; Kinunda 1975). Reports of participant expectations from this period, for example, suggest that adults felt they ‘deserved’ access to spectacles according to new Tanzanian development policies, financial contributions to fund spectacle donations were encouraged from local groups in the spirit of self-reliance, and high-level government efforts were taken to involve health staff in eye examinations (Hall 1971)<sup>2</sup>.

With government and donor sponsorship, the teaching hospitals managed to train around four specialist non-physician assistant medical officers in ophthalmology (AMOOs) a year from mission and government hospitals to serve rural regions, beginning in 1975 (Nkundwe Mwakyusa, personal communication). It wasn’t until the early 1980s that the first Tanzanian ophthalmologists were trained at Indian institutions and the first optometrists at KCMC, where a spectacles workshop was also set-up (Allen Foster, personal communication).

Over time, however, with divested budgets and reduced supplies, many services at government-run district and referral hospitals became run-down (Iliffe 1998; Ludwig 1999). This divestment policy furthermore coincided with the global economic crisis of the late 1970s, the break-up of the East African Community and the expense of war with Uganda which further weakened the public sector. Eventually this increasingly fragile economic situation led to the adoption of World Bank-recommended structural adjustment programmes as a condition of receiving loans. These reforms also had the effect of creating political space for domestic Church missions (particularly the Catholic, Lutheran and Anglican churches who had historically been most involved (Balina 2012)<sup>3</sup>) to retake ownership of key hospitals in the country (Iliffe 1998; Leurs, Tumaini-Mungu et al. 2011) and of reinvigorating donor interest in hospital services (Sullivan 2011), including eye care which, as highly technical and specialised, had suffered from a lack of public investment (Allen Foster, personal communication).

Healthcare was further reformed in the 1990s through a process of decentralisation of responsibility to district governments and the adoption of patient user fees and insurance mechanisms (Musau,

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<sup>1</sup> Sunday News 13 June 1976, quoted in (Iliffe 1998)

<sup>2</sup> Reports of campaigns in 1971-1974 commonly listed the numbers of adults per village who could not participate because of limited eye sight. Local government solutions included contacting high level government officials to send a doctor to examine patients and distribute spectacles in one district and arranging for the District Medical Officer himself to perform examinations in another.

<sup>3</sup> While Pentecostal churches now have the largest congregations, they tend to be less involved in social service provision (Leurs, Tumaini-Mungu and Mvungi 2011), (Loewenberg 2009), although there are exceptions.



Chee et al. 2011). Development funding was also reorganised into a more flexible Sector-Wide Approach (SWAp), allowing the MoHSW access to greater resources to develop the hospital system and the emergence of new government-NGO partnership models. High-performing hospitals, regardless of the sector they are in, may apply for additional, priority government funding to become District Designated Hospitals (DDHs)<sup>4</sup>. If an NGO or church-run facility, it becomes co-managed by district government structures and has access to central government funds for staff salaries and district 'basket' funds for medical supplies and infrastructure (Musau, Chee et al. 2011). This normally represents a financial opportunity for many church-owned facilities which, in recent years, have seen a decrease in direct donor funding due to the SWAp or other causes (Leurs, Tumaini-Mungu et al. 2011). Given the history of engagement in eye care by the churches and opportunities available through renewed investment by government, eye care units based in these types of mission-government hospitals might then be expected to perform particularly well. Nine international eye NGOs affiliated with IAPB currently operate in Tanzania<sup>5</sup> (IAPB 2014); many other non-IAPB-affiliated NGOs and donors also support eye care in the country.

## 2. Methods

### Setting and selection of study sites

In 2012, CBM supported eye health programmes in Tanzania in two specialist teaching hospitals and eight rural hospitals. Financial support to the rural hospital eye departments at this time varied between TZS 20 million to 100 million per year (USD 13,000-64,000) depending on equipment, infrastructure and training needs, co-financing available from government or other sources and projected cataract surgical output (CBM 2011).

CBM's entry to Tanzania in 1973 was intricately tied to KCMC. The presence of a long-term expatriate ophthalmologist on staff knowledgeable about the operational context but lacking financing offered CBM an attractive opportunity to influence eye service development in its first African programme (Allen Foster, personal communication). From KCMC this ophthalmologist would regularly visit other mission hospitals through outreach and encourage them to approach CBM for funding. He was also instrumental in persuading the Tanzanian government to start training medical assistants as 'eye doctors' (AMOOs). Through CBM-supported international outreach and recruitment, this programme now receives students from as far away as Sierra Leone.

While, in the 1970s and 80s, CBM had supported AMOOs across Tanzania with training, medical supplies, equipment, vehicles and other running costs regardless of sector, by the 1990s, reduced funding from private donors in Europe justified a shift to exclusive funding of eye departments in mission facilities. In 2012, CBM was attempting to further reduce its level of financial support to service delivery in Tanzania. This objective suited its belief that, after thirty years of 'charity' in the country, CBM needed to evolve into an organisation more focused on 'development', focusing on

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<sup>4</sup> While the DDH system was introduced after Independence as a way for mission hospitals to gain financial self-sufficiency from European funders, the scheme also depended on the financial viability of the government; the granting of DDH status was therefore suspended during Tanzania's economic recession and re-introduced in the 1990s (Allen Foster, personal communication).

<sup>5</sup> These are: Brian Holden Vision Institute, Christian Blind Mission (CBM), Focus on Vision, Helen Keller International, Hilton Perkins Foundation, International Trachoma Initiative, Kilimanjaro Centre for Community Ophthalmology (KCCO), Light for the World and Sightsavers International.



capacity-building so that they could eventually “move on”<sup>6</sup>. Many facilities were therefore only receiving funding to reimburse a proportional value of supplies used per patient operated on, according to a performance-based financing model.

Similar to the rest of the country, the ‘Lake Region’<sup>7</sup> of north-west Tanzania, where this study was conducted (Figure 1), has far fewer human resources for eye health and conducts less cataract surgery than recommended for sub-Saharan Africa; regional deficiencies in ophthalmologists and optometrists are particularly acute (Appendix A). The Lake Region is populated by more than 10 million people but has only one surgically-active ophthalmologist. Non-physician AMOOs and cataract surgeons (AMOOs with an extra year of training in cataract and other minor eye surgeries) therefore lead development of the sector here, delivering the most complex eye health interventions in the area. Cataract surgeons/AMOOs are more highly represented in the NGO and mission sector than other eye health cadres; more than half (6/11 or 55% of AMOOs, compared to 9/40 or 23% of ophthalmic nurses, for example) are employed in mission-owned facilities. There are 11 mission-owned hospitals in the Region, compared to 29 fully government-run facilities (and around 15 private hospitals or practices).

Of the seven surgically-active cataract surgeons in the region, we selected four to follow prospectively based on sector of employment (two from the mission sector and two from government) and geographic accessibility for the study team<sup>8</sup> (Table 1). Exploration of eye care activities in the private for-profit sector was limited.

*Table 1. Key characteristics of study hospitals*

	<b>Kitete</b>	<b>Musoma</b>	<b>Sengerema</b>	<b>Kolondoto</b>
<b>Sector</b>	Government	Government	Mission (Catholic)	Mission (African Inland Church, AIC)
<b>Hospital level</b>	Regional referral	Regional referral	District-designated (DDH)	District (DDH application underway)
<b>Region</b>	Tabora	Mara	Mwanza	Shinyanga
<b>NGO support to eye services</b>	None	KCCO (since 2005)	CBM (since 1989)	CBM (since 1970)

Note: KCCO: Kilimanjaro Centre for Community Ophthalmology (KCCO), CBM: Christian Blind Mission

We also prospectively followed regional developments in eye care through study of an eye care practitioner’s organisation which all surgeons in the study were members of, LARESA.

<sup>6</sup> Sustainability workshop presentation by CBM Tanzania representative, Dec 2012; this concept is also described in CBM Tanzania’s 2011 country situational analysis.

<sup>7</sup> This ‘Lake Region’ name was defined for historical reasons by eye care practitioners themselves who sought to describe their organisation of eye care practitioners as serving the four regions officially recognised as encompassed by the ‘Lake Zone’, as well as three poorly-served neighbouring regions that Lake Zone eye care practitioners traditionally provided outreach to (Tabora and parts of two new regions, Simiyu and Geita, which emerged during the study period). The sub-national divisions in Tanzania, in descending order, are: Zone, Region, District, Ward and Village.

<sup>8</sup> One distant region with two surgeons was excluded; in another region with two surgeons, selection was made based on the sector but we included both in some research activities.



Figure 1. Map of Tanzania showing the five political regions (in red) included in the 'Lake Region' study area

### Field work

Field work consisted of four field visits lasting 2-5 weeks to the Lake Region which took place quarterly over a one year period (between September 2012 and August 2013). Data was collected by a team of four expatriate researchers who contributed information to a central database: one (JP) who led the research and collected data from all case study hospitals on three trips, two student researchers (AG & MC) who spent extended periods in two case study hospitals each on the fourth trip, and another (KB) who collected data on LARESA and facilitated the sustainability analysis workshop on the second trip. Data collection was prioritised in the four case study hospitals but also occurred opportunistically in six others to further contextualise our analysis across all LARESA regions.

On each visit, qualitative data was collected through in-depth interviews with staff from eye departments, hospital management teams, mission health programmes and district and regional medical offices. Interviews were audio-recorded, followed a loose topic guide and addressed the following issues: the history and future plans of the eye programme at each hospital; emergent

events, relationships between actors of the health system, management decisions and associated rationale affecting eye care in the last quarter; and local perceptions of eye health system sustainability. Interview data was supplemented with field notes from informal discussions during observations of eye care activities and review of documents relating to eye care activities in the hospital.

Each quarterly field visit additionally pursued a specific complementary data collection objective: a mapping exercise to identify all eye care human resources and programmes in the Lake Region (1<sup>st</sup> visit, Appendix A); a participatory sustainability analysis exercise to choose indicators of eye health system sustainability in the Region and obtain measures in the case study hospitals (2<sup>nd</sup> visit, see below and Appendix B); a social network analysis to identify the most important actors who support eye care at each case study hospital (3<sup>rd</sup> visit, see below); and close observation of decision-making surrounding outreach (4<sup>th</sup> visit). Study of LARESA also involved interviews with members and the chairperson, observation of one meeting and review of meeting minutes and other documents since its establishment.

All notes, transcripts, documents and other research products were imported into a central NVivo qualitative analysis database and coded line-by-line to understand broad eye health sustainability narratives in the Lake Region. All information collected on individual case studies was assembled to understand the evolution of three main types of activities which emerged in discussions and tended to dominate enquiries on sustainability in each hospital: departmental financing; how services became diversified; and how information was shared among peers. After this internal process was completed for each case study, experiences were compared across hospitals and any differences by sector (mission vs. government) were identified and further explored (Yin 2003). Finally, by analysing theoretical eye health sustainability narratives alongside our observations of the processes of change pursued by eye departments in practice, we were able to identify five thematic 'sustainability strategies' which explained the most important ways in which eye care actors work to achieve sustainability in the Lake Region eye health system.

### Sustainability Analysis Process

The Sustainability Analysis Process (SAP, (Blanchet and Boggs 2012; Blanchet and Girois 2013)) combines an approach to sustainable strategic decision-making for the business sector with a conceptual framework for assessing sustainability in international development projects. Influenced by 'systems thinking' theory, the SAP assumes that sustainability is a multidimensional concept that encompasses six different components: (i) population health outcomes; (ii) quality and access of health services delivery; (iii) organizational capacity & viability of local authorities as health system stewards; (iv) organizational capacity & viability of local organisations and service providers; (v) community capacity; and (vi) the enabling social, economic and policy environment. A participatory, eight-step process is followed to analyse each component of sustainability as it relates to the local system and to choose indicators which reflect participants' vision of sustainability.

A two-day workshop was organised in collaboration with LARESA to introduce the SAP to members and other stakeholders in December 2012. Forty-two people participated including all cadres of eye care practitioners in the Lake Region, individuals involved in eye health service planning (the National Eye Care Programme (NECP) coordinator, Regional Eye Care Coordinators (RECCs), representatives of Regional Medical Offices, community and hospital management boards and non-governmental organisations in eye care), and individuals affected by eye care services (representatives of visually impaired/disabled peoples' organisations and former eye care patients).

To start the workshop, several participants involved in eye health service planning were asked to give presentations on the context of eye health services delivery in the Lake Region (for details, see (Palmer and Blanchet 2013)). Copies of the national eye care strategic plan were also distributed. Participants were then divided into small groups to discuss the sustainability components using this background information and their own experiences in eye care. The groups identified a draft list of indicators with standards (or targets) that captured key ideas about local system sustainability in the Lake Region; facilitators then gave each group a list of additional indicators collected from previous SAP workshops (see <http://www.sustainingability.org/case-studies/index.html> for examples) and international standards that participants could add to their lists, if useful. Extended lists were presented to the entire workshop for discussion and revision. Two eye teams which had brought standard data to the workshop then served as examples in an indicator measurement simulation exercise, allowing groups to 'pilot test' and further refine their indicators to make sure they were as specific and measurable as possible. To end, the groups illustrated these baseline indicator measurements in relation to the sustainability standards they had set on star (or radar) diagrams and emerging sustainability patterns were discussed, along with actions that individuals could take to improve sustainability in their own hospitals and regions.

Immediately following the workshop, the full draft list of indicators was compiled by the facilitators for a final phase of piloting and refinement during visits to support indicator measurement in each case study eye department. The final list of sustainability indicators with example measurements from the case study hospitals covering the period Jan-Dec 2012 (Appendix B) were circulated to workshop participants via email and hard copies distributed at the next LARESA meeting.

### Social network analysis

Social network analyses (SNA, (Blanchet and James 2012)) for each hospital were created through a series of interviews with eye care and wider hospital management teams over a period of two days per hospital. Eye teams were first asked to discuss all eye care activities they had undertaken over the four month period since the previous study visit (mid-Dec 2012 to mid-Apr 2013), prompted when necessary using notes from previous visits. Information was then extracted into a communications chart, listing all possible actors in the social network and the topics discussed. A second eye team interview was conducted to discuss the communications chart, to add detail and missing information on communications with other potential actors. Interviews were then conducted with key actors within hospital, NGO and regional management teams to verify eye team communications and independent eye care discussions with other actors. A third and final interview was conducted with eye teams to discuss discrepancies raised in non-eye team interviews, questions and impressions emerging from ongoing analysis. Interactions with other actors identified in the longer case study were not incorporated into the SNA diagrams if they did not communicate about any of the case study hospitals during this four month period.

Sixteen codes were created to define each type of eye care activity discussed (e.g., reporting, outreach, equipment procurement, human resources recruitment, advocacy, etc.). The number of different topic codes discussed by the eye team with each actor was then calculated to give a measure of the intensity of eye care interactions with each and a categorical score (0: no interactions, 1: 1 topic discussed, 2: 2-3 topics, 3: 4-7 topics) was assigned to describe the existence of and intensity of communication between actors in an information flow matrix. Social network information from these exercises was then incorporated into a single matrix for analysis by UCINET software to illustrate all connections between actors who support eye care activities delivered by four of the seven surgically-active teams in the region. A separate social network exercise was conducted with the LARESA chair in Dec 2012.

## Ethics statement

This study received a favourable opinion from the ethics committees of the London School of Hygiene & Tropical Medicine (received September 2012, reference number 6267) and the National Institute for Medical Research in Tanzania (received November 2012). All study participants voluntarily provided written informed consent. This study was supported by CBM.

## 3. Findings

### Eye care: A 'blind spot' for government

Eye health sustainability was most commonly perceived by actors in the Lake Region as constrained by systemic government neglect. At the sustainability workshop, each national- and regional-level actor who was asked to contribute information on the contextual overview of the eye care system<sup>9</sup> emphasised low government prioritisation of funds for eye health as a reason why human resources, infrastructure, equipment and activities were deficient in the sector (see Appendix B in (Palmer and Blanchet 2013) for the presentations made). These deficiencies in turn compromised implementation of VISION 2020 in Tanzania and domestic eye health strategies. Partly this was seen as a problem of global health priorities: by not directly causing mortality, vision loss could not compete with interventions for maternal-child health and HIV prioritised by the Millennium Development Goals and international and national policy actors<sup>10</sup>.

At regional level, while regional eye care coordinator (RECC) positions existed, actors pointed to their typical exclusion from formal regional health management teams (made up of nationally mandated 'core' positions covering topics such as nursing and dentistry, as well as 'co-opted' positions including for HIV and cold chain management, which depend on local determinations)<sup>11</sup>. Without regular inclusion in regional planning mechanisms, local supervisory support was limited in practice<sup>12</sup>. As a result, local advocacy efforts aimed at these structures by eye care practitioners themselves were considered ineffective<sup>13</sup>. Absence of basic eye care commodities in national supply systems was also strongly symbolic of neglect in this system for eye care actors; one cataract surgeon described being able to buy such items from the national medical store rather than more expensive private sources, as "a dream"<sup>14</sup>. The ambivalent procurement strategy outlined in the current national eye care plan, whereby closer links to the national medical store would be sought alongside development of new processes to purchase outside of it, also perhaps highlights mistrust by authors of the plan of government willingness to prioritise eye care (MoHSW 2011). A common saying among eye care practitioners therefore was, "the government has a blind spot on eye services"<sup>15</sup>.

At hospital level, general managers themselves admitted they often forgot about the equipment needs of this specialty service because they had little exposure to eye health in medical training<sup>16</sup>.

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<sup>9</sup> Sustainability workshop presentations by representatives of the NECP, LARESA and CBM, Dec 2012.

<sup>10</sup> See, for example, the sub-title of the Ministry of Health and Social Work's current strategic plan: "Health Sector Strategic Plan III: Partnership for Delivering the MDGs" (MoHSW 2009).

<sup>11</sup> An exception to this was observed in Mara Region, where the RECC, based at Musoma Regional Hospital, held a co-opted position.

<sup>12</sup> Sustainability workshop presentation by NECP representative, Dec 2012

<sup>13</sup> Sustainability workshop presentation by LARESA representative, Dec 2012

<sup>14</sup> Interviews with eye care practitioners (ECPs) in Kolondoto, Kitete and Ngudu Hospitals

<sup>15</sup> Interview with ECP, Nkinga Mission Hospital

<sup>16</sup> Interviews with health management team (HMT) members at Kitete and Sengerema Hospitals

Furthermore, practitioners felt there was little public appetite to address eye health needs: “If the maternal mortality rate goes up, the politicians will come here and ask why. But if many patients become blind nobody will care”<sup>17</sup>.

While long experience working in this sector undoubtedly informed these detailed critiques, most actors also cited curriculum introduced during their training at KCMC, a mission-owned teaching hospital where many eye health leaders in the Lake Region were educated, as influential in shaping their opinions; these also aligned with many topics discussed separately with KCMC staff<sup>18</sup>, suggesting that this particular national organisation played an important opinion-leading role in systems-thinking and sustainability in the Lake Region.

### Eye care: ‘All under the NGOs’

Given the relative lack of engagement by government in eye care in Tanzania, key actors in the eye health system therefore characterised eye care as “all under the NGOs”<sup>19</sup>, and a particular sector in which “donor assistance will always be required”<sup>20</sup>. Throughout the study period, donors were an obvious resource, which cataract surgeons were consistently referred to when seeking funding for routine activities from hospital, district, regional, even national management teams. Donor support was also seen as the only way eye services could ever be provided to patients for free<sup>21</sup>. However, eye care actors also saw NGO funding as inherently precarious. For instance, in all annual reports written by CBM-funded eye departments to hospital management during the study period, surgeons highlighted the challenge of working when donor funds were “late and insufficient”<sup>22</sup> (see also indicators 3.4 and 3.5 in Appendix B). Like government, eye care actors knew that NGOs can sometimes say they “don't have money to give”<sup>23</sup> and wouldn't be in Tanzania forever.

### A sectoral divide?

Despite coherence in the above sustainability narratives shared by eye care actors inside and outside the Region, analysis of key population outcomes in the case study hospitals painted a mixed picture of programme performance across the government and mission sectors.

In terms of the total number of eye patients examined by teams in 2012 (Table 2), no clear association could be identified with the hospital sector that eye care teams worked in<sup>24</sup>.

On the other hand, the number of eye surgeries teams performed may have been associated with the sector, since both mission hospitals performed more surgeries than both government hospitals (969 and 985 versus 0 and 605, respectively, considering those conducted both at the facility and by outreach). The government hospital with external eye care donor funding also notably performed more surgeries than the government hospital with none.

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<sup>17</sup> Interview with ECP, Kitete Government Hospital

<sup>18</sup> Interview with representative of KCMC College AMOO training school

<sup>19</sup> Interview with NECP representative

<sup>20</sup> Interview with CBM representative

<sup>21</sup> Interviews with ECPs at Musoma and Kitete Hospitals.

<sup>22</sup> Sengerema Annual Report 2012

<sup>23</sup> Interview with ECP, Musoma Hospital

<sup>24</sup> The number of patient examinations was probably explained by several factors including the size of the catchment population and patient demand for eye and/or general health services at the hospital which have multiple determinants not specifically explored in this study. For example, while it might have been expected that the team at Kolondoto Mission District Hospital would examine the fewest patients since the hospital served the smallest catchment population, Sengerema Mission District Hospital's catchment was smaller than the two government regional hospitals but they examined the most. No pattern between the numbers of patients examined and the numbers who received operations across hospitals was identified.



Table 2. Key population health outcomes by case study hospitals and region in 2012

	<b>Kitete (gov't)</b>	<b>Musoma (gov't)</b>	<b>Sengerema (mission DDH)</b>	<b>Kolondoto (mission)</b>
Number of eye patients examined by team				
At base	2,599	5,020	7,180	1,720
Via outreach	0	4,682	12,502	161
Total	2,599	9,702	19,682	1,881
Number of cataract surgeries performed by team				
At base	0	605	498	955
Via outreach	0	0	471	30
Total	0	605	969	985
Number of cataract surgeries performed by other surgical teams in region				
Total	334	0	254	0
Regional CSR				
All teams	146	347	441	642

Note: gov't = government, CSR = cataract surgical rate, per million population. CSRs were calculated using 2012 population data found in Appendix A. For further detail on regional population outcomes, see indicators 1.1-1.6 in Appendix B.

Remaining sections of this paper seek to explore the dynamic factors which contributed to the delivery of eye care services (at base or on outreach), paying particular attention to the strategies teams undertook to improve or maintain their sustainability. Five main strategies are discussed.

### Sustainability strategy 1: Maintain 'sustainability funds'

Apart from revenue sources available through the government and donor structures, patient fees also offered a stream of revenue to hospital eye departments. Fees were, however, accounted for in more complex ways in eye care actors' considerations of system sustainability.

In the short term, eye care actors saw collection of user fees as the most practical way to overcome financial deficiencies in government structures and dependency on NGOs to achieve sustainability. When patient fees were collected and/or managed by eye care practitioners themselves, this type of income was "easy to get"<sup>25</sup>, it was reliable given the greater demand for services than supply could provide and, through short-term forecasting, practitioners could tell from patient numbers when they "need to pull up [their] stockings" and bring in more patients and therefore revenue through outreach<sup>26</sup>. Furthermore, this type of income could be used very flexibly. Access to this type of income normally translated into greater autonomy for eye teams as they didn't need to seek permission from actors outside the eye team such as hospital managers or donors for regular purchases or for those that required quick decisions. Income from user fees could also be used to purchase drugs outside the national medical store –something which couldn't easily be done with money coming through typical government sources dedicated to purchasing in federal systems<sup>27</sup>. When we presented our 36% estimate of the proportion of the eye department budget which came

<sup>25</sup> Interview with ECP at Kolondoto Hospital

<sup>26</sup> Interview with ECP at Kolondoto Hospital

<sup>27</sup> Interview with ECP at Musoma Hospital



from patient fees in one government hospital, the eye team was disappointed, seeing this as unsustainable. 70% was their ideal “so that [they] [would]n’t have to depend on government”<sup>28</sup>. Along with desire for predictable disbursement of funding from eye donors (indicator 3.4), proportion of income from patient fees (indicators 3.1 and 3.3) was therefore chosen by participants as a key indicator of sustainability, with 60% as the sustainability threshold target.

Income from patient fees was also commonly referred to using a meaningful colloquial name by eye care actors: the ‘sustainability fund’. It was a reserve fund that teams could build up slowly and protect, since, “every fund generated in the hospital, has to go to the common pool, right? Now from the common pool, now the management committee of the hospital decides oh we need this and we need this and then there is no money, there are no funds [left] for eyes”<sup>29</sup>. Additionally, with a small, departmentally-controlled fund, this could help eye teams demonstrate to others (e.g., hospital management, local government or donors) that they wanted to “progress” or build their unit’s sustainability, encouraging external actors to “pitch in”<sup>30</sup>.

In 2012, three out of the four eye departments we studied had ‘sustainability funds’. Kitete Hospital did not, and relied entirely on the hospital to provide income for consumables and any other purchases they needed (Figure 2). As all other teams received donor funding, it is possible that the verticality of donor accounting processes particularly enabled the initiation of separately-controlled eye accounts in these hospitals. In both Musoma and Sengerema, a portion of patient fees revenue was given to the hospital to enable central purchases, but the department eventually received the value back in-kind through some consumables and access to hospital infrastructure. Access to funds was more restricted in Musoma where the Regional Medical Office had to approve all withdrawals from the eye account, but a close working relationship with this office meant that most requests were easily granted. In the mission sector, teams had more financial independence; Sengerema staff rarely had to negotiate permission to use funds for outreach activities or professional development expenses such as attendance at zonal or international meetings.

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<sup>28</sup> Interview with ECP at Musoma Hospital

<sup>29</sup> Quote reflecting observed Lake Region behaviour from interview with representative of KCMC College AMOO training school

<sup>30</sup> Ibid

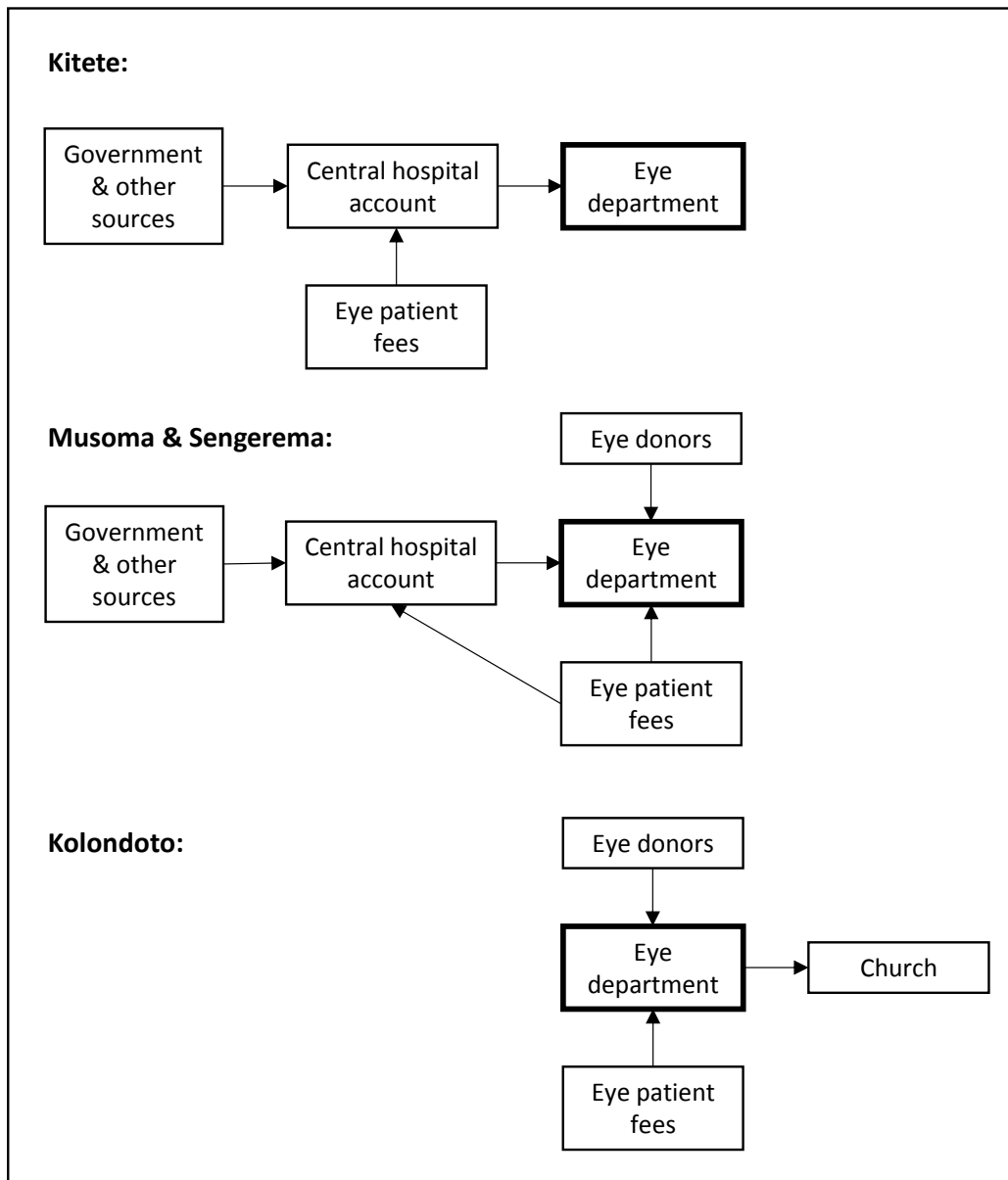


Figure 2. Schematic of revenue streams available to eye departments in case study hospitals in 2012

Kolondoto eye department's income was the most partitioned. While it was required to contribute some income to the church, it had recently opened a separate fee collection window from the hospital's and stopped contributing to the hospital's central budget. From the perspective of the eye care unit, this was a protective measure since the hospital was near bankruptcy and, with the precariousness of CBM funding, patient fees were increasingly their largest source of income. Managed independently from the rest of the hospital, this system ensured that all eye patients paid before receiving treatment and funds were available immediately to pay for consumables, salaries and other service delivery costs. Kolondoto was a rare example of a department within a hospital that had the financial capacity to pay its staff salaries every month.

Over the study period, the eye team in Kitete Hospital came to the conclusion that they needed to develop a sustainability fund, like in other successful eye hospitals they had observed in Tanzania. A 2013 visit by the eye team to Kolondoto Hospital to 'refresh' their surgical skills appeared particularly influential. In the Kitete team's words, although Kolondoto received less donor support now, larger amounts from CBM historically had helped them become "a well-established unit. They

were getting a good support before, then after they matured, they started to move themselves [...] now they are managing themselves from patient fees. It is working”<sup>31</sup>. The Kitete team judged that, as a government facility, they could not set-up their own fee collection window for the department. However, after this visit they became more systematic about ensuring patients had paid their fees, before administering treatment. This allowed them to independently track the eye unit income, collecting information on a ‘virtual’ sustainability fund, which they planned to use in future negotiations with hospital managers to demonstrate the (monetary) value of their service and therefore advocate for more hospital funds being spent in the eye department.

Therefore, although the circumstances differed in each case study, all eye departments advocated for the collection of user fees. In the absence of government financial support, ‘sustainability funds’, which arose from these fees both improved teams’ functional autonomy and represented a protection mechanism (a safety net) from bankruptcy in other parts of the hospital. The creation of this parallel financing system, where rules of collection, pooling and purchasing were solely determined by the eye care team in response to their specific needs (such as flexibility or autonomy), reflected the creativity of local actors to put into place new systems when the main system failed due to the neglect already described.

### Sustainability strategy 2: Avoid exemptions

At the same time as many eye departments were working towards increasing their income from patient fees, however, other investigations revealed practitioners’ fears about an over-reliance on patient fee collection. Eye service sustainability was at potential risk in the long term if this income was perceived by the population to be in contradiction with existing government poverty-reduction policies.

Although free health care was introduced to government facilities at Independence, severe budget deficits eventually led Tanzania to reinstate user fees in 1993 for all but a few categories of patients (pregnant women, children under five years of age, and those deemed unable to pay by Village Councils including poor older people aged 60 years and above) (MoHSW 1999). Given difficulties verifying age, carrying out economic means tests, and shifting political narratives about the contribution of older people to national development, over-60s were also granted universal exemptions for healthcare a decade later (MoLYDS 2003; MoLEYD and HelpAge 2010; Maluka 2013). This policy is particularly relevant to eye health services, since vision declines rapidly with age and users are mainly older people: globally, 82% of blind and 65% of visually-impaired people are over the age of 50 (WHO 2013). With no clear mechanism in place to account for these exemptions, however, eye care practitioners widely saw this policy as practically problematic, commonly posing the question: “We don’t see any compensation from the government [...] Who is going to pay for them?”<sup>32</sup> Rather, adoption of this policy was mainly seen as a populist issue, used to appeal to voters across the political spectrum in Tanzania using “sweet words”<sup>33</sup> but with few provisions for implementation:

In theory the government says that they will pay for those people but when we go to the higher management, the district team says that they have no budget for that, [...] so it is remaining an exemption forever [...] it is merely political, nowhere can you stand and say,

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<sup>31</sup> Interview with ECP from Kitete Hospital.

<sup>32</sup> Interview with ECP from Sengerema Hospital.

<sup>33</sup> Interview with ECP from Musoma Hospital.

you government, you say from this policy. The government is leaving us in an uncertain position.<sup>34</sup>

For some, this reality meant that the policy was not implementable and paradoxically, once more contributed to the overall government neglect of eye health at the policy level. As one practitioner put it, “ours [eye disease] is a condition which is not involved in free care”.<sup>35</sup> Others, however, justified skirting this policy using sectoral arguments. Whereas practitioners in the government sector, if discovered, were at risk of public shaming in the media, mission sector hospitals, even District-Designated ones, could claim parastatal status to explain their fee structure<sup>36</sup>. But moral justifications could be found for government hospitals, too, since systemic government deficiencies made it difficult to implement any policy affecting eye care, such as the minimum human resources and equipment needed to deliver eye services: “They [government] speak well but don’t put into practice [...] what they write in policies, for example ensuring government hospitals have drugs, equipment and even simple things. This is why you find that mission hospitals have more patients than government hospitals.”<sup>37</sup> (See also indicators 2.4 and 2.5 which demonstrate this insufficiency of resources in all case study hospitals.) In practice, however, when challenged by patients, practitioners tended to justify their behaviour by explaining the financial deficit in their hospital and, under these circumstances, claiming relative modesty in their own pricing structure: “Whereas in other places you would have to pay 100,000 plus eye drops, our rate is 40,000. If you pay 40,000 you will not be requested to pay for anything else.”<sup>38</sup> ‘Other places’ outside of the Lake Region which were known to charge fees to over-60s notably also included government teaching hospitals which Lake Region staff trained in<sup>39</sup>.

In our study, we found no evidence that exemptions were routinely made for elderly eye care patients in any hospital in the Lake Region. No exemptions were offered to eye patients at Kolandoto Mission, even for those with government health insurance since it took the hospital so long to be reimbursed<sup>40</sup>. In Kitete government hospital, surgical records indicated that while under-5s did not pay, over-60s did. Even in Musoma where exemptions were given to 15.8% of patients operated on in 2012, they were only granted to patients affected by ‘poverty’ (regardless of age), ‘difficult to reach’ patients targeted on World Sight Day, and those with insurance (whose eventual reimbursements by the scheme were never collected in a way that would reach the eye department)<sup>41</sup>. Furthermore, there appeared to be little collective appetite to address this complex problem transparently at LARESA meetings, despite recognition of its special importance to the eye care sector: a tentative proposal at one LARESA meeting to brainstorm solutions so that

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<sup>34</sup> Interview with ECP from Ngudu Hospital.

<sup>35</sup> Interview with ECP from Kitete Hospital.

<sup>36</sup> Interview with HMT member from Sengerema Hospital.

<sup>37</sup> Interview with ECP from Nkinga mission hospital.

<sup>38</sup> Interview with ECP from Musoma Hospital.

<sup>39</sup> Interview with ECP from Musoma Hospital.

<sup>40</sup> Confusion over the applicability of ‘exemptions’ for patients who contribute to health insurance therefore also appeared to be subject to sector-related rationalizations. When the NECP representative stated at the SAP workshop that national insurance covers “all facilities: district even mission”, many participants expressed surprise.

<sup>41</sup> Beginning in the last month of the study period, July 2013, many more patients over 60 years of age began receiving exemptions; this was at the request of the hospital’s medical officer, who had received a personal visit from the Minister of Health.

practitioners wouldn't have to "go against the law" was shelved for future discussion and has so far not been returned to<sup>42</sup>.

Ineffective implementation of exemption policies elsewhere in Tanzania has been explained by confusion about eligibility criteria as well as fear of jeopardising district funds' financial viability before (Maluka 2013). Patient fees were the main source of income in the Lake Region case study hospitals, which a universal exemption policy for the elderly would have put at substantial risk, threatening eye departments' organisational viability (SAP components 3 & 4). In fact, despite the prominence of NGO relationships determining service performance in the eye health sustainability narratives already discussed, income from patient fees exceeded that from donors in each study hospital (Table 3). Additionally, since eye donors accounted for government contributions (and therefore sector 'location') in estimations of their annual disbursements, when income from both sectors was combined, eye departments with any donor actually received approximately similar amounts (TZS 28-32 million)<sup>43</sup>. The major differences in income generated overall were instead associated with the amounts departments accrued through patient fees<sup>44</sup>.

*Table 3. Sources of income and patient fees charged across eye departments by end of 2012*

	<b>Kitete<sup>1</sup> (gov't)</b>	<b>Musoma<sup>2</sup> (gov't)</b>	<b>Sengerema (mission DDH)</b>	<b>Kolondoto<sup>3</sup> (mission)</b>
<b>Sources of income (TZS)</b>				
Government <sup>4</sup>	Unknown	17,180,000	7,900,000	0
Eye health donors	0	15,200,000	20,000,000	30,900,000
Patient fees	0	18,480,000	21,700,000	118,800,000
Total	Unknown	50,860,000	49,600,000	149,700,000
<b>Patient fees charged for surgery</b>	<b>50,000</b>	<b>40,000</b>	<b>130,000</b>	<b>150,000</b>

<sup>1</sup> In Kitete, financial contributions could not be estimated by the cataract surgeon who did not participate in financial planning for the eye department in 2012. Income generation from eye surgeries began in 2013, so the 2013 patient fee value has been reported; patients also paid around TZS 4,000 out of pocket on surgical consumables they were asked to provide privately. 2012 patient fees from the other hospitals had not increased from 2012 values by July 2013.

<sup>2</sup> Musoma hospital was the only one in the case study which sold spectacles (at TZS 20,000 per pair); this income has not been included in the analysis, for comparative purposes.

<sup>3</sup> In Kolondoto, disbursement of donor funding was severely delayed in 2012; in response, patient fees were increased from 80,000 to 150,000. In Sengerema, fees were also increased that year from 85,000 to 130,000 in response to rising hospital costs.

<sup>4</sup> An unknown, small proportion of income classified as 'government' comes from patient fees using general hospital services.

In turn, income from patient fees was very dependent on the sector eye teams operated in. There was large variation in the amounts patients were charged for cataract surgeries across the study hospitals (ranging from TZS 40,000 to TZS 150,000, Table 3). Most actors interviewed could not name the exact amount charged by other facilities but knew generally that fees tended to be higher in the mission sector than the government, where fees are capped by law. In fact, the precise amount that government facilities were mandated to charge for eye surgery was unknown by eye care actors, but, unlike practices used in response to exemptions policies, government hospitals were hesitant to avoid implementation and inflate fees. While surgical patient fees in mission

<sup>42</sup> This problem was posed at a LARESA meeting in December 2012. Minutes of subsequent meetings indicate no further consideration of this issue.

<sup>43</sup> In the three hospitals where financial data was available.

<sup>44</sup> Mainly for cataract and other small surgeries, rather than eye examinations.

facilities were around twice as high as those in the government sector at the beginning of 2012, by the end of the year they were three times as much, potentially highlighting the greater autonomy of eye units in the mission sector to respond to economic threats affecting the sustainability of their services.

Therefore, contrary to actors' outward impressions of sustainability in the Lake Region eye health system, eye departments in the mission sector appeared not to be financially better off because of their privileged access to donor financing (although this was a contribution), they were better off mainly because they had direct control (collection and management) of a revenue stream: patient fees, which contributed to a 'sustainability fund'.

### Sustainability strategy 3: Expand & contract services

Outreach activities are emphasised in cataract surgery training in Tanzania<sup>45</sup>. In the Lake Region, practitioners see outreach as a necessary means to improving population eye health outcomes (indicators 1.1-1.6) either by bringing surgical services closer to patients in remote areas (surgical outreach, via intermittent surgical camps or more regular rotations to local operating theatres) or by screening and referring patients to services at central locations (clinical outreach). Both types of outreach help sensitise communities to eye diseases and eye service availability, which generates demand for services, thereby promoting eye health system sustainability.

As with the volume of cataract surgeries across hospitals (**Error! Reference source not found.**), in 2012, there also appeared to be some sectoral differences in the range of services available in eye departments (Table 4). Examinations and surgeries were both routinely offered at base facilities and via outreach by mission hospitals. In the government hospitals, surgical outreach services in particular were more limited. Close observation of service expansion behaviour in all hospitals, however, revealed two trends. By the end of the study period, the government hospitals had taken promising steps to expand the types of services they offered, whereas services had recently contracted in one mission hospital. We chart the evolution of service delivery changes in each case study eye department (Figure 3) to understand factors and strategies that may explain these trends.

Table 4. Changes in availability of services in case study eye departments, 2012-2013

Activities performed	Kitete <sup>1</sup> (gov't)		Musoma <sup>2</sup> (gov't)		Sengerema (mission DDH)		Kolondoto <sup>3</sup> (mission)	
	2012	2013	2012	2013	2012	2013	2012	2013
Examinations at facility	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Surgery at facility	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Examinations via outreach	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Surgery via outreach	No	Yes	No	Yes	Yes	Yes	Yes	Yes

Note: Yes = service was available, No = service was not available.

The experiences of three hospitals indicated that short-term availability of donor funds to respond to changing eye department wishes for service expansion was unpredictable. Donors had made particular commitments which could only sometimes be adjusted or re-committed to other hospitals within the local eye health system as circumstances changed. During this period and in this particular setting, Fred Hollows Foundation and KCCO (in Kitete and Musoma respectively), were notably more flexible in their dealings with hospitals than CBM (in Kolondoto and Kitete). Donors only sometimes sought to directly influence local government commitments to eye care, as illustrated by the interactions Kolondoto and Kitete had with district authorities and AMREF. Donor behaviour

<sup>45</sup> Interview with representative of KCMC College AMOO training school.

therefore directly and indirectly influenced surgical teams' decisions to expand or contract services and affected sustainability in this system.

In contrast, individual eye departments uniformly demonstrated flexibility and personal resourcefulness in response to changes in funding structures, even in long-running programmes. For example, Sengerema Hospital had developed strategies to extract commitments for outreach funding from several local authorities in their region and income from both donors and patients contributed to their ability to change their activities quickly when even small amounts of government funding became available. In fact, in all departments, having control of some of their own resources enhanced eye teams' ability to take advantage of commitments from external actors. The willingness of the Kitete team to use personal income to pay the transportation costs for donated equipment, even before they had initiated their virtual 'sustainability fund', demonstrated an understanding that personal initiatives, in particular, were necessary to run an eye unit in this kind of health system structure.

When Kolondoto's eye department experienced the 'shock' of the late dispersal from CBM, their main response to avoid interruption of services was to contract outreach services (since these cost more and raise less income per patient) and increase user fees at their base, taking advantage of the relatively greater implementation freedom that hospital structures in the mission sector allowed. The only 'external' actor they sought assistance from was the AIC hospital board (a mission organisation based in Mwanza, which oversees several AIC hospitals) to resolve the financial delay. They were the only team that did not proactively seek financial contributions for outreach expansion from local government, either directly or through their RECC as intermediary.



**Sengerema (mission DDH):** The only hospital in the region to have previously been staffed by two cataract surgeons, the current Sengerema eye department (staffed by one) inherited a very busy outreach schedule which they largely maintained during the study period. The weekly outreach schedule was made annually and was diverse, including visits to a school for albino and blind students, a prison, a leprosy camp settlement, and most hospitals in Mwanza and surrounding regions. More surgeries were performed outside than inside Sengerema Hospital, either by travelling with operating equipment to use in district hospitals' theatres or by using additional equipment centrally stored at a larger regional referral hospital lacking surgical eye health staff. Patient fees charged at these clinical and surgical outreach visits were very flexible: while CBM support was used to cover fuel, travel costs and a portion of the supplies, the team was sometimes able to offer services for free, such as at the prison, when the Regional Medical Office agreed to help finance the activities, or at a subsidised rate in particular hospitals if the District Medical Office showed willingness to contribute some support such as team per diems. Changes to the schedule were also sometimes made to respond to and incentivise such local government contributions. The main factor constraining expansion appeared to be the lack of staff able to run both outreach and services at the central facility.

**Kolondoto (mission):** In previous years, the Kolondoto team had performed clinical and surgical outreach on a large scale with CBM support, but a reduction in donor funding combined with severe delays in the 2012 disbursement threatened the viability of their programme. The team therefore felt compelled to reduce their outreach activities to concentrate on raising income through patient fees at the hospital. As one practitioner stated, "if the CBM portion reduces, we simply reduce our (outreach) activities", since cash outlays are always needed in advance of these activities for fuel and per diems, in addition to the consumables normally stocked for Kolondoto-based surgeries. Only very limited clinical and surgical outreach activities were maintained that year (**Error! eference source not found.**) to honour long-standing agreements with two mission facilities which had received foreign donor funding for this purpose. The team could not, however, perform surgical outreach when requested to replace surgeons unable to travel from another NGO, AMREF, as AMREF would not transfer funds for consumables and disagreed with Kolondoto charging patient fees to recoup this expense. The team instead organised a clinical outreach and referred eligible patients to Kolondoto for surgery. Limited outreach activities continued at the same mission facilities in 2013.

**Musoma (government):** Since 2005, the eye team at Musoma Hospital had led outreach activities with external funding within one of the only official district-level 'VISION 2020' programmes in the country. By 2007, the number of surgeries performed annually began to plateau, at around 600<sup>46</sup>. Although substantial numbers of patients were examined, all outreach to district facilities was clinical. Surgical outreach in the Region had only previously been performed several years earlier, by a visiting surgeon from Sengerema. In 2012, the team were reluctant to perform surgery during their own outreaches for fear of further damaging their operating microscope which had not been serviced since the donation was originally made and was in need of repair. It wasn't until after a 2012 LARESA meeting, when members discussed the importance of doing outreach in "hard to reach areas", that the team re-considered performing surgeries during outreach, and requested supplemental funding to do so from KCCO, who also agreed to fund the microscope repair.

**Kitete (government):** In 2012, Kitete Hospital received a recently graduated cataract surgeon. Staffed until then by a retired surgeon, no surgeries had been conducted there in the last four years due to that surgeon's own deteriorating vision. The new surgeon had received his training in robust teaching hospital outreach programmes and so was disappointed on arrival when he found the hospital's operating equipment rusted and in disrepair. No one had investigated the equipment provisions before his arrival and so a frustrating twelve-month period of conversations with KCMC, the national eye care programme and other donors ensued before a solution was found: KCMC identified a donor for the equipment (Fred Hollows Foundation) who had already allocated funding for equipment in undetermined government hospitals and the cataract surgeon himself would pay for the equipment transportation costs, to be reimbursed later by the hospital. Sufficient consumables for 100 patients were also provided to seed the eye department's 'sustainability fund' which could then be used to order more. Although the retired surgeon advised him to prioritise setting up a good service at the hospital before starting to do outreach, the new surgeon saw outreach as an activity that could attract co-funding for donations of consumables, transportation costs, even potentially equipment. Over this period he contacted eight types of actor about outreach or equipment, including several district-level eye care coordinators and medical offices. CBM was unwilling to reallocate funds dedicated to another mission facility in the region which could not use them, but the surgeon was able to capitalise on provisions made in another local government-donor agreement that couldn't proceed as planned. When AMREF could not operate in one area of the region, the district medical office asked the new cataract surgeon to step-in, with additional financial support from themselves, thereby adding limited outreach activities to Kitete Hospital's portfolio of eye care services.

Figure 3. Summary of the evolution of cataract surgery services in each case study hospital

<sup>46</sup> Presentation by Mara RECC at SAP workshop, Dec 2012.

#### Sustainability strategy 4: Access peer support

As a form of social capital, social networks are a resource which local eye actors may draw on to solve problems or improve their services. In social sciences, social network analysis (SNA) has proven to be helpful in understanding the nature of relations between actors within a system and how these relationships influence the structure of a system (Webb and Bodin 2008). In organisational studies, scholars have shown that social networks determine the level of cooperation between individuals: in other words, individuals tend to collaborate more easily with their direct neighbours (Nowak 2006). SNA researchers have also shown that, while individuals may be connected with a limited number of people, all people in the world are indirectly connected by a number of ties that on average does not exceed “six degrees” (Watts and Strogatz 1998). SNA showed that social connections represent a social capital that provides, for example, the power to find jobs (McGuire 2000) or finalise business contracts (Uzzi and Gillespie 2002).

A good illustration of the potential of this type of social capital in the Lake Region eye health system is the Kitete eye department case study. There, the number and range of external actor types which the eye care team contacted to help service expansion was striking. They needed not only funding for consumables, outreach fuel and per diems, but also expensive pieces of equipment. Costing upwards of tens of thousands of dollars, when cataract surgeons approach government authorities for this essential equipment, authorities were said typically to “turn the other side [saying] no, no, it’s impossible”<sup>47</sup>; only one example could be found of any piece of eye care equipment in the Lake Region being bought by the government<sup>48</sup>. International donors were normally the only actors mobilised to provide equipment, as in the case of Kitete.

Beyond direct enquiries for resources, however, the Kitete team was also notable for the number of peers they consulted for advice on expanding their service. Over the course of the study, they contacted seven surgeons at six other hospitals. The peer coaching offered at Kolondoto before the team received equipment has previously been mentioned. Peer advice was also important for the team to overcome their frustrations and start operating when, even after equipment was procured, only a single cataract surgical set was available to them, contrary to best practice<sup>49</sup>. Eye staff at Sengerema impressed on them the need to start operating using whatever resources were available to him, reportedly saying, “you can’t experience more without starting, just go and start. Start slowly with difficulty and later on things will start to change”. Likewise, in Musoma, successful peer models of outreach in remote areas influenced that team to re-conceptualise the limitations of their equipment and start performing surgeries away from their base.

Further understanding of the influence and advantage of maintaining social networks is possible by examining the structure of social network diagrams.

As illustrated in Figure 4, each case study eye department communicated about their work with other actors inside and outside their hospital. Topics covered included: surgery at the facility; diabetes screening at the facility; outreach (clinical, surgical and optometry); patient referrals; consumables (drugs, supplies, spectacles); equipment; eye programme financing; human resources recruitment; human resources training; reporting; supervision; advocacy; LARES business; and this sustainability study. Outreach was the topic most frequently discussed with actors outside of hospitals including all levels of government, LARESA, non-governmental and community organisations.

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<sup>47</sup> Interview with representative of KCMC College AMOO training school.

<sup>48</sup> Interview with LARESA chairperson.

<sup>49</sup> Having only a single set slows teams down, dramatically limiting their efficiency, since time is needed between patients to sterilize the instruments.

Comparison of each eye team's interactions with specific actor types during the four month period studied in detail are outlined below:

Government: All eye teams interacted with each level of government, but in Kolondoto, the only fully mission-owned hospital, government communications were less frequent and with a smaller number of actors. Communication with Regional Medical Offices (RMOs) was typically intense, addressing 4-7 eye care topics in the study period (Appendix C); the Kolondoto eye team had indirect contact with this office through the Regional Eye Care Coordinator (RECC).

International NGOs: All eye teams were in contact with at least one international eye care NGO or programme. Sengerema's international network was most diversified with connections to four NGOs; Kitete's three-NGO network reflected recent efforts to expand its services.

Within hospitals & missions: Within hospitals, medical directors were the key actor with whom eye teams discussed their work, as was the Catholic Diocese Health Secretary in Sengerema; the AIC Health Secretary in Kolondoto was comparatively less involved in eye services decision-making and problem-solving. Hospital boards tended not to discuss eye care, apart from in Kolondoto where CBM requested a financial audit.

Other hospitals: All teams communicated with other hospitals inside and outside their region. The training institution, KCMC, based outside the Lake Region, was a resource for three of the four case study hospitals during this period. Informal peer mentoring for new cataract surgeons was also notable for initiating contact between some facilities. Apart from the national coordinator, departmental activities were discussed with no other ophthalmologist in the country; no teams were connected to the hospital where the Region's only ophthalmologist was based.

LARESA: All but Kolondoto were in contact with the chairperson of the regional eye care practitioners' network, while contact with national practitioners' networks (ophthalmic or optometry associations) was rare.

Commercial organisations: Mission hospitals were more likely to communicate with private pharmacies.

Communities: Only Sengerema Hospital regularly communicated with community organisations, during outreach. None involved these organisations in eye programme planning (see also indicators 2.1, 5.1 and 5.2).

Overall, compared to the three other case study hospitals, Sengerema eye team discussed eye care with the widest range of actor types and their network involved the most sectors, including media, education, business, donor and local government. This team had ties to the greatest number of actors within the system (29 out of 70 possible) followed by Kolondoto and Kitete (16 each) and Musoma (12). In addition, Sengerema had the highest intensity relationships with these actors, in terms of the numbers of eye care topics discussed (Figure 5). Eight actors were strongly connected with Sengerema eye health team compared to three in Kolondoto and two in Kitete and Musoma. This type of communication was likely necessary for and mutually reinforcing of the high level of outreach activities performed by the Sengerema team. Musoma was the only eye department not connected to other case study hospitals<sup>50</sup>.

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<sup>50</sup> Staff from Musoma, Kolondoto and Sengerema all participated in a regional outreach to Ukwere during the study period, but reportedly did not discuss anything related to their programmes with staff from those hospitals.

While national and regional actors (e.g., CBM, the NECP, LARESA, KCMC) were normally connected to several or all of the case study eye departments, they did not always communicate with each other about activities specifically related to the Lake Region. Communications with national and regional actors were also typically of low intensity, discussing only one topic each during this period. Of these central coordinating actors, the LARESA chairperson was connected to the highest amount of other actors in the system (13).

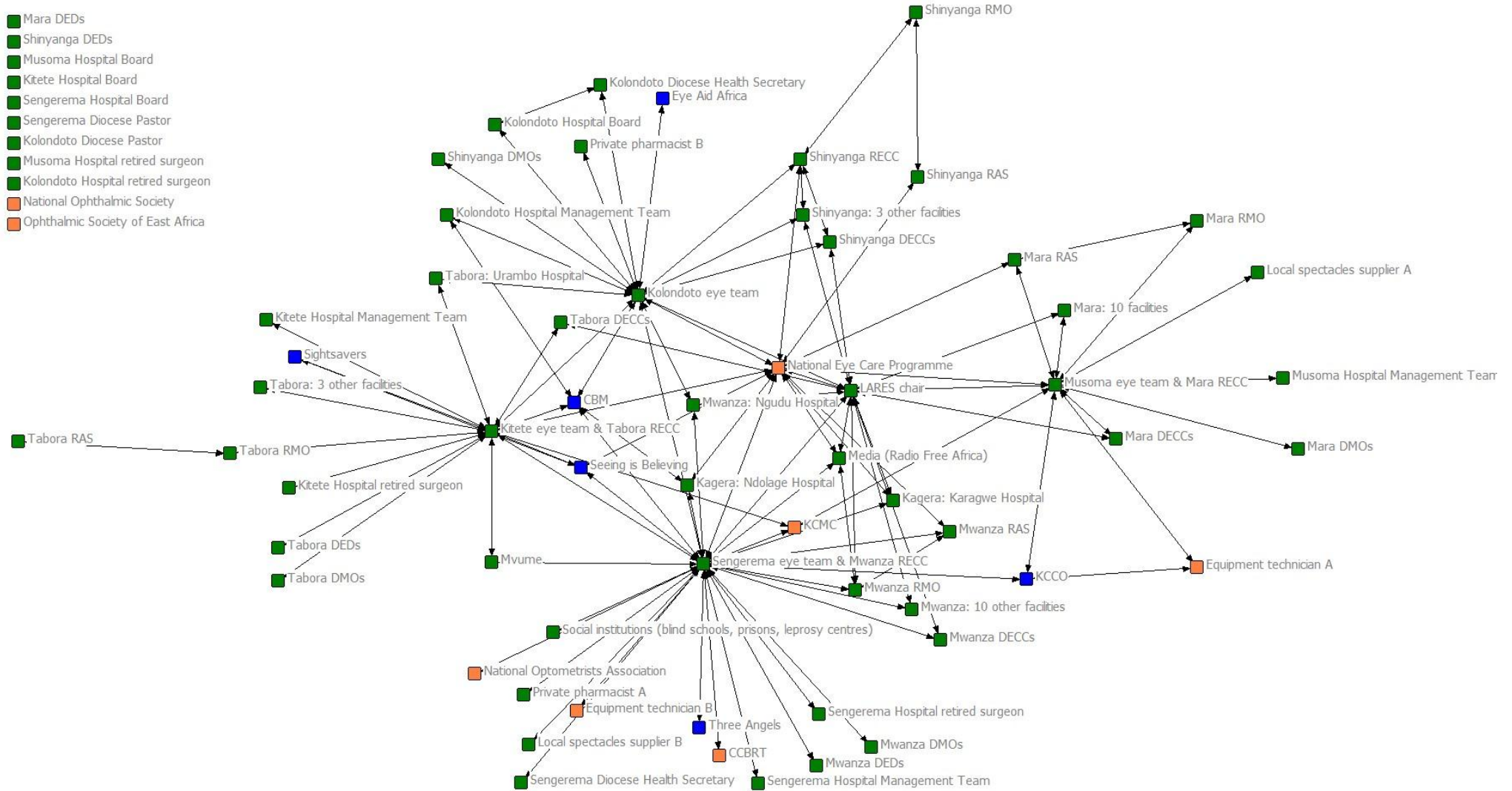


Figure 4. Social network of eye departments in four case study hospitals, Dec 2012 to Apr 2013

Legend: Green boxes signify eye care actors within the Lake Region, orange are domestic actors outside the Lake Region and blue are international actors. Arrows between boxes ('ties') link actors if they discussed activities in the case study eye departments between mid-December 2012 and mid-April 2013. Potential eye care actors who did not communicate about these departments have no links to the network and are listed in the top left corner. Eye care communications that did not concern case study eye departments were not systematically investigated. Some within-hospital communications are not shown. Communications with Hospital Boards exclude the Hospital Medical Director, who is a member.



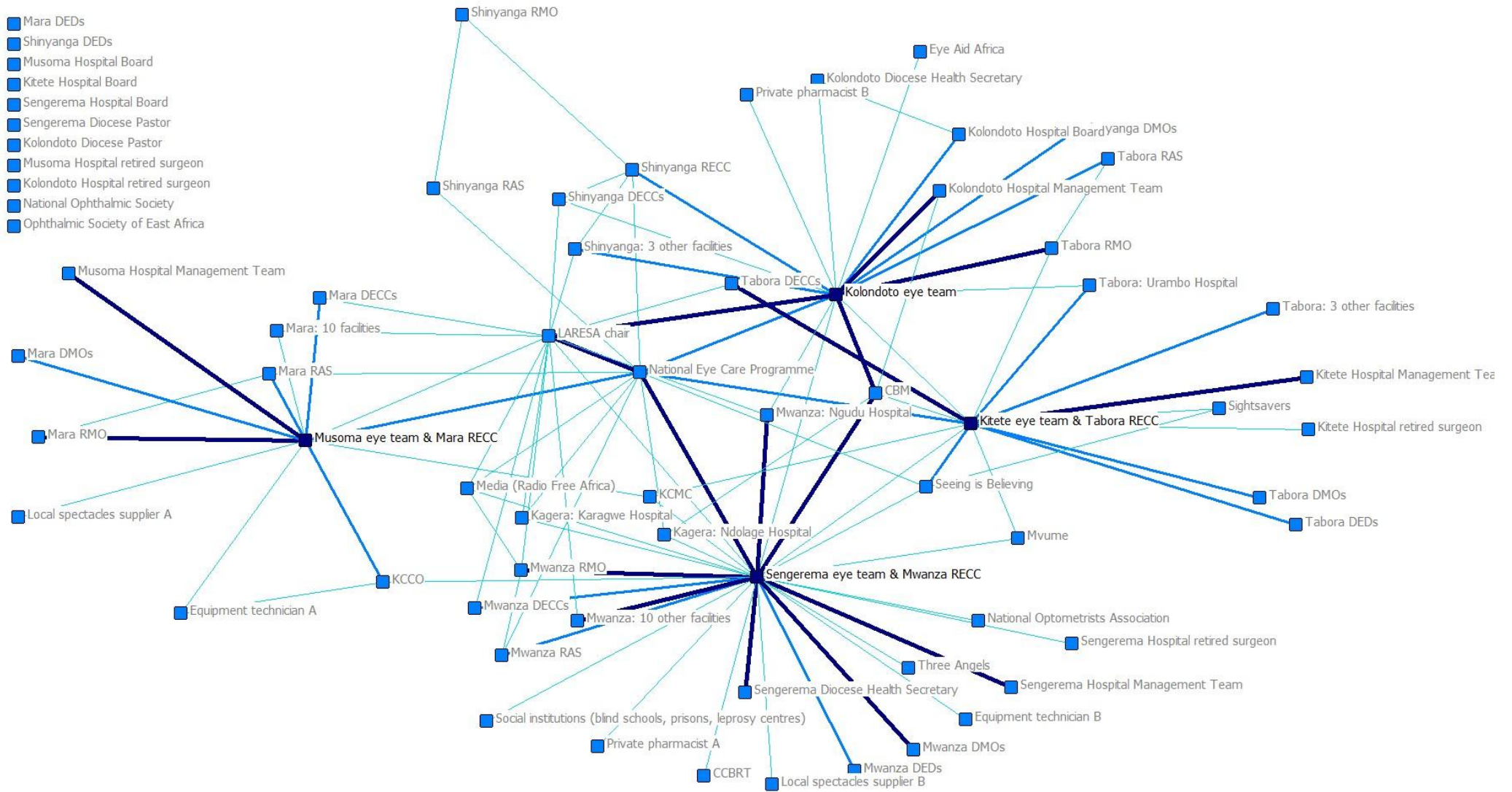


Figure 5. Intensity of eye care communications in case study eye department social networks, Dec 2012 to Apr 2013

Legend: Boxes signify eye care actors within the Lake Region; lines between boxes ('ties') link actors if they discussed activities in the case study eye departments. Line thickness corresponds to the number of different types of eye care activities discussed between actors between mid-December 2012 and mid-April 2013. 1 topic: thin, light blue lines; 2-3 topics: medium thickness, mid-blue lines; 4-7: thick, dark blue lines. Potential eye care actors who did not communicate about these departments have no links to the network and are listed in the top left corner.

## LARESA: A network of individuals to 'shout louder'

Eye care human resources in the Lake Region in 2012 were insufficient in number (indicator 2.4, Appendix B), but they were even scarcer in the 1990s. Then, there were only two cataract surgeons to serve the region, both supported by CBM. These surgeons were sometimes joined by ophthalmologists on outreach from the national teaching hospitals, but they felt largely isolated<sup>51</sup>. Although they covered large distances, no one seemed to “know” about cataract surgery services – not communities, not authorities, not hospitals, nor most other health workers. Eventually, through discussions with non-surgical eye care staff they met during their extensive outreach work, these surgeons realised that everyone, regardless of the sector they worked in, felt isolated, that “every individual was just working independently” and decided to create a network to bring everyone together. They reasoned, “if we can organise ourselves, we can shout louder” about the deprivation eye health suffered in their region. The primary objective was then to speak with one unified voice in order to attract more resources for eye care. Further, if global and national VISION 2020 strategic plan goals were ever to be achieved in their area, Lake Region actors such as themselves would first need “to collect all the problems, analyse them and present them [...] for help or attention”<sup>52</sup>. Such was their feeling of isolation and neglect.

Their primary targets at this time were the MoHSW and CBM. These bodies, however, refused to work with such an organisation, whose informal structure had little precedent in the country. From CBM’s perspective, they were “not government, not mission, not a professional organisation, not an NGO”, so for accounting purposes it would be more efficient to work through existing agreements with members’ mission hospitals<sup>53</sup>. From the Ministry’s, LARESA didn’t fit into the national programme’s existing governance structure and members were accused of trying to separate Lake Region planning from federal processes to compete for donor attention<sup>54</sup>. Its members demoralised, LARESA was disbanded for twelve years until a convergence of factors prompted its re-establishment in 2008<sup>55</sup>. In 2013, members passed LARESA’s constitution and the association is currently undergoing a process of formal registration as a non-profit organisation<sup>56</sup>. It now works with the national control programme and donors to organise surgical camps in remote areas on World Sight Day and to collect information on equipment needs to advocate for the fair distribution of these resources across facilities<sup>57</sup>. Through less formal means, LARESA also seeks to counter professional isolation by offering the experience of its members during meetings as a technical resource to other members who need help solving problems in their day-to-day work.

Stemming from the above philosophy and origins, LARESA’s social network structure was observed to be non-hierarchical and centralised (Figure 6). The chairperson often said during meetings, “whether you are from public or mission sector, we should all come together to work for the poor people of this region. If you are an eye health provider, you are automatically a member.”<sup>58</sup> Envisioned primarily as a network of individual disenfranchised eye care practitioners rather than

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<sup>51</sup> Presentation on LARESA at SAP workshop, Dec 2012.

<sup>52</sup> Ibid.

<sup>53</sup> Interview with CBM representative.

<sup>54</sup> Interview with LARESA chairperson.

<sup>55</sup> These included the retirement of one of the two founding cataract surgeons who advised younger surgeons to try to revive the organization, the cessation of national meetings which collected input from RECCs and the establishment by CCBRT, a national teaching hospital, of a semi-annual zonal pediatric outreach programme in Mwanza which provided local professional education opportunities.

<sup>56</sup> Interview with LARESA chairperson.

<sup>57</sup> LARES five year strategic plan 2012-2017.

<sup>58</sup> Observation of LARESA meeting, Dec 2012.



institutions, communications about LARESA business were addressed to named individuals rather than eye care departments. Communications were also managed individually by the chairperson who personally contacted all sixty members before each quarterly meeting himself. Although our observations suggest that practitioners from the four case study hospitals communicated with other hospitals inside and outside their region as opportunity arose, LARESA members<sup>59</sup> rarely communicated outside of meeting days to discuss LARESA business. Furthermore, government-recognised RECCs played no official or informal role in the LARESA structure. With a few notable exceptions, most information flowed outwards, *provided to* rather than *collected from* members, which limits analysis of the system as a whole.

As the objectives of LARESA progress towards greater support to individual members through peer support mechanisms, the structure of this network is likely to become less centralised. LARESA is also, for the moment, exclusively a network of eye care providers which includes no other actors outside this practitioner community. It will be interesting to follow how LARESA's network structure and the nature of actors included evolves over time.

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<sup>59</sup> Even those who served on sub-committees.

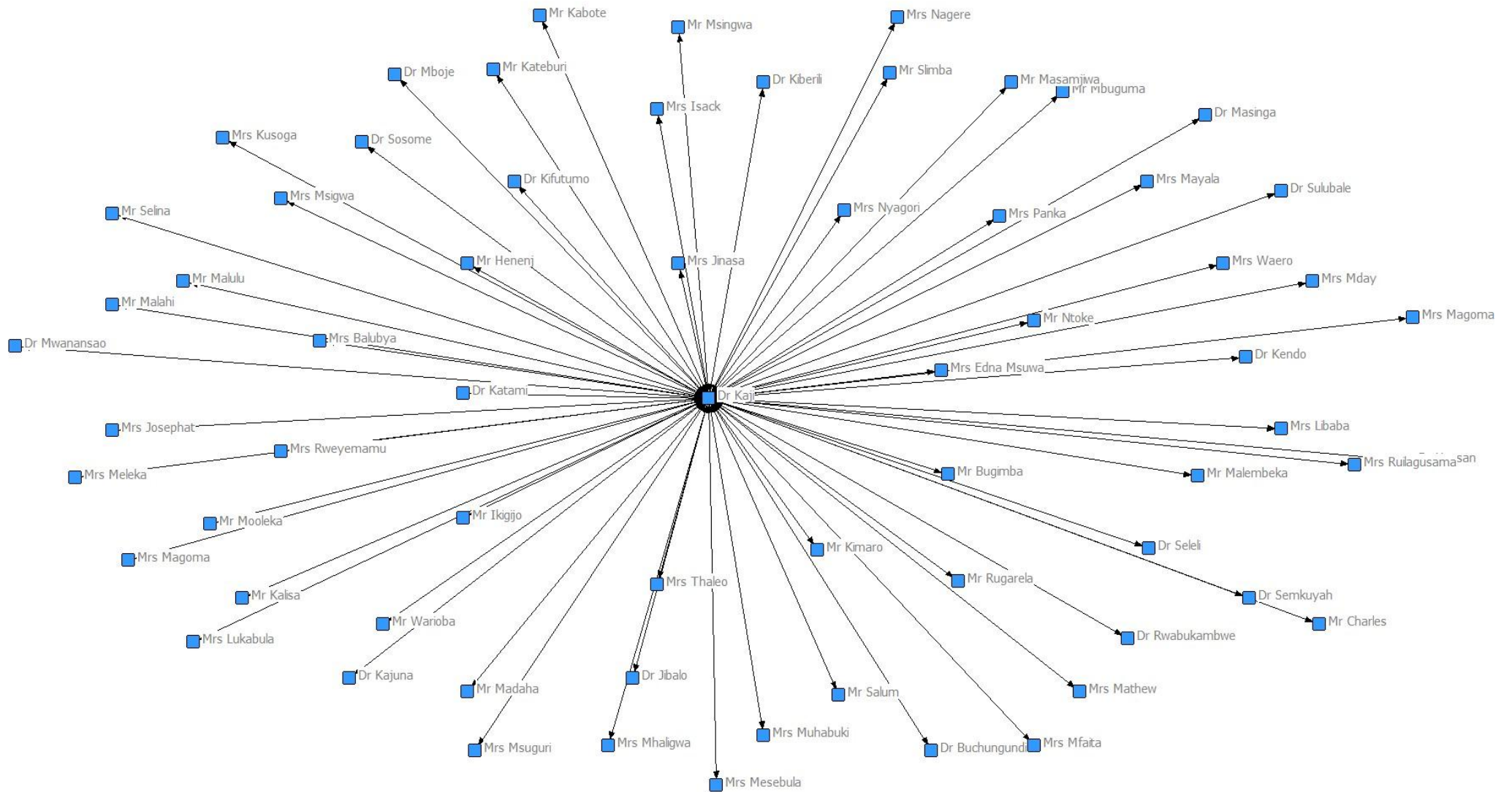


Figure 6. LARESA founder's perception of the LARESA social network

Legend: Blue boxes signify individual LARESA members. Lines between boxes link actors if they discussed LARESA-related business in 2012; arrows show the direction of communication.

## A burgeoning sustainability strategy: Collect and share eye data for advocacy & management

During the Sustainability workshop, eye care actors recognised the advocacy potential of translating their vision of the future into measurable sustainability indicators in order to demonstrate to their colleagues and superiors “what an eye department should look like”<sup>60</sup>. Accordingly, eye care services could only expand and become more sustainable if managerial norms were enlarged to include robust eye care services in the standard vision of a well-functioning hospital. Recently-graduated practitioners, especially, felt a duty to model best practices developed in teaching hospitals to senior managers who might never have been exposed to them. Standard equipment and human resources lists published by the NECP were one tool that practitioners could and did use during advocacy discussions during the study period. Indicators selected by LARESA members to reflect eye care norms not captured on these lists were another.

Promisingly, many of these sustainability indicators (and/or the concepts underpinning them) appear to have enhanced standard internal reporting practice in the two government hospitals in 2013. Measurements from several indicators were incorporated into the Musoma team’s quarterly reports to the hospital and, as already described, the Kitete team adopted new approaches to patient income accounting for use in internal hospital advocacy on eye department resourcing.

Observation of the overall availability of sustainability measurements (Appendix B and Figure 7 for an example from Musoma eye department), however, illustrates some deficiencies in information sharing in the Lake Region eye health system, which, if addressed, could improve information analysis and advocacy at all levels.

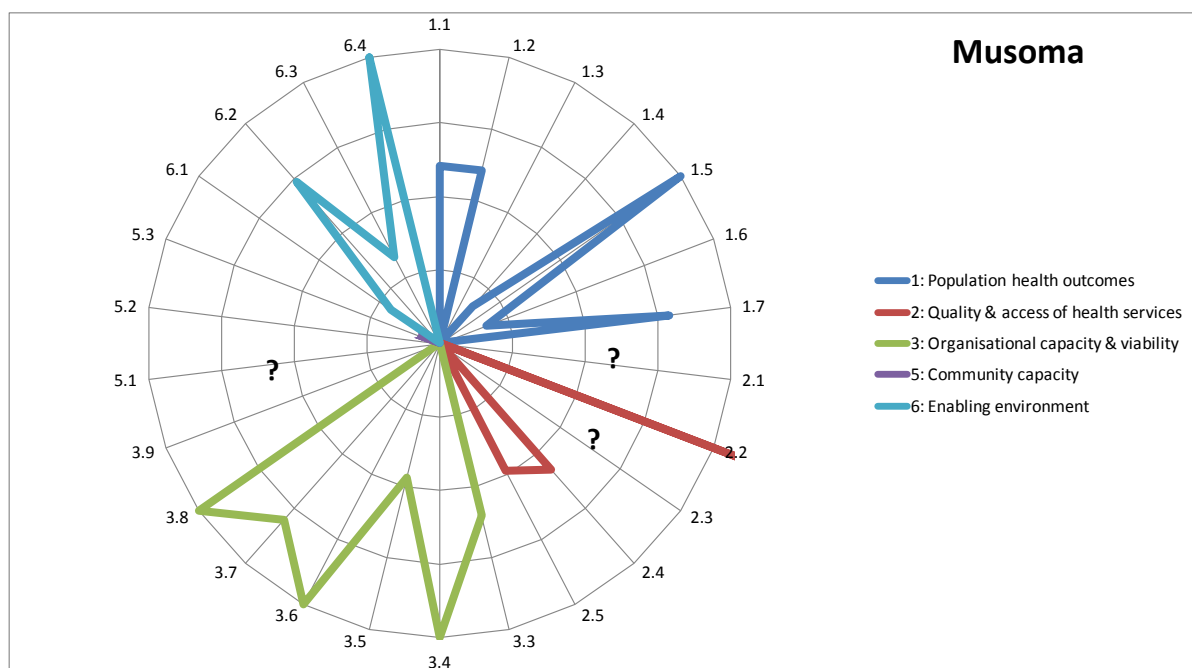


Figure 7. Sustainability of Musoma Government Hospital eye programme, Mara Region, according to LARESA sustainability targets in 2012

Note: Each radian of the circle represents a sustainability indicator. Indicator measurements are plotted along the radians with the outer ring representing achievement of 100% of the sustainability target and the centre representing 0%. See Appendix B for definitions of indicators numbered above. ?: Data could not be collected.

<sup>60</sup> Interview with ECP at Kitete Hospital, Dec 2012.

Facility-level data has limited usefulness to describe the performance and resource needs of a region. Before the SAP workshop, donor and internal hospital data reporting systems were institutionalised in Musoma, Kolondoto and Sengerema eye departments; these contributed data to some key population-level indicators (component 1) which required data from a single source. Internal reporting practices were not regular during the study period in Kitete where there appeared to be little informational accountability at either hospital or regional level. In reports to the national level (to the NECP), however, RECCs collected little information from the district level. Neither type of report was shared with LARESA and there were no mechanisms to make data assembled at higher levels publicly available. There was therefore little regular data flow between facilities. This not only made locating information for sustainability indicators that required input from more than one facility (e.g., indicators 1.4, 1.6) very difficult, it also potentially limited the information eye care actors could use in their arguments about eye care norms and standards.

In other instances when indicator measurements could not be made, this was because information required was not routinely recorded (such as on patient satisfaction, indicators 2.1 and 2.3) and/or standard practices varied by hospital and from the way the indicator was defined (such as on diabetic retinopathy screening and post-operative clinical outcomes, indicators 1.7 and 2.2). This made collection and analysis of data on the quality and access of eye care services (component 2) difficult. The lack of participation of patients, disabled peoples' organisations and communities in eye health system planning was also particularly marked (component 5). If LARESA members or other eye health system actors believe these indicators reflect practices that should be undertaken or harmonised to improve sustainability in the system, new initiatives may be required at several levels.

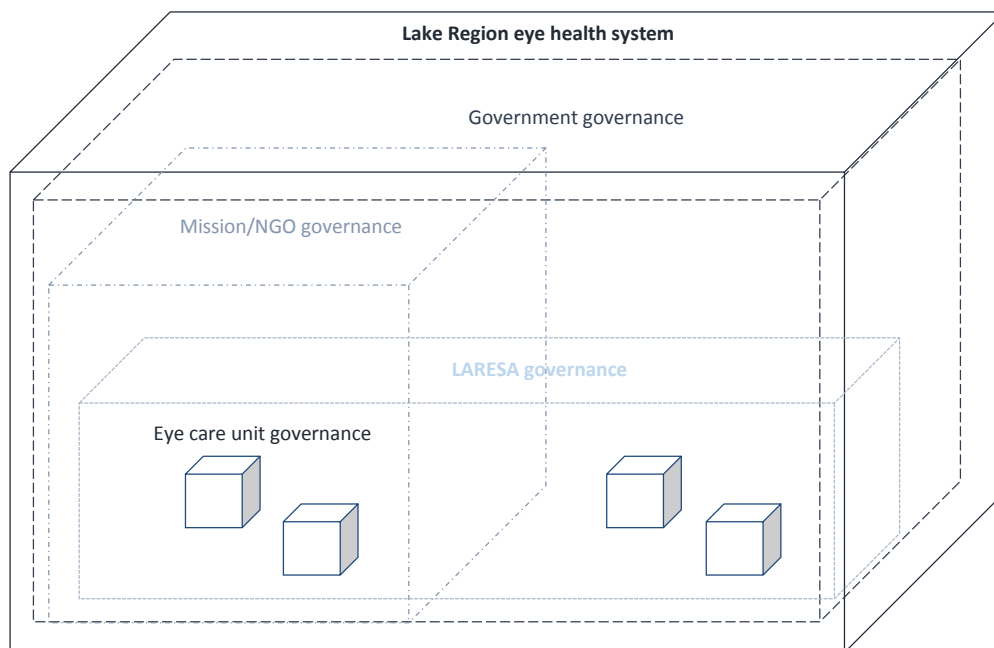
## 4. Discussion

### Neglect as opportunity: spaces for decision-making in a decentralised system

Eye care, like other specialist hospital services in Tanzania, developed unevenly as a result of the wider health system structural changes during the 20<sup>th</sup> Century. Today, in the north-west Lake Region, the most complex eye care activities are planned and performed by cataract surgeons who are disproportionately employed in mission-owned facilities. By the time of our study, strong narratives about eye health had developed among practitioners who described eye care as 'all under the NGOs' because of the systemic neglect that eye care suffered by all levels of government. While eye health may have been 'political' during Nyerere's literacy campaigns after Independence, by 2012, eye care practitioners had become distrustful of government to engage meaningfully in eye health development. This feeling of neglect became more acute as practitioners discussed the precariousness of support from international donors and missions. These narratives appeared to be, at least partially, influenced by norms introduced during the training that many Lake Region practitioners underwent at mission-owned teaching facilities such as KCMC. Against this narrative backdrop, we explored how eye teams worked towards sustainability in this context of neglect, within a decentralised health system.

As in many other low-income settings (Blanchet, Gilbert et al. 2014), eye care provision in the Lake Region was not restricted to the formal, government health system. Eye care was also provided through mission facilities (themselves variable according to church and diocese structures, despite the existence of inter-faith coordinating structures), as well as through private practices. Regardless of their sector of employment, eye care practitioners could additionally belong to the informal peer

network, LARESA, and they could draw on personal or official relationships within their individual social networks. Within this pluralistic health system, several systems of governance with their own characteristics had also emerged, reflecting the complexity of modern society and the dynamic interplay between government, civil society and market (Kooiman 1993) (Figure 8). Following Kooiman’s sociological approach to governance (Kooiman 2003; Kooiman 2010), government systems are typically hierarchical, whereby rules are made at the highest levels and passed down for health workers to follow. Co-governance may emerge when hierarchical systems fail, whereby organized forms of interactions are utilised for governing purposes in the absence of a central hierarchy, such as those maintained by missions in Tanzania. Self-governance is a governance mode created by health system actors themselves to respond to their primary objectives and needs, which, in our case, characterised the informal self-governance rules created by each eye care unit and the LARESA network.



*Figure 8. Schematic of governance systems influencing the sustainability practices of eye care units in the Lake Region*

Note: Private for-profit eye care practices which are influenced by government and LARESA governance were not studied and are absent from this schematic.

With these overlapping modes of governance co-existing in the same health system, the differences we observed between our four case study eye departments could not be completely explained by their position in a particular mission or government sector. In fact, we observed that teams in several hospitals found similar strategies to manage their programmes even when their management structures or governance systems differed and were unique. As has been found elsewhere (Bossert 1998; Bossert and Beauvais 2002) this suggested to us that within this weak, decentralised government structure, the multiplicity of rules which became available to govern service delivery meant that eye care practitioners in the Lake Region had substantial ‘decision space’ within which to operate. The challenge for eye care actors was to selectively draw from all governance systems so that they benefitted eye care programmes without jeopardizing their activities. Five strategies, in particular, pointed to systemic trends operating in this decision space which should be accounted for when considering how best to advance eye health sustainability in the Lake Region.

## New rules to survive

Two sustainability strategies related to eye programme financing: (i) maintenance of 'sustainability funds' and (ii) avoidance of user fee exemptions. Sustainability funds, or bank accounts which contained income from donors and patient user fees, were kept by three of the four eye departments to maintain financial autonomy from their host hospitals. Mission-based departments tended to have greater power over spending decisions and, having observed a funding model which relied on such a fund in the mission sector, by the end of the study period the fourth department in the government sector had taken steps to begin their own independent fund. Contributions to this fund from patient income were seen as essential to guarantee financial flexibility because they were reliably and immediately available through delivery of standard services; in all models they also contributed greater overall amounts than either donor or government sources. All teams therefore sought to maximise income from this source, by raising fees, by avoiding granting exemptions or both. Teams operating from the mission sector, especially, had greater freedom to avoid government policies that could have limited this strategy, but all teams appeared to feel justified in doing so.

These values and practices concerning eye care financing, in effect, reflected an independent system of governance that likely emerged in both sectors because of the space of overall neglect which eye care practitioners in the Lake Region operate in. With little apparent government, mission or public interest in the eye health service needs of elderly patients, eye care practitioners have neither the support to implement government policies sustainably, nor do they face opposition in decisions to skirt them. Eye care practitioners are not alone in selectively implementing exemptions in Tanzania (Maluka 2013); weak government capacity to monitor health regulations promotes the emergence of pluralistic governance models (Blanchet, Gilbert et al. 2014). In many low-income settings, in fact, informal rules or norms supersede formal mechanisms when these mechanisms are untenable, when there are no rules or when the rules are vague (Atkinson, Medeiros et al. 2000; Asante, Zwi et al. 2006). In such circumstances, people can be expected to create new rules for themselves to solve important problems like how to sustain financing for eye care services. Indeed, some health systems research suggests that compliance with upstream bureaucratic accountability mechanisms can constrain the local level innovation by front-line providers that may be needed to improve quality of care, responsiveness and accountability to patients (Cleary, Molyneux et al. 2013). Seen in this light, strategies to maintain sustainability funds and avoid exemptions appear to be supply side innovations that developed in the mission sector, were passed on to others in government hospitals and became routine, local norms followed by LARESA members which now act to 'filter' formal policies thereby influencing implementation behaviour (Atkinson, Medeiros et al. 2000).

Contradictory financial considerations also underlay the third sustainability strategy: (iii) maintain willingness to expand & contract services. As financial circumstances worsened for one team, they elected to contract outreach services in order not to detract from higher-earning services at their base. In contrast, two other departments saw outreach as an opportunity to diversify their income. Both types of experience illustrated an inherent characteristic of outreach that limits the ability of actors to adopt it as a new activity or continue outreach after a 'shock' to the system such as withdrawal of donor funding: its low 'compatibility' with existing health systems (Blanchet and James 2014). Since outreach requires teams to work outside their typical place of work and interact with external actors, conducting outreach may not always be coherent with the perceived 'mandates' or expectations of other actors operating within the same governance systems so significant modifications to actor roles may be required to solve new problems such as access to transportation and equipment without donor support. In turn, accessing peer support and other

forms of social capital was an important strategy to solve problems such as teams' desires to conduct outreach.

In the long term, coherence (rather than standardisation) between the various governance systems in the Region identified here will need to improve so that survival strategies of eye care providers do not endanger financial access of eye care services for populations.

### Eye care providers as social entrepreneurs

The remaining two sustainability strategies, (iv) access peer support and (v) share eye data for advocacy, were specific rationale for the formation of LARESA, the informal peer network which invites eye care practitioners, regardless of cadre and sector, to think about eye health system sustainability and overcome the neglect eye care suffers through problem-solving and collective advocacy. While these strategies were pursued by the individual eye departments in our case study, we believe LARESA has the potential to promote these strategies more widely. This is important because a major problem characteristic of pluralistic systems such as the Lake Region's is that actors tend to work in isolation (Standing and Chowdhury 2008). Currently key resources such as equipment and donor contributions to outreach are partitioned. This has contributed to the diversity of service delivery models we have already described, but it also limits the sustainability of the entire system. With little sharing of resources across the network, sustainability can only be described as the sum of the sustainability of each eye department within it, rather than a single, robust system which benefits from synergism.

Similarly, there is little transparent sharing of data from teams in the region which LARESA could assemble for others to learn from or use in advocacy discussions. While LARESA is not a hierarchical system, it is capable of helping to write new informal rules, establish beneficial norms and change relationships between actors. A particular opportunity for influencing and engagement would be a more formalised system of mentorship for recent graduates. Health systems literature promotes network-building for both learning and exchange of experience by 'social entrepreneurs' and wider groups (Thake and Zadek 1997; Tucker, Fenton et al. 2012; Wilson, Whitaker et al. 2012). Multi-sectoral networks can share not only technical expertise, but also information technology support, marketing networks, etc.

In contrast to commercial entrepreneurs whose principle objective is wealth creation, social entrepreneurs seek to create social value or social justice (Thake and Zadek 1997; Catford 1998; Dees 2001; Peredo and McLean 2006; Traynor, Davis et al. 2006; Weerawardena and Sullivan Mort 2006; Farmer and Kilpatrick 2009; Harting, Kunst et al. 2010; Wei-Skillern 2010). The often dynamic environment in which social entrepreneurs work frequently necessitates an innovative approach to respond to change and create social value (Weerawardena and Mort 2006). As social entrepreneurs, eye care providers in the Lake Region innovate mainly as individuals rather than as organisations and this contributes to their ability to innovate; they are detached from the constraints of traditional governance structures, allowing them the freedom to operate in an innovative way (Dawes 2009). Social entrepreneurs additionally tend to create networks or communities of mutual interest (Wei-Skillern 2010), such as LARESA. This allows network members to focus not only on maximising their own organisational (or departmental) effectiveness, but also on maximising social impact, as part of a wider network approach (exemplified in the Lake Region by the collective outreach campaigns organised annually by LARESA).

Wei-Skillern (2010) suggests that the social entrepreneurship model, specifically by working through networks, is essential for effective population health initiatives, because they are able to cut across organisations, sectors, and groups that traditional governance models and paradigms cannot reach.



Such a model has been suggested by others in eye health to both spur and provide technical oversight of commercial initiatives to bring ready-made spectacles to rural areas in Africa and Asia, and which ultimately contribute to poverty alleviation (Naidoo and Jaggernath 2012).

### The legacy of eye care NGOs

Can we say anything about the specific legacy of NGO and mission sector engagement with eye care in this part of Tanzania? Certainly these structures were important. All teams relied on donors for access to equipment, through international mission structures but also through links to KCMC, a key NGO-supported teaching hospital. Mission-based eye care departments were at an advantage for being able to access donors through both routes. These donors also supported surgical running and other costs in some facilities; this was critical in Kolondoto the only eye department without access to any government resources for eye care. The importance of donor contributions was also highlighted in Kitete where services were extremely limited in the first twelve months of operation because of a lack of donor relationships. Ultimately, the most productive team with the most diversified service delivery (Sengerema eye department) drew financial and social capital from both the mission and government sectors.

Although some eye care donors in Tanzania may be particularly inspired by their faith, we found no evidence to suggest that eye health was particularly prioritised in local mission hospitals in the Lake Region. Indeed, rather than promoting local charity, either in-line with Nyerere's historical declaration of self-reliance or with the current government's provisions for older persons, the African Inland Church itself actually received contributions from the eye department which ultimately came from patients. The relative success of eye care teams in the mission sector in this area of Tanzania arguably has more to do with international eye care donor commitment and the broader history of health services management by missionaries in the country. By operating from missions, teams were allowed greater freedom to avoid implementing government policies which poorly address implementation realities in a system of decentralised eye services provision. Furthermore, these alternative ways of delivering services served as models for government hospitals. CBM's investment is therefore positive not only in terms of the population health outcomes achieved by the surgical teams they have supported, but also in terms of the organisational models its partners have developed which, through social networks such as LARESA, help to open practitioners' eyes about what might be possible through observation of diversity. Just as CBM originally invested in expatriate ophthalmologists based at KCMC in the 1970s to develop training programmes and informal eye care networks across the country, support to LARESA now offers an innovative opportunity to invest in social entrepreneurs dedicated to developing local eye care services and who cut across eye health sectors in Tanzania.

Looking to the future, we sound a final note of caution: while separating eye department procedures from hospital systems and raising patient fees is an attractive solution to management problems due to neglect in the short-term, in the long term these strategies endanger the sustainability of the whole system. Patients will be the ones to pay for a less efficient system in the end and high user fees reduce population access and equity. Expanding insurance programmes and increasing government investment in mission-owned facilities through district-designated schemes may offer some resistance to these negative trends.

The effects of neglect in eye health appear to be more complex than we commonly realise, because, as the experience of practitioners in the Lake Region shows, neglect generates new dynamics that affect sustainability in unexpected ways.

## Recommendations to key actors in the Lake Region

### CBM and other eye care donors:

- Provide a central pot of funding to LARESA to incentivise work on innovative and collective projects; to encourage peer support (e.g., transport and living allowances to visit other facilities); to help address equity and supply gaps using members' own innovations; and to improve the availability of health information to members and other actors.
- Perceive eye care providers as social entrepreneurs and financially support and promote their innovations that aim to promote equitable access to eye care services (e.g. innovation grants offered to competitive projects).
- Continue existing facility-based support, but prioritise funding towards the Lake Region as a whole to ensure equitable distribution of resources in the region.
- Promote what has been accomplished and learned in the Lake Region outside of it by inviting LARESA members to share lessons at national coordination meetings in Dar es Salaam.
- Encourage eye care partners to work more closely with civil society; these voices are missing in the LARESA network and could beneficially influence the effectiveness and quality of eye care in the region. Promote links between LARESA and disabled peoples' organisations or associations of service users.

### LARESA:

- Help reduce isolation of individual eye departments. Strengthen the existing informal, weak links between centres through activities which address the system constraints highlighted in this report. Activities could include mentoring systems for new cataract surgeons or equipment borrowing schemes.
- Improve contact with KCMC and other training schools to discuss training priorities and equipment needs for the entire Lake Region.
- Publish data within the network from member eye departments to demonstrate models and norms and hold ongoing discussions on sustainability targets and visions, including standards of care. RECCs and DECCs could be used to both disseminate and collect information from members.

### Future research:

- Additional research could be conducted on areas which this study could not cover such as: analysis of the private sector, patient experiences of eye care and contributions to sustainability, the contribution of optometry and refractive services to eye department success and strategies to improve team performance to align with VISION 2020 and universal healthcare targets.

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## Appendix A: Eye care staff & cataract surgery volume in the 'Lake Region' in 2012, by district and sector

Cadre	Population 2012	Ophthalmologists	AMOOs & Cataract surgeons	Ophthalmic nursing officers	Optometrists	Ophthalmic assistants	Cataract surgeries 2011
<b>Kagera Total</b>	<b>2,458,023</b>	<b>0</b>	<b>3</b>	<b>8</b>	<b>2</b>	<b>3</b>	<b>570</b>
Government		0	1	5	1	0	
NGOs/Mission		0	2	2	1	2	
Private		0	0	1	0	1	
<b>Mara Total</b>	<b>1,743,830</b>	<b>0</b>	<b>1</b>	<b>5</b>	<b>3</b>	<b>2</b>	<b>585</b>
Government		0	1	5	2	2	
NGOs/Mission		0	0	0	0	0	
Private		0	0	0	1	0	
<b>Mwanza Total</b>	<b>2,772,509</b>	<b>1</b>	<b>3</b>	<b>16</b>	<b>4</b>	<b>9</b>	<b>2331</b>
Government		0	1	13	2	5	
NGOs/Mission		1	2	2	2	4	
Private		0	0	1	0	0	
<b>Shinyanga Total</b>	<b>1,534,808</b>	<b>1</b>	<b>2</b>	<b>6</b>	<b>3</b>	<b>8</b>	<b>1650</b>
Government		0	0	3	3	7	
NGOs/Mission		0	1	2	0	1	
Private		1	1	1	0	0	
<b>Tabora Total</b>	<b>2,291,623</b>	<b>0</b>	<b>2</b>	<b>5</b>	<b>3</b>	<b>11</b>	<b>644</b>
Government		0	1	2	1	8	
NGOs/Mission		0	1	3	1	3	
Private		0	0	0	1	0	
<b>Lake Region Total</b>	<b>10,800,793</b>	<b>2</b>	<b>11</b>	<b>40</b>	<b>15</b>	<b>33</b>	<b>5780</b>
Government		0	4	28	9	22	
NGOs/Mission		1	6	9	4	10	
Private		1	1	3	2	1	
<b>Lake Region ratios per million population</b>		<b>0.2</b>	<b>1.0</b>	<b>3.7</b>	<b>1.4</b>	<b>3.1</b>	<b>535</b>
<b>National ratios per million population (2011)</b>		<b>0.7</b>	<b>1.4</b>	<b>3.2</b>	<b>3.8</b>	<b>3.5</b>	<b>545</b>
<b>VISION 2020 targets</b>		<b>4.0</b>	<b>10.0</b>		<b>20.0</b>		<b>2,000</b>

Note: Data shared by National Eye Care Programme in 2012 and verified through interviews with Regional Eye Care Coordinators (RECCs). 2011 national ratios come from (Palmer, Chinanayi et al. Submitted). VISION 2020 targets are given for ophthalmologists, 'mid-level personnel' (including cataract surgeons, advanced medical officers (AMOOs) in ophthalmology and ophthalmic nurses) and 'refractionists' (including optometrists and other mid-level personnel with refraction training) (V2020 2007). 2012 population data from (National Bureau of Statistics 2013).



## Appendix B: Eye health system sustainability indicators chosen by LARESA, with 2012 measurements

#	Sustainability indicator	Sustainability Target	Tabora Region: Kitete Hospital (government)	Mara Region: Musoma Hospital (government)	Mwanza Region: Sengerema Hospital (mission)	Shinyanga Region: Kolondoto Hospital (mission)
<b>Component 1: Population health outcomes</b>						
1.1	Number of cataract surgeries performed in the facility	1,000	0	605	498	955
1.2	Number of cataract surgeries performed at all facilities in the region	1,000	334 (via outreach by actors outside of Lake Region)	605 (all at Musoma Hospital)	1223 (at facility and via outreach by Sengerema Hospital staff and others)	985 (at facility and via outreach by Kolondoto Hospital staff)
1.3	% of cataract surgeries in region performed via outreach	60%	100%	0%	59%	3%
1.4	% of districts in region where at least 200 cataract surgeries were performed in a year (via outreach or static clinics)	100%	17% (1/6 districts) (Igunga 259, Nzega 0, Urambo 40, Sikonge 0, Uyui 0, Tabora Munic 35)	17% (1/6 districts) (Tarime 0, Bunda 0, Musoma 605, Butiama 0, Rorya 0, Serengeti 0)	25% (2/8 old districts) (Nyamagana 0, Ilemela 411, Sengerema 498, Ukwere 43, Misungwi 0, Kwimba 97, Magu 110, Geita 64)	11% (1/9 old districts) (Meatu 10, Maswa 20, Bariadi 0, Shinyanga Municipal 955, Shinyanga Rural 0, Kahama 0, Kishapu 0, Ushetu 0)
1.5	Number of eye patients attended in the facility	5,000	2599	5020	7180	1720
1.6	% of districts in the region where at least 5000 eye patients were attended (considering data by teams from all facilities)	100%	0	17% (1/6 districts) (Tarime 2040, Bunda 3500, Musoma 5020, Butiama ? <5000, Rorya ? <5000, Serengeti ? <5000; pts seen via outreach included?)	? (Sengerema: 7180, other districts unknown)	20% (1/5 new districts) (Shinyanga Municipal: 5,628 (Kolondoto: 1881, SH Mun eye dept: 1747, optometry PPP centre: >2000), Kahama: 1,687, 3 other new districts: 0)
1.7	% of diabetic patients diagnosed at facility screened for diabetic eye condition	90%	0	71% (180 screened/252 diagnosed)	?	0
<b>Component 2: Quality &amp; access of health services delivery</b>						
2.1	% of patients who are satisfied with services that are provided in health facility	75%	?	?	?	?
2.2	% of eyes operated for cataract with best corrected visual acuity of 6/18 or better after surgery	80%	N/a (Cataract surgeries currently not performed)	94% (502/605 (83%) patients operated on were refracted afterwards. 472/502 (94%) patients improved to VA 6/18 or better.)	? (Patients not refracted after surgery. Data on improvements in uncorrected visual acuity not centrally collected, self-estimated at 70%.)	? (Patients not refracted after surgery. Data on improvements in uncorrected visual acuity not centrally collected, self-estimated at 75%.)

2.3	% of patients being consulted within 2 hrs of coming to the health facility	75%	? (Data not currently collected; estimated at 100%)	? (Data not currently collected; estimated at 70%)	? (Data not currently collected; estimated at 85%)	? (Data not currently collected; estimated at 20%)
2.4	% of minimum number of eye care staff required by the NECP employed by the facility	75%	43% (3/7 staff required + 1 oph assist)	43% (3/7 staff required + 1 oph assist)	60% (3/5 staff required + 2 oph assists)	60% (3/5 staff required + 1 oph assist)
2.5	% of appropriate infrastructure and functional equipment required by the NECP in the facility	80%	64% (23/36 pieces)	39% (14/36 pieces)	55% (17/31 pieces)	65% (20/31 pieces)
<b>Component 3&amp;4: Organisational capacity/viability of local authorities, local organisations &amp; service providers</b>						
3.1	Eye unit income from patient user fees	None chosen	?	18.5M TSh	15.2M TSh	118.8M TSh
3.2	Total eye unit income	None chosen	?	50.9M Tsh	49.6M TSh	149.7M TSh
3.3	% of eye unit income from user fees	60%	?	36%	31%	79%
3.4	Number of quarters when money has been timely disbursed to eye care unit	4	n/a	4 (from 1 donor)	0/4 (from both 1 donor and government)	0 (from 1 donor)
3.5	% of funds disbursed compared to requested budget	100%	n/a	47% (1.5M/3.2M from government)	87% (from donor)	63% (53M/83.9M from donor)
3.6	Budget line for eye care activities exists at the facility level	Yes	No (No specific eye budget exists)	Yes	Yes	No (Eye budget separate from facility budget)
3.7	% of eye care providers who work full time in eye care unit	100%	100% (4/4 staff)	80% (4/5 staff)	80% (4/5 staff)	100% (8/8 staff)
3.8	Number of quarterly meetings held with eye unit staff per year	4	0	4	3	0
3.9	Number of annual facility planning meetings where eye care staff is involved	1	0	0	1	1
<b>Component 5: Community capacity</b>						
5.1	Number of sensitization meetings conducted by facility per year	4	0	? (problem with definition; 45 annually with community, before weekly outreach)	? (problem with definition; 2 with regional authorities for pediatric surgery clinic)	0
5.2	Number of community feedback meetings conducted by facility per year	4	0	0	0	0
5.3	% of villages in the region which have a trained community eye worker	100%	?	9% (Volunteers from 20/235 villages in region trained on referral of childhood cataract)	7% (8/123 villages)	?

Component 6: Enabling environment			
6.1	% of population covered by health insurance	50%	10% (Tanzania)
6.2	% of government budget allocated to health	15%	11% (Tanzania)
6.3	Number of strikes by government health staff	≤3	2 (Lake Region)
6.4	% increase in the national Human Development Index	Any increase	Yes (Tanzania: Increase from 0.454 in 2009 to 0.466 in 2011)

## Appendix C: Intensity of eye care communications between eye departments and other actors, Dec 2012 to Apr 2013

Actor Type	Actor (person/organisation)	Kitete (gov't)	Musoma (gov't)	Sengerema (mission)	Kolondoto (mission)
National govt	National Eye Care Programme	Mid-pink	Mid-pink	Mid-pink	Light pink
Regional govt	Regional Administrative Secretary	Light pink	Light pink	Light pink	Light pink
	Regional Medical Office	Dark pink	Dark pink	Dark pink	Dark pink
	Regional Eye Care Coordinator	Grey hatched	Grey hatched	Grey hatched	Dark pink
District govt	District Executive Director	Light pink	Light pink	Light pink	Light pink
	District Medical Office	Light pink	Mid-pink	Dark pink	Dark pink
	District Eye Care Coordinators	Dark pink	Mid-pink	Mid-pink	Light pink
Within hospital	Hospital Board (other than Med Dir)	Light pink	Light pink	Light pink	Dark pink
	Diocese/Mission Health Secretary	Grey hatched	Grey hatched	Dark pink	Light pink
	Hospital Management Team	Dark pink	Dark pink	Dark pink	Grey hatched
	Retired Hospital Cataract Surgeon	Light pink	Grey hatched	Light pink	Light pink
Other hospitals	Other facilities in region	Dark pink	Light pink	Light pink	Dark pink
	KCMC Hospital & Training Institute	Dark pink	Light pink	Dark pink	Light pink
	Other eye hospitals outside region	Dark pink	Light pink	Dark pink	Dark pink
Eye NGOs	KCCO	Light pink	Mid-pink	Light pink	Light pink
	CBM	Dark pink	Light pink	Dark pink	Dark pink
	Sightsavers	Light pink	Light pink	Light pink	Light pink
	Seeing is Believing Coordinators	Dark pink	Light pink	Light pink	Light pink
	Three Angels	Light pink	Light pink	Light pink	Light pink
	Eye Aid Africa	Light pink	Light pink	Light pink	Light pink
Professional organisations	LARESA Chair	Light pink	Light pink	Dark pink	Dark pink
	National professional societies	Light pink	Light pink	Light pink	Light pink
Commercial organisations	Equipment technicians (separate)	Light pink	Dark pink	Dark pink	Dark pink
	Local spectacles suppliers (separate)	Grey hatched	Dark pink	Dark pink	Dark pink
	Private pharmacists (separate)	Light pink	Light pink	Dark pink	Dark pink
Community	Social institutions (blind schools, prisons, leprosy centres)	Light pink	Light pink	Dark pink	Light pink
	Media (Radio Free Africa)	Light pink	Light pink	Light pink	Light pink

Legend: Cell shading corresponds to the number of different types of eye care activities discussed between actors. 0 topics: unshaded; 1 topic: light pink; 2-3 topics: mid-pink; 4-7: dark pink; not applicable: grey hatched.