

# EYE HEALTH SYSTEMS ASSESSMENT (EHSA): GHANA COUNTRY REPORT



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All EHSA-related documents and guidelines can be found online on:

<http://www.healthsystemassessment.com/eye-health-system-assessment-ehsa-2/>

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## Acronyms

CHAG	Christian Health Association of Ghana
CHPS	Community-based Health Planning and Services Initiative
CSR	Cataract Surgical Rate (no. cataract operations per million population per year)
DDHS	District Directors of Health Services
DHIMS	District Health Information Management System
DHMT	District Health Management Team
DPO	Disabled People's Organisation
EHSA	Eye Health System Assessment
FBO	Faith-based Organisation(s)
GAG	Glaucoma Association of Ghana
GBU	Ghana Blind Union
GDA	Ghana Diabetes Association
GFD	Ghana Federation of the Disabled
GHC	Ghana Cedis (currency)
GHS	Ghana Health Service
HASS	Health Administration and Support Services (a Department of the MOH/GHS)
HIS	Health Information System(s)
HR	Human Resources
HRH	Human Resources for Health
HReH	Human Resources for Eye Health
HSS	Health Systems Strengthening
IAPB	International Agency for the Prevention of Blindness
ICD	Institutional Care Division (a Department of the MOH/GHS)
ICEH	International Centre for Eye Health
IGF	Internally Generated Fund(s)
KATH	Komfo Anokye Teaching Hospital, Kumasi
KBTH	Korle Bu Teaching Hospital, Accra
KNUST	Kwame Nkrumah University of Science and Technology
LMIC	Low and Middle Income Countries
LSHTM	London School of Hygiene & Tropical Medicine
M&E	Monitoring & Evaluation
MDG	Millennium Development Goal
MOE	Ministry of Education
MOH	Ministry of Health
NCD	Non Communicable Disease(s)

NECU	National Eye Care Unit
NEML	Ghana National Essential Medicines List
NHI	National Health Insurance
NHIS	National Health Insurance Scheme
NHIA	National Health Insurance Authority
NTD	Neglected Tropical Disease(s)
OEU	Operation Eyesight Universal
ON	Ophthalmic Nurse
OPP	Out of Pocket Payment (“Cash and Carry”)
OPD	Outpatient Department
PCMB	Private Clinics and Maternity Board
PEC	Primary Eye Care
PHC	Primary Health Care
PPME	Policy, Planning, Monitoring and Evaluation (a Department of the MOH/GHS)
RHMT	Regional Health Management Team
RO	Regional Ophthalmologist
SSA	Sub-Saharan Africa
SSDM	Stores, Supplies and Drugs Management (a Department of the MOH/GHS)
SSNIT	Social Security and National Insurance Trust (a Ghana government department)
SRC	Swiss Red Cross
SS	Sightsavers
USAID	US Agency for International Development
WHO	World Health Organisation

# Executive Summary

## Overview of the eye health system

### Strengths

- Long-term support from national and international donors, which has improved and sustained service coverage and quality
- The National Health Insurance scheme covers most diseases, including eye diseases, reducing financial barriers to access
- Very active private sector in eye care, especially opticians and optometrists

### Weaknesses

- The National Eye Care Unit has limited resources for programme coordination
- The integration of eye care services is not fully effective in every district
- Inequitable distribution of Human Resources for Eye Health with a concentration of professionals in the south of the country
- Low Cataract Surgical Rates
- Limited provision of refraction and low vision services

## Governance of the eye health system

### Strengths

- Presence of a National Eye Care Unit to oversee eye care in Ghana, with dedicated staff.
- Active Disabled People's Organisations, such as Ghana Blind Union and Ghana Federation of the Disabled, with evidence of changes to policy brought about by advocacy.
- Good collaboration between the National Eye Care Unit and international non-governmental organisations.

### Weaknesses

- There are a number of hierarchical levels between the Ministry of Health and the National Eye Care Unit in order to make eye care organisations' voice to be heard at policy level
- No eye-care specific feedback on how beneficiaries experience eye health services and perceive the quality of service

## Eye Health Financing

### Strengths

- Salaries of the majority of front-line eye care staff in public facilities are Ghana Health Service-funded, a sign of sustainable integration of eye care services into general health care

- The National Health Insurance scheme includes several eye care interventions such as cataract surgery

#### **Weaknesses**

- Ghana Health Service financial commitment to eye care is limited compared to international donors' funding
- Public funds are disbursed with delays at facility level constraining the purchase of drugs and consumables
- Key eye care services and devices are excluded from the National Health Insurance scheme e.g. refraction and optical aids; glaucoma visual field and some glaucoma drugs; retinal detachment, laser treatment

### **Eye Health Service Delivery**

#### **Strengths**

- The majority of district hospitals in the country are staffed by Ophthalmic Nurses
- Ophthalmic Nurses in some areas have developed integrated relationships with other speciality professionals

#### **Weaknesses**

- Primary Eye Care is not integrated within Primary Health Care
- Outreach consultations organised by Ophthalmic Nurses are often constrained by the lack of consensus between District Health Management Teams and hospital managers
- The quality of eye care services is not assessed

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

#### **Strengths**

- Regional Ophthalmologists oversee eye care services and carry out cataract surgery in nearly every region
- Ghana has staffed nearly every health district with at least one Ophthalmic Nurse
- There are increasing numbers of nurses applying for Ophthalmic Nurse training, including from rural areas currently under-served by eye care services

#### **Weaknesses**

- Poor distribution of Ophthalmologists in the country with many regions under-staffed
- Limited number of doctors interested in studying ophthalmology
- Supervision of eye care staff at every level of the health system is not systematic

## Medicines, products and equipment for eye health

### Strengths

- Eye care drugs are included on the Ghana National Essential Medicines List, and over 50% of drugs prescribed are covered by the National Health Insurance Scheme
- The Ministry of Health funded glaucoma equipment in 2011

### Weaknesses

- Some key medicines are missing from the National Essential Medicines List and are not reimbursed by the National Health Insurance Agency
- Refraction/Optical Devices are not reimbursed by the National Health Insurance Agency

## Health information systems for eye health

### Strengths

- Eye health indicators are collected at district level
- National Eye Care Unit conducts quarterly monitoring
- International non-governmental organisations collect detailed data in regions where they work

### Weaknesses

- Lack of accurate national baseline for prevalence of different eye conditions
- At district level, data collected is not used to inform decision makers nor for planning



# 1. Introduction

Governments across the world face difficult challenges in meeting their populations' health needs. This is especially the case in Low and Middle Income Countries (LMIC) which, whilst facing economic and human resource constraints, need to respond to communicable health threats such as HIV and malaria, as well as an increasing burdens of chronic, non-communicable diseases (NCDs).

There is an increasing acknowledgment that a "health system approach" is needed to address these challenges. Instead of targeting a single area or disease, a country's health system needs to be strengthened as a whole. USAID have therefore developed and tested the Health Systems Assessment (HSA) Approach<sup>1-2</sup>, for rapidly assessing strengths and weaknesses of a country's health system. The impact has been very positive: between 2007 and 2012 more than 20 countries have undertaken assessments.<sup>3</sup>

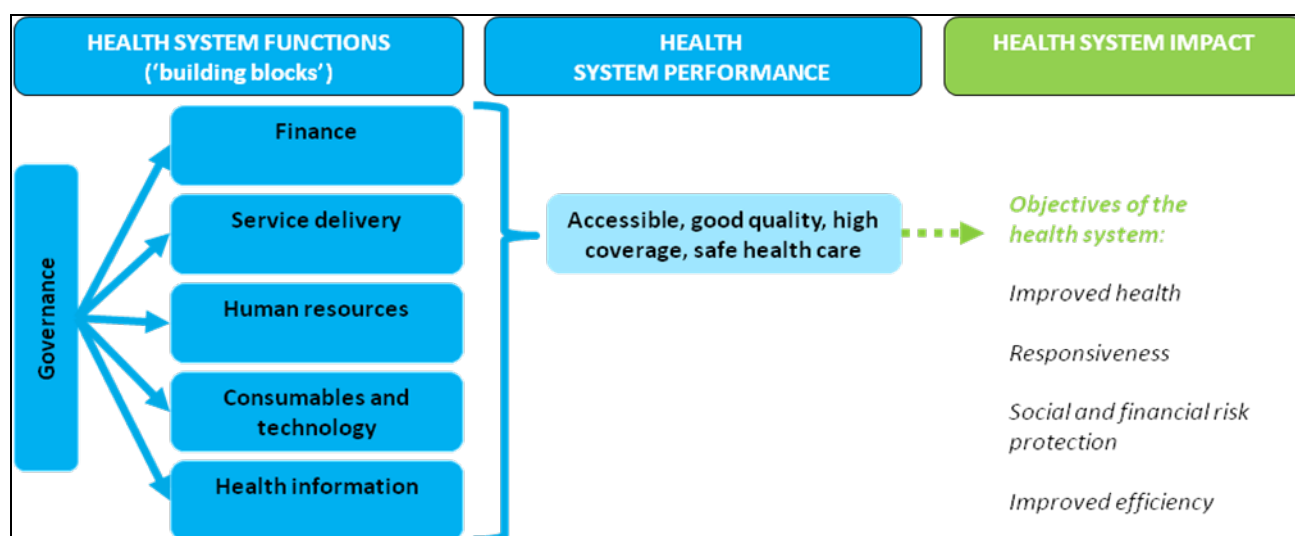
Over the last few years, increasing efforts have been invested in exploring the relationship between the eye health system and the general health system. Around 80% of visual impairment is preventable or curable through effective eye care services. General consensus is emerging in the international eye care community that the effectiveness of eye care interventions can only be improved through a better understanding of how health systems function. A consortium of eye care experts and health experts, coordinated by the International Centre for Eye Health (ICEH) at the London School of Hygiene and Tropical Medicine (LSHTM), have therefore developed the Eye Health Assessment approach (EHSA),<sup>4</sup> funded by Sightsavers.

The objectives of Eye Health System Assessments are to:

- Enable national and international eye care actors to regularly assess a country's eye health system, in order to diagnose its relative strengths and weaknesses, to develop plans prioritising key areas of weakness, and to identify potential solutions or recommendations for eye care interventions.
- Assist national eye health authorities and international organisations in including eye health systems interventions in eye care programme design and implementation, and incorporating it into the general health system.

The EHSA Approach is designed to provide a rapid and yet comprehensive assessment of the key health systems functions as they relate to eye health, and their interactions, based on the health system 'building blocks' framework elaborated by the World Health Organisation (WHO), shown in Figure 1.<sup>5</sup>

Figure 1: Foundations of Health Systems



*Adapted from World Health Organisation 2007 and Islam 2007*

The EHSA's focus is not necessarily to discover new evidence but rather by examining all components of the eye health system and their inter-relationships, it makes important cross-cutting recommendations that affect the functioning of the whole eye health system.

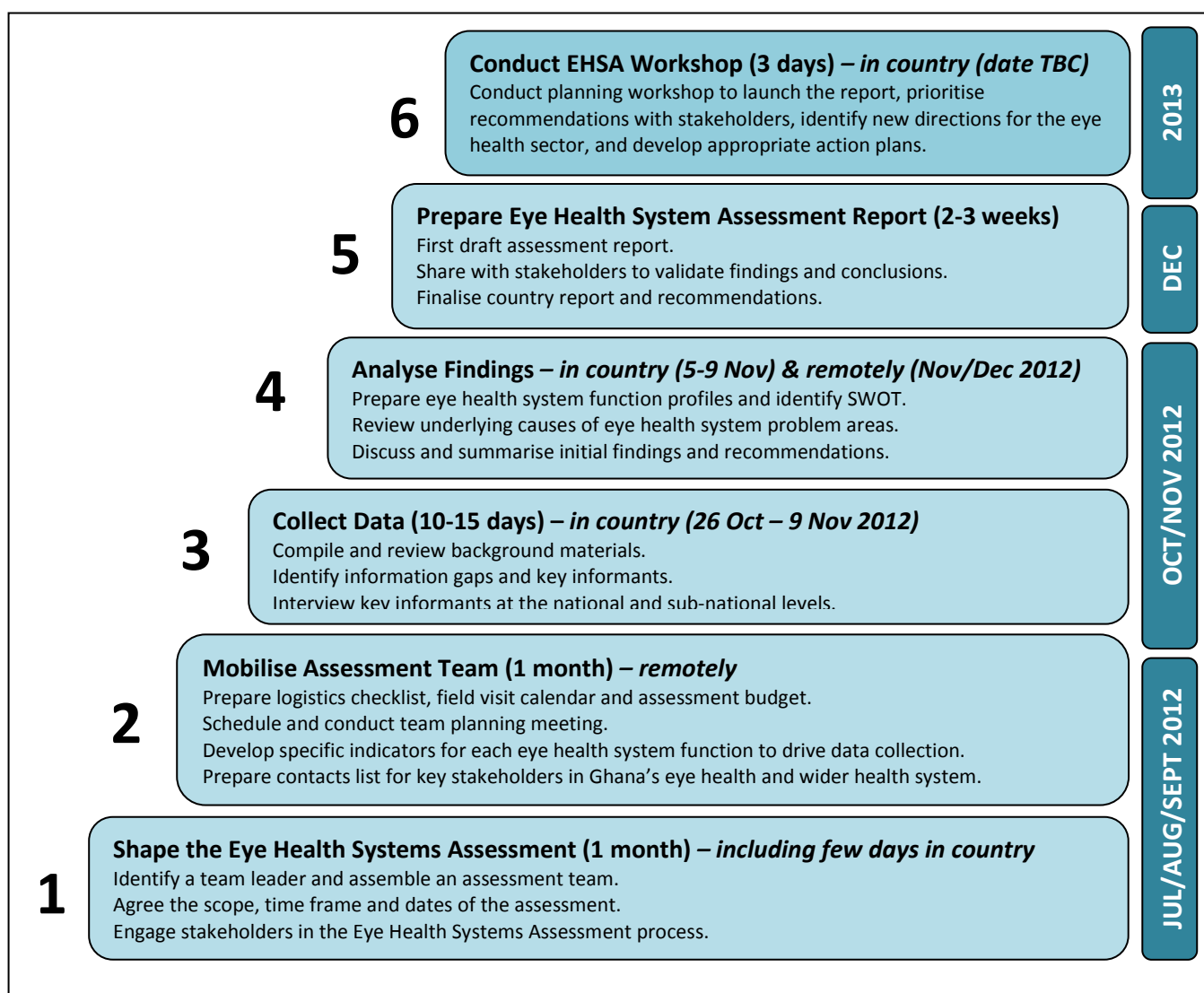
Ghana was selected as the first country to pilot the EHSA, through discussion between the National Eye Care Unit (NECU) in Ghana, Sightsavers, and ICEH. This report documents assessment findings, providing a basis for work to strengthen the eye health system in Ghana and improve outcomes for eye conditions.

## 2. Methodology of the Eye Health System Assessment

The EHSA approach provides a rapid yet comprehensive assessment of the key health systems functions relevant to eye health and their interactions. This includes the leadership and governance of the eye health system, the financing of eye care, delivery of eye health services, the available human resources for eye health, the medical products, vaccines, and technologies or equipment relevant to eye care, and the information systems that enable collection, analysis and use of information about eye health.

The EHSA tool<sup>4</sup> used to undertake this assessment focuses on a list of selected indicators used to measure the performance of the eye health system, and on possible sources of information where relevant information can be found. The HSA manual<sup>1</sup> was also consulted when planning the assessment, synthesis of findings, and identifying eye health system strengths and weaknesses, due to the extensive experience in undertaking whole health system assessments underpinning it. The approach to the EHSA process in Ghana was agreed with the NECU and Sightsavers Ghana Country Office, and consisted of several successive steps, shown in Figure 2.

**Figure 2:** Steps in the approach to Eye Health System Assessment in Ghana, July-December 2012



## Ethical approval

Ethical approval for this work was sought and obtained from the Ghana Health Service Ethical Review Committee, and from the LSHTM Ethics Committee.

## Data collection

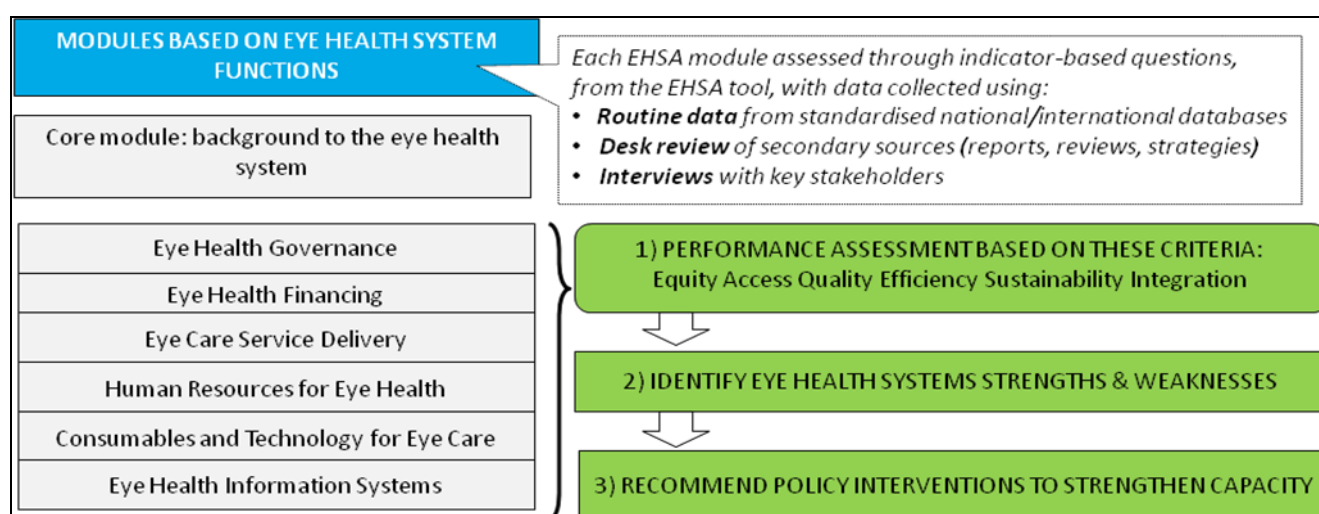
### Data collection methodology

Data was collected for each module (1 core module and the 6 technical ‘health system building blocks’ modules) by members of the assessment team using the indicators detailed in the EHSA tool<sup>4</sup> (supported by a series of standardised probing questions developed by the ICEH<sup>a</sup>, if necessary to ensure comprehensive enough information was collected).

As a rapid assessment, the EHSA does not aim to collect primary quantitative data but rather to consolidate and analyse the available data across all components of the eye health system. As seen in Figure 3, the EHSA assessment was therefore carried out through:

- Desk-based review of documents and data sources
- Interviews with eye health system stakeholders

**Figure 3: Eye Health Systems Assessment Approach**



### The assessment team

The assessment team was lead by the Head of the National Eye Care Unit (NECU) of Ghana Health Service (GHS), and National Coordinator for the Prevention of Blindness. The team consisted of 5 people from GHS (with and without specialism in eye care), and technical support was provided by a public health specialist and researcher from ICEH/LSHTM. Names and job titles are given in Annex C: Eye Health System Assessment Team.

<sup>a</sup> Available on request from ICEH - iceh@iceh.org.uk

## Dates of assessment

In-country data collection and analysis were conducted over two weeks between 29<sup>th</sup> October to 9<sup>th</sup> November 2012, with interviews of key informants at the national level, as well as travel to selected regions and districts. Figure 2 gives the overarching timeframe for the whole assessment process; Annex D: Ghana EHSA Schedule: 29 Oct to 09 Nov 2012 gives the specific timetable for the 2 weeks of data collection and analysis.

## Location of assessment

Data collection was carried out in the capital (Accra) and in two regional locations (Upper East; Western) and in four districts (Bulsa and Zebilla districts in Upper East, and Tarkwa and Wasa Mpohor districts in Western). Data collection at the national level was important to collect information on strategic health service planning and organisation relevant to eye health, and to gain understanding of how eye health in Ghana fits into the general health system.

The two regions were chosen to give a picture of areas where eye health services in Ghana are relatively strong (Upper East) due to a long history of support from national and international non-governmental organisations (NGOs), and where there may be gaps in service provision due to a lack of human or other resources (for example, lack of an ophthalmic nurse at some District Hospitals) and logistical challenges (Western). As discussed in more detail below, the choice of regions/districts was not intended to be statistically representative for the whole country, but to provide case studies and insights into some of the strengths and weaknesses across eye health in Ghana.

## Interviews

The EHSA team interviewed 45 individuals from national, regional and district health authorities, hospital management teams and health staff involved in the delivery of eye care services). The sampling procedure to identify relevant people to interview was chosen according to the objectives of the study: generating theories and concepts rather than generalising findings to a wider population. Therefore, a purposive rather than a probabilistic sampling method was deliberately used by the team.<sup>6-7</sup> Purposive sampling is used when researchers “seek out groups, settings and individuals where ... the processes being studied are most likely to occur.”<sup>8</sup>

The list of those interviewed is given in Annex E: List of Interviews conducted and sites visited.

## Document review

The EHSA team reviewed the documents in Annex F: List of documents consulted, which were identified through the interviews and through discussion within the EHSA team and with the Head of the Eye Care Unit.

### 3. Ghana: health system overview

#### Overview of the whole health system

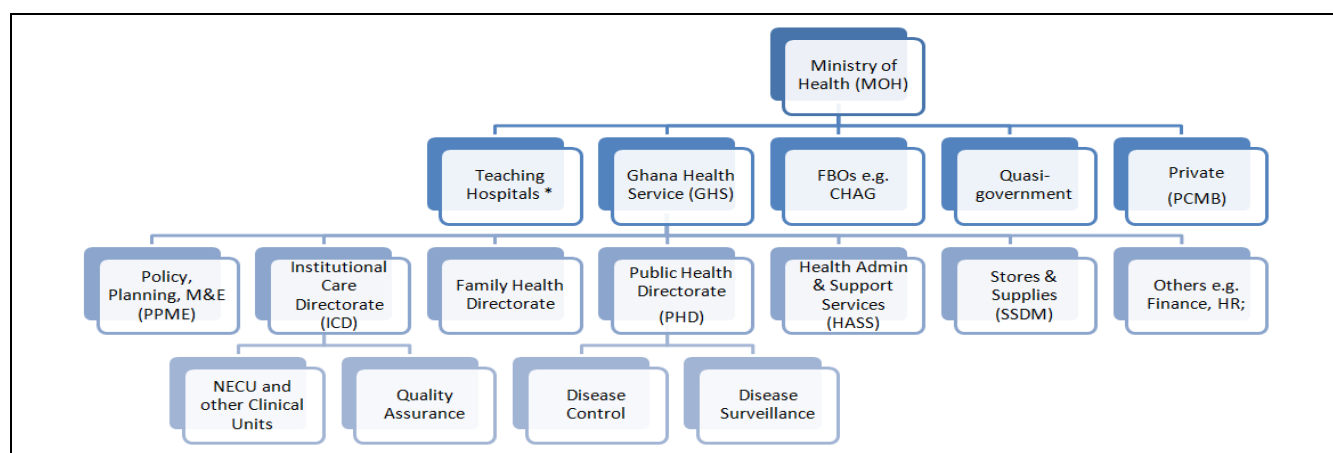
##### Organisation of services

In Ghana, the Ministry of Health (MOH) provides strategic direction at the national level, for instance, setting and ensuring implementation of policies and standards. Public health services are provided by Ghana Health Services (GHS), an independent public agency, under the decentralised management of Regional Health Management Teams (RHMT) in each of the 10 regions, and District Health Management Teams (DHMT) in every district. The majority of planning and management of both preventative and curative services happens at the district level.<sup>9</sup> There are Budget Management Centres (BMCs) or cost centres, at each of the administrative levels described (i.e. one at national GHS headquarters level, 10 at RHMT level, 8 for the Regional Hospitals, 110 for the DHMT level and 95 for the District Hospitals), for administering Government of Ghana and development partner funds.<sup>10</sup>

Ghana has a large faith-based sector, with 8% of all facilities (and 20% of all hospitals)<sup>11</sup> provided by non-governmental faith based organisations (FBOs), the largest of which is the Christian Health Association of Ghana (CHAG) which brings together churches involved in the provision of health services. These facilities can be seen as quasi-public as the majority of their staff salaries are provided through the Ministry of Health and service delivery is overseen by GHS.

The GHS is the largest agency with about half of all health facilities and almost two-thirds of health personnel in the formal sector. In addition to the health services overseen by GHS, health services are provided by quasi-government providers (for instance police or military clinics/hospitals), teaching hospitals and private (for profit) providers, overseen by the Private Clinics and Maternity Board (PCMB). The latter forms only a very small part of health service provision outside the capital, mainly pharmacies.

**Figure 4:** Organisations and departments involved in delivering or overseeing eye care in Ghana



See Acronyms list on page iii for full names of each of the Directorates. There are other Directorates not included on this diagram.

\*Teaching Hospitals are separate to GHS and autonomous, with links to the Ministry of Education (e.g. teaching staff salaries)

- At the regional level, curative services are delivered at the regional hospitals and public health services by the DHMT as well as the Public Health division of the regional hospital. The RHMT provides supervision and management support to its districts and sub-districts.
- At the district level, curative services are provided by district hospitals (in each district capital), many of which are faith-based. Public health services are provided by the DHMT and the Public Health unit of the district hospitals. The DHMT provides supervision and management support to their sub-districts.
- At the sub-district level both preventive and curative services are provided by the health centres as well as out-reach services to the communities within their catchment areas.
- Over the past few years, Ghana has developed and rolled out the 'Community-based Health Planning and Services Initiative' (CHPS) initiative to make basic Primary Health Care (PHC) services available to all Ghanaians.<sup>12</sup> A CHPS compound serves a population of around 3,000-5,000: the more populated areas have more CHPS compounds.

Generally, the public health sector (including FBOs) plays a vital role in delivering care to the majority of the population, apart from the very well off. However, resources are poorly distributed geographically, including human resources, and there are issues with efficiency and responsiveness.<sup>9</sup>

### Health financing

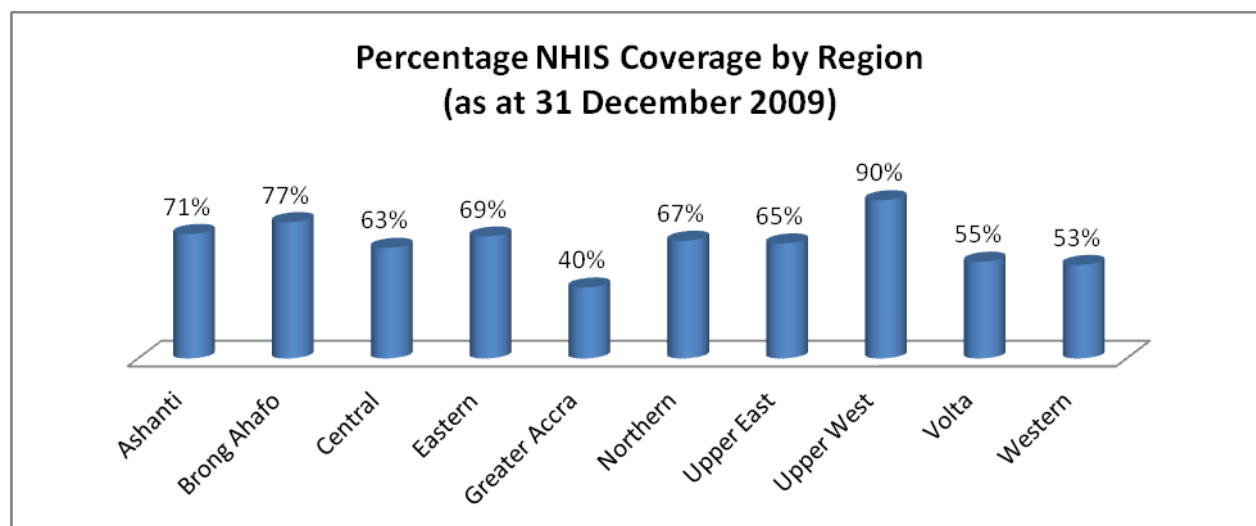
The most recent figures for 2010 show that total spend on health is just over 5% of Ghana's GDP, and 12% of total government expenditure<sup>13</sup> (see Figure 5). There is considerable political commitment to the health sector in Ghana, one of the few countries which may meet the Abuja commitment to invest 15% of government funds into the health sector.<sup>14</sup> Sixty percent of expenditure on health is from government sources, the remaining 40% is private sector expenditure (of which, two thirds is Out of Pocket Payments (OPP) known as "Cash and Carry", contributed by both those who are not registered with the National Health Insurance Scheme, and by spend on services which are not covered by the NHIS).

**Figure 5: WHO National Accounts data for Ghana (Source: World Health Statistics 2010)<sup>13</sup>**

Indicator	Ghana (2010)
External resources for health as % of total expenditure on health	16.9
Total expenditure on health as % of GDP	5.2
General government expenditure on health as % of general government expenditure	12.1
General government expenditure on health as % of total expenditure on health	59.5
Private expenditure on health as % of total expenditure on health	40.5
Out of pocket expenditure as % of private expenditure on health	66.4
Private prepaid plans as % of private expenditure on health	6.2
Social security expenditure on health as % of general government expenditure on health	25.2

State-sponsored National Health Insurance was introduced in 2005 and has been rolled out across the country under the National Health Insurance Authority (NHIA), with the majority of funds coming from tax.<sup>15</sup> Nationally it is reported that more than two thirds of people are enrolled, representing 15.6 million by June 2010,<sup>16</sup> with upward trend since 2005, although coverage varies by region.<sup>17</sup> The data in Figure 6 shows that coverage rates vary, with highest registration in the Upper West, and lowest in Greater Accra.

**Figure 6: Percentage NHI coverage by region as at December 31 2009 (NHIA 2009)<sup>17</sup>**



For those with health insurance, health services covered by tariff are provided free at the point of access at NHIA-accredited facilities. Health facilities are then reimbursed via monthly billing, according to regularly updated tariff lists.

The scheme costs 4 Ghana Cedis (GHC) for the National Health Insurance ID card, with a recurrent 8 GHC yearly premium, and covers all outpatient appointments, a selection of inpatient conditions and selected drugs.<sup>18-19</sup> For those in formal employment, the premium is deducted directly from salaries. There are waivers for a number of groups: those under the age of 18, pensioners and those over 70 years old pay for the card but do not have to pay the yearly premium; pregnant women and those who are too poor to pay (as assessed by local Assembly Chiefs) receive a NHI ID card and coverage at no cost to them.

A proportion of the population remain uninsured, and reasons for this may include lack of awareness of the scheme (although at district and regional level the NHIA do undertake community education), resistance to change, or perceptions of opportunity cost of paying annual registration compared to OPP (especially for large families where each family member needs to be registered but if they do not become sick then the money for that year is lost). For those who are not insured, they can face considerable fees in public health facilities.<sup>9</sup>

There is also some evidence that there are more card holders than people contributing annually to the scheme, which creates problems with sustainability.<sup>15</sup>



There is evidence that, for *members* of the Scheme, NHI has increased both utilisation of health services, and may have had an impact on quality of services. There may have been an impact on inequalities in both access and outcome, although a recent report<sup>20</sup> found that the introduction of the NHIS had only a weak effect on OPP and this and other data suggest that the scheme may in practice be a pro-rich rather than a pro-poor reform, as those who are well educated and better off are more likely to be enrolled.<sup>14, 20</sup>

### **Human Resources for Health (HRH)**

Nationally, there is a lack of human resources for health. Ghana has a relatively low health worker to population ratio (1 doctor per 11,929 population and 1 nurse per 1,213 population in 2009<sup>21</sup>), compounded by an inequitable distribution of HRH between regions, especially between Greater Accra and the rest of the country, and between the north and south of the country, as well as significant ‘brain drain’ of health professionals.

Although most planning and management of health services are decentralised to districts, the Ministry of Health holds the salaries of GHS staff.

### **Medicines, Equipment and Procurement**

There is evidence that through the introduction of the NHIS, with its “fee-for-service” method of paying providers, there has been an increase in the number of drugs per prescription from 2.4 in 2004 to 6 in 2008.<sup>15</sup>

### **Health information systems**

The District Health Information Management System (DHIMS) has been introduced with the aim of improving efficiency and effectiveness in data management at the community, facility and district levels of the GHS.

## Key Strengths and Weaknesses of the general health system in Ghana

The GHS Five Year Strategic Framework for Service Delivery 2007-2011<sup>22</sup> highlights some key strengths and weaknesses of the public health system.

### Strengths

- Regional and District Health Management Teams established in all districts.
- Decentralisation creates flexibility at district level to plan, monitor and coordinate service delivery; also aspects of HR management including posting/performance management.
- Decentralisation of financial management permits districts to allocate and manage their resources, and to mobilise additional funds from donors.
- Introduction of the DHMIS provides a chance to standardise, collect and collate essential data at the district level. Implementation of the CHPS initiative to make basic and comprehensive PHC health services accessible to all; success already seen in reducing maternal mortality rates, improving family planning and immunisation coverage in poor and underserved areas.

### Weaknesses

- Leadership/management issues undermine GHS performance (weak governance, ineffective communication/information flow).
- Service Delivery: health system weaknesses impede scale up of cost-effective interventions; pressure to spend on specialised services rather than PHC; referral systems remain weak; not enough attention on reducing risk factors and complications.
- Inequitable geographical and financial access to services; low NHIS registration in some districts, and problems with implementing the exemption policy.
- Inadequate budgetary provision and irregular flow of funds; lack of rational criteria for allocating budgets and lack of transparency in disbursement of funds.
- Insufficient supervision of health facilities: little accountability for performance, reduced morale.
- Health Information Management: data often not used in defining district priorities, resource allocation, decision-making, or monitoring and evaluation (M&E).
- Institutional Care: issues with staff attitude, productivity, and quality of clinical services
- HR production not matched with need; chronic staffing imbalance due to attrition and inequitable distribution
- Purchasing systems fail to ensure value for money; centralised procurement has not always brought economies of scale; inadequate coordination of operational logistics and poor maintenance.
- Inter-sectoral collaboration: opportunities for collaboration are weak: public and private sectors continue to operate separately; NGOs play little role in planning and evaluating health services.
- Planning and implementation of services in Teaching Hospitals are not linked with that of GHS, undermining data flow and referral systems.

## 4. Overview of the eye health system

### Key findings

#### Strengths

- Dedicated National Eye Care Secretariat/Unit with a National Coordinator and fully funded GHS salaries.
- Long-term support from national and international donors which has improved and sustained service coverage and quality.
- Almost every district hospital has an ophthalmic nurse
- NHIS covers most diseases, including eye diseases, reducing financial barriers to access.
- Very active private sector in eye care, especially opticians and optometrists

#### Weaknesses

- Lack of national baseline for prevalence of blindness and low vision
- NECU has lack of resources for programmes
- The integration of eye care services is not fully effective in every district
- Inequitable distribution of HReH with a concentration of professionals in the south of the country
- Low Cataract Surgical Rates
- Limited provision of refraction and low vision services
- The information system focuses on outputs (number of cataract surgeries and consultations). No data on quality

### Eye Health Status

There have not been any national population-based studies to directly assess the prevalence of blindness in Ghana. It is hoped that a comprehensive National Blindness Survey will be undertaken in 2013, with the support of Operation Eyesight Universal and involvement of the Ghana Statistical Service.

Using World Health Organisation (WHO) estimates for major causes of blindness, 1% or 240,000 of the 24 million<sup>b</sup> people in Ghana are estimated to be blind from all causes.<sup>23</sup> Sightsavers sponsored a Rapid Assessment on Avoidable Blindness (RAAB) in the Eastern Region in 2009, which estimated a prevalence of blindness in this Region at 0.7%. The Eastern Region may not be a true representative sample for the whole country as Sightsavers have been working there for over 30 years preventing and treating blindness. The WHO estimates that visual impairment is about 3 times the number of blind people, so Ghana uses an estimate of 3% for visual impairment corresponding to around 72,000 people.

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<sup>b</sup> The Ghana Census 2010 gives the population as 24,658,823 – see <http://www.statsghana.gov.gh/>

Cataract is the leading cause of blindness, contributing around 45 - 50% of the burden of blindness. The incidence of cataract blindness is estimated to be 20% of the prevalence, which means about 120,000 people in Ghana are currently blind due to cataract with 24,000 more people becoming blind each year from cataract.<sup>24</sup> Keeping pace with the incidence only, this means 48,000 eyes require cataract operations every year, equivalent to a target Cataract Surgical Rate (CSR) of 2,000 per 1,000,000 population (based on a total population of 24 million).

Other eye conditions contribute to the burden as follows: glaucoma 15 – 20%, trachoma 5%, onchocerciasis 5%, childhood blindness 5 – 10%, refractive errors and low vision 5% and others 10 – 15%. Trachoma only has public health implications in Northern and Upper West Regions.<sup>25</sup>

Ghana ranks among the most affected countries in the world for glaucoma,<sup>26</sup> with an estimated 600,000 people affected. Late presentation is a problem: a study in Bawku Presby Hospital Eye Clinic found 34% of patients who reported to the clinic for the first time with glaucoma were irreversibly blind.<sup>c</sup> There is some suggestion that glaucoma is more and more affecting younger people in Ghana, but it is difficult to tell whether this is due to increased ascertainment or a shift in pattern of disease.

A recent study of in Tema, an urban area in Greater Accra, found that refractive error is a major cause of blindness and visual impairment in this population, above cataract and glaucoma.<sup>27</sup>

Acute eye conditions are in the top 10 causes of outpatient morbidity: in 2008, there were 185,175 (out of a total of 10,639,546) outpatient appointments for “Acute Eye Infection”, 1.7% of the total, behind malaria (nearly 50%), upper respiratory tract infection (7.5%), diarrhoeal diseases, skin diseases, hypertension, and home/occupational injuries.<sup>21</sup> According to data collected from eye units by the NECU, the top 5 eye conditions seen (based on number of patients seen in outpatient departments (OPD)) are: Acute red eye; Refractive Error; Cataract; Glaucoma; Uveitis (eye inflammation).

In terms of in-patient activity, just over 900 cataract surgeries were performed per 1,000,000 population in 2011, below the annual target of 2,000 to meet VISION2020 targets.

## Eye Health System Governance

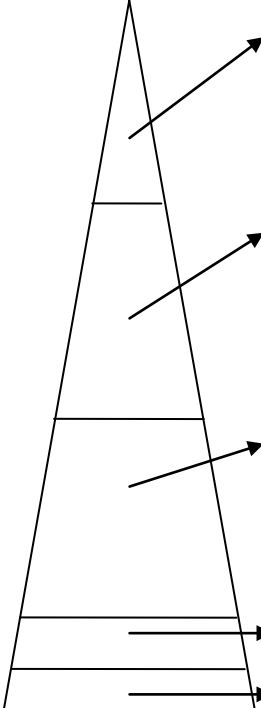
At the national level, provision of public eye health services is overseen by Ghana Health Service, as for other health services. The National Eye Care Unit sits within GHS’s Institutional Care Directorate (ICD), and provides a strategic role for the delivery of eye care services in Ghana. The delivery of Trachoma and Onchocerciasis programmes is separate and vertical and since 2009 have come under the Neglected Tropical Diseases (NTD) Unit, although the National Eye Care Coordinator strategically oversees the trachoma programme. Other programmes of work relevant to delivery of effective eye care services sit within the Public Health Directorate such as diabetes and outreach services.

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<sup>c</sup> Reported by NECU

Eye care services in Ghana are delivered at the five levels of the health system.

**Figure 7: Ghana eye health sector pyramid**



LEVEL	TYPE OF FACILITY & STAFF	POP'N	EYE CARE SERVICES
<b>National</b>	<b>Teaching Hospital</b> <ul style="list-style-type: none"> <li>• Ophthalmologist(s)</li> <li>• Ophthalmic Nurse(s)</li> <li>• Optometrist(s)</li> </ul>	-	<ul style="list-style-type: none"> <li>• Cataract Surgery</li> <li>• Outpatients (OPD)</li> <li>• Refraction</li> </ul>
<b>Regional</b>	<b>Regional Hospital (GHS)</b> <ul style="list-style-type: none"> <li>• Regional Ophthalmologist</li> <li>• Ophthalmic Nurse(s)</li> <li>• Optometrist(s)</li> </ul>	Varies by region	<ul style="list-style-type: none"> <li>• Cataract Surgery</li> <li>• OPD</li> <li>• Refraction</li> </ul>
<b>District</b>	<b>District Hospital (GHS/CHAG)</b> <ul style="list-style-type: none"> <li>• (Ophthalmologist)</li> <li>• (Ophthalmic Nurse)</li> </ul>	100,000 - 200,000	<ul style="list-style-type: none"> <li>• OPD</li> <li>• Outreach</li> <li>• (Refraction)</li> </ul>
<b>Sub-District</b>	<b>Health Centre</b>	20,000	No eye care services
<b>Community</b>	<b>CHPS compound</b>	3-5,000	No eye care services

- **National**

At the national level, eye care is seen as integrated into general health services. The majority of eye care staff are employed through MOH, eye care indicators (albeit a very limited set) are routinely collected as part of national morbidity data and all new Regional/District hospitals that are built include eye care units within the main hospital buildings. However, there is a historical legacy of separate eye care units in many parts of Ghana, with physically separate eye clinics built through vertical non-GHS funding. Although there is a sense that eye care is becoming more integrated, consequences of this historical separation can be seen, for instance, in the lack of financial support from hospitals for eye care equipment or outreach in some areas.

- **Regional**

At the regional level, the RHMT has responsibility for the delivery of public funded eye services, as for other medical specialities. Regional hospitals are all run by GHS. Seven out of nine regional hospitals have an eye clinic staffed by a regional ophthalmologist and at least one ophthalmic nurse, and six out of nine have an optometrist. Regional hospitals provide outpatient services, refraction services and cataract surgery (see Figure 7) and undertake some cataract surgical outreach to district hospitals.

- District

The majority of districts have a District Hospital with an eye care service (the NECU 2011 Annual Report gives the figure of 90% having an eye clinic). About 90% of District Hospitals are GHS, and 10% are CHAG,<sup>27</sup> but all report to GHS through the DHMT. Eye services at the district level are provided by ophthalmic nurses who act as gatekeepers to eye care services. Over the past few years the National Eye Care Programme has been working towards at least one ophthalmic nurse for every District Hospital: currently over 90% of district hospitals have at least one eye nurse. They run an outpatient service for eye conditions, referring complex or surgical patients to the regional ophthalmologist (RO) (either at the regional hospital, or to a regular cataract surgery list undertaken by the ROs as outreach to the district hospitals) and refraction cases to optometrists (where they exist). Where possible they are supposed to conduct outreach into the catchment area and undertake school screening. In theory, the DHMTs are responsible for overseeing outreach, and the Hospital Administration for delivery of clinical services, but where financial responsibilities lie is often unclear and the level of support for eye care outreach services varies from area to area. This may be a downstream consequence of where the National Eye Care Unit sits, within Institutional Care: the Directorate's remit of clinical service delivery rather than public health may be one reason why district level public health budgets are not easily accessible for ONs to do outreach.

- Sub-district (Primary health care level)

There is no eye care delivery at the primary health care (PHC) level (health centres and CHPS compounds), apart from outreach undertaken by district ONs, or in those few areas supported by NGOs where Primary Eye Care (PEC) Workers or volunteers have been trained to treat basic eye conditions and refer on.

- Community

At the community level, GHS and CHAG are supported in the Northern and Upper West region by a large network of Ghana Red Cross Society volunteers, developed with the help of the Swiss Red Cross. The role of these eye care volunteers is to identify cataract patients and escort them to the district hospital. In 2011, GHS and Sightsavers launched a new initiative to integrate eye care in the CHPS.

#### Private sector

There are a few private hospitals and clinics providing eye care, mainly in the Greater Accra region, with one or two in Kumasi. There are also many privately owned pharmacies which sell drugs for eye care. GHS ophthalmologists may have their own private eye clinics. Private providers are required to report to GHS at the regional level, but also directly to the MOH. The majority of optometrists work in the private sector, and so refraction services are mainly provided by private providers, with the exception of six regional hospitals and teaching hospitals which have refraction clinics and low vision clinics.

**Table 1: Eye health service delivery system: facilities**

	Public	Private			Total
		Faith-based	quasi-government	For-profit	
Facilities with eye clinic	113	31	10	14	168

### Strategies and policies relating to eye health

The delivery of eye care services in Ghana is overseen by the National Eye Care Unit of the GHS, through the National Eye Health Programme, whose aim is taken from the global initiative VISION 2020 THE RIGHT TO SIGHT which targets the elimination of avoidable blindness by the year 2020. The Government of Ghana launched and signed the global declaration of support to VISION 2020 on October 31st 2000, to commit the country to working towards achieving the aim.

The National Eye Care Unit provides an Annual Report yearly or bi-annually (see Annex F: List of documents consulted), and there has been a National Eye Health Programme 5-year strategic plan (2004-2008): “Imagine Ghana Free of Avoidable Blindness”,<sup>28</sup> and an updated strategic plan 2009-2014 is currently in draft form, entitled “A Shared Vision” to reflect partnership working between NECU and the international NGOs (INGOs) involved in eye care in Ghana. The international partners also produce annual reports and collect quarterly statistics in every supported district eye clinic.

Some regions produce annual plans for delivery of eye care services, for instance Eastern region (due to Sightsavers’ role in eye care in this Region), and Upper East (produced by Bawku Hospital/CHAG).

### Financing of eye health services

It has not been possible through this assessment to obtain any data on funding to eye care services, split out from the information in Figure 5. Funding for eye care services is discussed in more detail in the section on EYE HEALTH FINANCING, but sources of funding include MOH, National Health Insurance and Out of Pocket payments (for services and consumables, with OPPs particularly for refraction and low vision services and devices) and national and international donors.

### Donor mapping and coordination

There are currently four main INGOs who work on comprehensive eye health services in Ghana, Sightsavers, Swiss Red Cross, CBM and Operation Eyesight Universal. The Standard Chartered ‘Seeing is Believing’ (SiB) programme is currently being rolled out in Ghana, coordinated by Operation Eyesight Universal, with a focus on eye care equipment. See Table 2 for an overview of donor support to eye health in Ghana.

The INGOs meet regularly through an Eye Care INGO Forum, to which NECU is invited, in order to coordinate activities and share best practice. The relationship between the INGOs and with NECU is reported to be

constructive by all parties. At the first meeting of each year, strategies and workplans are shared, and activities adjusted to ensure cooperation rather than duplication. The INGO work and planning is focused at regional and district level, although all activities are discussed with NECU and fit within the broader NECU strategies for the eye health system. There is increasing recognition amongst INGOs that NECU is not very well resourced and that this impacts on the Unit's effectiveness: it has been agreed that the Head of NECU present his action plan for next year to the next INGO Forum to that they can best see how to support the work of the NECU.

**Table 2: International donor contributions to eye health**

Donor	Field of Intervention and Activities	Timeline & duration	Project location	Partner
Sightsavers	<ul style="list-style-type: none"> <li>Established and support NECU</li> <li>Comprehensive Eye Care Services in Eastern Region</li> <li>Oncho and LF projects (all regions apart from Greater Accra).</li> <li>Trachoma (Upper West, Northern Regions)</li> <li>Support to training of ONs.</li> <li>Social Inclusion work nationally with GBU/GFD</li> </ul>	1993-present  (although worked through partners e.g. GBU since the 1970s)	Projects in 9/10 Regions (not GA).  Service Delivery: > Eastern Region (since 1996) <i>[Formerly Volta Region]</i>	GHS (RHMT) NECU NTD Teaching hospital? GBU/GFD
Swiss Red Cross	<ul style="list-style-type: none"> <li>Comprehensive Eye Care Services</li> <li>Project to fight childhood blindness (Action Against Childhood Blindness, AACHIB)</li> <li>Previously funded training</li> </ul>	2005-present	> Upper West > 6 districts in Northern. <i>[Formerly Brong Ahafo Region]</i>	GHS (RHMT) NECU Teaching hospital?
Operation Eyesight Universal	<ul style="list-style-type: none"> <li>Service Delivery (in partnership with RHMT) in 24 selected Districts</li> <li>Equipment (through SiB)</li> <li>Funding research: prevalence survey to be carried out in 2013</li> <li>Support to HReH development (ON refresher courses and training of equipment technicians)</li> </ul>	2005 - 2016	35 districts and hospitals across the 10 regions in Ghana	MOH GHS (RHMT) NECU



	<ul style="list-style-type: none"> <li>• Advocacy and Awareness creation</li> <li>• In the future, plan to work more with District Health Teams to make best use of CHPS</li> </ul>			
<i>[CBM – no longer have a base in Ghana]</i>	<i>Historically funded service Delivery, outreach eye care services, ran the Refraction/Low Vision Programme (passed over to NECU in 2009), and supported training of ONs and Ophthalmologists.</i>			CHAG (FBOs e.g. Presby eye units in Agogo and Bawku)

## GOVERNANCE OF THE EYE HEALTH SYSTEM

### Key findings

#### Strengths

- Presence of a NECU to oversee eye care in Ghana, with dedicated staff
- Active DPOs e.g. GBU and GFD, with evidence of changes to policy brought about by advocacy
- Good collaboration between NECU and international NGOs

#### Weaknesses

- There are a number of hierarchical levels between MOH and NECU which makes it hard for eye care organisations' voice to be heard at policy level
- No eye-care specific feedback on how beneficiaries experience eye health services and perceive the quality of service
- There is no data publicly available comparing the various eye care providers in terms of quality and performance

### Organisational structures and their impact on governance

There is a National Eye Care Unit to coordinate activity nationally, which is positive and gives a sign that eye care is at least nominally seen as important. NECU is part of ICD (see Figure 4), and so relies on representation via the Director of ICD at senior level meetings to give voice to the Unit and its priorities. However, a number of interviewees reported that there were a number of steps between the NECU and policy makers in the MOH, that they “had not heard anything from eye care” and that “ICD has been quiet for some years now”. This has the effect of reducing the voice and reach of the NECU in advocacy for eye care in Ghana.

The suggestion was also made that eye health may more logically sit under the very active Public Health Directorate (outreach, prevention) rather than Institutional Care with its more clinical treatment focus, although interviewees recognised that changing set organisational structures may be difficult. Where eye health sits within the structure has consequences, in terms of voice at national level and in terms of power and funding at district level.

NECU has no direct access to parliament or ministers. It is occasionally invited to the Parliamentary Health Select Committee, for instance as part of advocacy for World Sight Day in 2011.

An opportunity for increasing importance of eye health at the national level is to lobby the new Director General of GHS who is known for being supportive to eye care.

## Government responsiveness to beneficiaries

At the national level, collection of information regarding patient satisfaction is the responsibility of the ICD through the national Quality Assurance (QA) strategy,<sup>29</sup> with QA boards in every hospital to oversee this at the local level. Whilst it is encouraging that there is a national policy on quality, the extent to which this is being implemented appears to vary between facilities and regions. From interviews it appears that those areas supported by CHAG or other external donors may have a stronger focus on assessing and reporting on quality. In addition, the focus appears to be generic service factors (waiting times, cleanliness, staff attitudes) rather than aiming to assess patient priorities or compiling feedback regarding specific services such as eye care.

Scarce information is collected on quality of eye care services. A manual tally sheet for cataract surgical outcomes monitoring exists,<sup>30</sup> which ophthalmic nurses (ONs) generally fill in and return to the regional ophthalmologists. As far as interviewees were aware, this is not a national policy and data on surgical outcomes are not aggregated or reported at any level of the health system. Therefore patients are unable to make informed choices about whether to have surgery based on data about quality of surgical outcomes in their local facility, and eye care staff are unable to benchmark the quality of their own performance with others. Instead, the public tends to use word of mouth to share information about perceived quality of eye care: for instance, staff at Tarkwa have seen an increase in people coming for surgery when peer-reported surgical outcomes are good. The Swiss Red Cross with GHS developed a QA policy<sup>31</sup> that was implemented in 2008 and 2009 in three regions. This policy was aligned with the national policy on quality assurance and could serve as a solid foundation for a new quality assurance policy in eye care.

As eye health at the national level is integrated within general health services, there is no separate mechanism for collecting feedback specifically about eye care services. At sub-national level, the collection of data and responsiveness of eye care services to patient input appears to vary. For instance, in the Western and Upper East regions, feedback about eye services is not collected separately, or separated out of the general QA data; in the Eastern region, there has been quite a bit of work to collect feedback on eye care services, including complaints desks in eye clinics and eye patient satisfaction surveys (co-funded by Sightsavers and the Regional Health Authority). CHAG-supported eye services in the Upper East region train staff in communication skills and conduct client satisfaction surveys every 6 months: results are posted on clinic notice boards and included in annual reports to funders. Eye care services are more likely to be effectively and efficiently meeting need in those areas where patients are involved in decisions about and reporting back on the care that they receive.

When holding annual review or strategic meetings, the NECU does invite representatives from MOH, GHS, regions, districts, eye care staff, private practitioners and partners (INGOs, GBU etc), but does not systematically invite input from those utilising eye care services in Ghana.

## Disabled People's Organisations in Ghana: role and capacity

### *Representation/voice*

The main Disabled People's Organisation relevant to those with eye conditions in Ghana is the Ghana Blind Union (GBU) which has 107 District branches, and nearly 9,000 card-bearing members. This represents just under 4% of the estimated blind population in Ghana. GBU is part of the Ghana Federation of the Disabled (GFD). Other relevant patient associations include the Glaucoma Association of Ghana (GAG) and the Ghana Diabetes Association (GDA).

The government of Ghana tends to listen to agencies such as the GFD. GBU tends to liaise more with the Ministry of Employment and Social Welfare rather than the Ministry of Health, so has no formal strategic interactions with NECU.

The main focus of GFD is capacity building of their members, although there are not enough trained personnel to do this equitably across the country, and especially in rural areas. It is not clear how representative GBU members are of the whole population of those with eye conditions. The NECU do not appear to use GBU in a systematic way to listen to beneficiary voices about how they feel about any eye care services (for instance, to explore reasons why those who are already blind from cataract may not access cataract surgery).

### *Technical power/oversight*

General opinion is that GBU has both the capacity and the opportunity to advocate for eye health issues at a national level (although less at a local branch level). Examples of successful national campaigns include the "I RESPECT THE WHITE CANE" campaign to increase driver awareness (see bumper sticker, right), and advocacy to enable blind people to vote independently, and to influence school building policies to phase out low light bricks rather than proper windows.

*Picture 1: Evidence of the Ghana Blind Union "I respect the white cane" campaign on the bumper of a vehicle*



However, it was acknowledged through a number of interviews that GBU do not have systematic access to good data on eye health. It does not appear that any data is provided regularly to them, but instead comes in an ad hoc way via relationships with partners, or from data they collect from their grassroots membership. The GBU have not received the NECU Annual Report for the last few years. There are opportunities for NECU to work more closely with GBU and other DPOs to use their membership base to consult on strategic NECU documents, and for DPOs to advocate at parliament-level on behalf of the NECU.

### **Information available to the public about eye care services**

There is little public information about quality and cost of eye care services. Regarding cost, the majority of eye care services are covered by the NHIS but there is still a proportion of the population not covered by NHIS. User fees should theoretically be the same price as the NHIS tariff, but some facilities decide their own tariffs for OPPs. In addition, some eye-related conditions or items (medicines, optical devices) are not covered by NHIS. Information regarding the cost of these is not readily available to the public.

### **Information available for decision-makers**

Health service activity data is collected from facilities via the District Health Management System (DHMS). However, very little information is collected on eye care services from facilities, and even at district level it is collated with other specialty service data so is not available for decision-making about eye care services.

The NECU therefore collects basic information on a limited number of indicators (surgeries for cataract, trachoma, glaucoma, OPD attendance for trachoma, cataract, glaucoma, refractive error, and available HReH) directly from ophthalmic nurses and ophthalmologists, in order to report, advocate and plan.

In terms of GHS Directorate planning and reporting, as NECU sits within the ICD, their annual plans and reports are sent to ICD who determines which areas to prioritise and report on, and submits a report to the Directorate of Policy, Planning, Monitoring & Evaluation (PPME) who compile the GHS Annual Report. By the time it gets to this national report stage, eye care is often missing. A number of participants mentioned that underlying the lack of focus on eye care was a lack of prioritisation of eye care by ICD or GHS as a whole, likely based on the fact that blindness and low vision are not part of the Millennium Development Goals (MDGs), and do not induce high mortality rates.

Regarding information flow in the other direction, collated data and analysis is rarely fed back down to the level at which it was collected, for local benchmarking, planning and decision-making.

### **Health sector regulations**

General health sector regulations apply to eye health, as eye health comes under GHS services. Changes to MOH regulations and new policy directives are disseminated to staff, including eye care staff, via department heads in regional and district hospitals. However, as identified with QA, it appears that there is a lack of audit as to whether information has in fact been disseminated, and progress of implementation on the ground.

## EYE HEALTH FINANCING

### Key findings

#### Strengths

- Fully funded NECU team (staff salaries from core GHS funding)
- Salaries of the majority of front-line eye care staff in public facilities are MoH / GHS-funded, a sign of sustainable integration of eye care services into general health care
- NHI scheme includes several eye care interventions such as cataract surgery

#### Weaknesses

- MoH / GHS financial commitment to eye care is limited compared to international donors' funding
- Public funds are disbursed with delays at facility level constraining the purchase of drugs and consumables
- Key eye care services and devices are excluded from NHI e.g. refraction and optical aids; glaucoma visual field and some glaucoma drugs; retinal detachment, laser treatment
- Lack of clarity around who is responsible for funding outreach and school screenings: DHMT or facilities?

### Revenue collection: sources of financial resources for eye care

#### Government

It proved impossible to get an overall figure for money spent on eye health, a figure for public (government) spending on eye health as a percentage of total health expenditure, nor donor spending as a percentage of total eye health spending.

At the national level, ICD collates proposed workplans from its Programme Units and submits a single workplan to GHS. There is no specific budget line for eye care: instead workplan activities are coded according to theme, for instance 'Advocacy', or 'Training', and so advocacy for eye care would be amalgamated with advocacy activities from other Units within ICD. This makes it difficult to determine the proportion of the budget that is allocated to (and actually received by) NECU.

Funds are allocated to ICD as a whole, and divested to the individual units through directorate negotiations about priority. Even when funds have been allocated, they do not arrive in a timely way, but in small quantities throughout the year. This means that even if budget has been allocated to the NECU, by the time funds arrive another unit may have a more pressing need that is given priority. Generally, nothing is earmarked for eye care, unless for a specific national event such as World Sight Day.

The NECU reports that it often does not receive even 1% of the funds requested, which may be because of the lack of priority put on eye care, or a general lack of funds across ICD. The majority of the budget for eye care

services is managed by district hospitals and is integrated into their general budget although INGOs have in the past directly funded the eye care clinic without providing financial data to district hospital managers.

The majority (over 70%) of the health sector workforce is employed by GHS.<sup>22</sup> However, it was not possible during this assessment to get a specific figure for spend on eye care staff as cadres are usually grouped under other headings, for instance ophthalmologists are often included under “specialists”, and ophthalmic nurses under “nurses”.<sup>32</sup> The fact that GHS holds the budget for public sector staff including eye care staff has an impact on the employment of some cadres in the public health service, for instance optometrists and opticians, discussed in the HUMAN RESOURCES FOR EYE HEALTH section.

### *Non-governmental organisations*

Additional revenue is available through national and international non-governmental organisations, such as NGOs or INGOs, or through business Corporate Social Responsibility programmes, whose funds are usually tied to specific facilities or programmes.

Donors tend to give funds direct to districts or regions to implement programmes of work and do not tend to fund the work of the NECU (although occasionally INGOs report having funded office equipment for the NECU when supplies have run low and no funds are available from government).

Although the majority of staff providing eye care services are employed by GHS, and therefore their salaries are paid for by government funds, some staff working in non-GHS facilities (for example, District Hospitals run by CHAG) receive additional expenses on top of their MoH salary, for instance travel costs. This gives them freedom to deliver more comprehensive services, such as outreach, leading to differences in service provision between areas with only GHS facilities and those supported by non-GHS organisations.

INGOs reported a strategic move towards wanting to work in a spirit of partnership through co-funded collaborative programmes at Regional or national level, which is a positive move for sustainability and integration of services. However, they also reported experiencing situations where GHS promised to contribute a certain amount of matched funding but despite signed agreements, funds were not forthcoming.

### **Pooling and allocation of financial resources for eye care:**

#### *Government*

Government budgets are decentralised to facilities, district and regions, and funds managed via BMCs. The exception is funds for capital spend and for Human Resources (including salaries) which are held centrally. This central management of HR budgets can cause problems as it means that local managers have much less control over staff recruitment and distribution.

It is often unclear who is responsible for funding specific eye care services at the district level, for instance, whether eye care equipment should be funded by the facility as for other specialities, or through district or national funds. Similarly, whether outreach is the responsibility of the DHMT (as a public health activity), or of the facility (as the ON based there is the one doing the outreach). As a result, eye care staff often have

difficulties getting funding for equipment and outreach. It was reported by a number of interviewees that there is no funding from districts for aspects of services that do not have targets attached.

Regardless of where the funding *does* sit, there is opportunity for the NECU to support local eye care staff to make a financial case for investing in eye care staff, equipment and outreach.

Interviewees reported delays in receiving funds from central government which impacted on cash flows and ability to purchase equipment. At GHS facility, district or regional level, there are no earmarked funds for eye care (non-GHS facilities with external, non-government sources of funding may differ, and this is discussed below).

### *National Health Insurance*

Ghana has a NHIS which covers a large proportion of the population, and a majority of eye care services. Eye care staff interviewed at all levels reported that they felt that the NHIS had increased the numbers accessing eye care services and consequently increased pressure on the eye health staff and on the system, although no specific figures were available to evidence this. National data that shows that the number of outpatient attendances per member has increased.<sup>14</sup> However, NHIS coverage rates vary by region (Figure 6), a proportion of the population is not registered (particularly those with low education<sup>14, 20</sup>) or hold cards but do not pay the annual premium, and some key eye care services are not covered by NHIS which means that there is likely to still be inequity in access to eye care, particularly amongst the most poor.

Although the 2009 NHIA annual report<sup>17</sup> (p42) includes the list in Box 1 as part of the minimum package of services covered by NHIS, there is no mention of either refraction or visual field on the more recent NHIA tariff lists in 2011<sup>33</sup> (Table 4), or of A-Scan or Keratometry on the list of diagnostics covered (although these costs may be included within the “OPD Eye” tariff, Table 4). Neither retinal detachment nor laser treatment is mentioned.

Optical aids are specifically excluded from NHIS (Annual Report 2009 p44). It is likely that there is a large amount of unmet need , , particularly amongst those who are unable to pay Out-of-Pocket for refraction or glasses, and this must be addressed. Consensus amongst eye care staff is that basic glasses should be included under NHIS. Additionally, services and drugs for glaucoma are not fully covered by NHIA (see MEDICINES, PRODUCTS AND EQUIPMENT FOR EYE HEALTH), and this also needs to be tackled. In parts of Ghana where non-GHS providers such as CHAG operate, with access to external resources, the local population often have better access to eye care services, through subsidies or free provision of drugs, equipment or services outside of tariff.

The Head of the NECU and the Ophthalmological Society of Ghana are invited to contribute to discussions at GHS over what is included / excluded, prior to meetings with the NHIA. As eye care is not an MDG priority, there is a lack of confidence that eye care requests will be included by GHS in discussions with NHIA.



**Eye care services**

- A. Refraction
- B. Visual fields
- C. A-scan
- D. Keratometry
- E. Cataract removal
- F. Eye lid surgery

Interviewees reported inefficiency in reimbursements at facility level, and that as with government funds, NHIS funds were often received many months late, a problem identified elsewhere<sup>14</sup> and which creates challenges for planning. Examples were given at facility level that spending on equipment or training for eye care staff was restricted due to uncertain funding flows.

NHIS is likely to have led to an increase in data quality as facilities record each activity in order to be reimbursed. Although there are negatives to this in terms of cost inflation,<sup>14</sup> there could be opportunity for the NECU or local eye care services to use NHI data to improve the performance of services.

**Budget setting and expenditure at facility level**

In most facilities, setting budgets and balancing the requests of different service units within a hospital appears to be based on historic activity (demand) or planned activities (supply) rather than estimated need.

GHS facilities tend to have one budget (the Internally Generated Fund, IGF) split into two separate budget lines only: a drugs account (reimbursements from NHI for drug expenditures), and a service account (covering everything else, for instance funds received through NHI reimbursement, OPP/"cash and carry", and any donations for example for HIV/malaria). Facilities have autonomy over what they use their IGF for: they do not have to get sign off at district or regional levels. Any user-fee revenue generated from eye care in GHS facilities (whether through NHI or OPP) is not ring-fenced for eye health at facility or district level, but goes into the general IGF funding pot.

Some hospital administration teams reported having set aside IGF for eye care equipment, but there will be differences in the spend on eye care services from hospital to hospital depending on local relationships and arrangements, leading to inequalities in the quality and quantity of services provided to patients in one area compared to another.

No evidence could be found that facilities track actual expenditure (for instance, how much an OPD appointment actually costs to provide) compared to NHIS tariffs, and whether at facility level the hospitals are breaking even or making a profit.

Eye health services in some non-GHS facilities, do have a separate account for eye care services, which helps to demonstrate how much income is generated by the eye care work, and this money can be ring-fenced.

The Eye Clinic at the Navrongo War Memorial Hospital in the Upper East Region is staffed by an Ophthalmic Nurse. The Ophthalmic Nurse books a sufficient number of cataract cases and then invites the Regional Ophthalmologist from the Upper East Region (usually based at Bawku Presby Hospital) to perform the surgeries. A percentage of the funds that accrue from the surgeries is given to the nurse for his share of the work in collecting patients for surgery.

As a result of this local incentive, together with the recognition from hospital administration that he is bringing in income to the hospital, the numbers of cataract surgeries have increased and the ophthalmic nurse is highly motivated, reporting “I have not regretted accepting to come and work here.” The clinic is well supported by the hospital management in terms of consumables and other office amenities, and the ophthalmic nurse has increased influence in the hospital and is invited to hospital management meetings.

This model could be encouraged elsewhere, and the return on investment used to incentivise hospitals to support clinics with equipment and consumables and staff to train in eye care.

### **User fees**

All health facilities have the same general tariffs for eye care, although the pricing differs according to the type of facility (see Table 7). Some facilities may set their own OPP prices rather than basing them on the NHIS tariffs.

School screenings are generally free of charge to the families, but as with outreach, whether it is the hospital or DHMT who should cover costs associated with screening (e.g. transport) is often unclear, so school screenings are not organised as often as they should be. It also depends who is undertaking the screenings: if an ON, then it would be free to families. If done by a private optometrist, then payment is required, which leads to inequitable access for those families too poor to pay.

## EYE HEALTH SERVICE DELIVERY

### Key findings

#### Strengths

- The majority of district hospitals in the country are staffed by ONs
- ONs in some areas have developed integrated relationships with other speciality professionals

#### Weaknesses

- Historical provision of eye care services as vertical programmes funded by national or international NGOs means that eye care services are sometimes not as integrated as they should be
- Primary Eye Care (PEC) is not integrated within PHC
- Outreach consultations organised by ONs are often constrained by the lack of consensus between DHMTs and hospital managers
- Lack of refraction/low vision services in many parts of the country
- The quality of eye care services is not assessed

### Availability, access to and utilisation of eye care services

There is a basic level of eye care services across all regions, although availability and coverage of eye care services varies from region to region, and within regions, depending on a variety of factors, including:

- whether the local hospital is GHS-funded or has external funding sources such as CHAG or INGOs which boost provision of services and equipment through capital investment, subsidisation of services not covered by NHIS, incentives to staff, or training of community-level eye health workers;
- whether there are enough ophthalmic nurses to provide both outpatient and outreach services;
- whether there is anyone to provide refraction and low vision services;
- whether the hospital and/or the DHMT sees it as their responsibility to fund/provide equipment and transport for in-hospital and outreach services;
- whether there are additional factors driving up quantity of service provided, for instance some ophthalmologists working in GHS facilities receive incentives per surgery; other purely private facilities are profit-making, and so more activity means more profit.

Strategies to increase access to eye health services include outreach by ophthalmic nurses (increase attendance at OPDs) and by regional ophthalmologists (surgical outreach to increase cataract surgical rates), as well as national awareness-raising campaigns such as World Sight Day (focused in a different Region each year), World Glaucoma Awareness Week (Accra-centric) and Glaucoma Association Week (Ghana-wide). It is recognised that

some activities may be concentrated around Accra, and that organisations such as Ghana Blind Union and the Glaucoma Association may need support to effectively reach out to those in the regions.

The introduction of the NHIS scheme both increased utilisation of eye care services and put pressure on the eye health system, and although this is likely to have plateaued, population growth will continue to increase the yearly pressure on eye care services.

## **Provision of comprehensive eye health services?**

### *Levels of provision*

Curative (secondary and tertiary) eye care services are provided through district, regional and teaching hospitals, and although there are limitations to service provision as highlighted by this assessment, a major gap is in the provision of Primary Eye Care services, with a knock on impact on access to secondary/tertiary care. A robust PHC system is emerging, but does not include eye care. There is no provision of eye health services below district level: the vast majority of health centres and CHPS compounds do not have staff trained in eye care. CHPS compounds are easily accessible, open 24 hours of the day 7 days a week, and having PHC staff trained in PEC would increase awareness and early and appropriate treatment of eye conditions especially injuries.

The NECU is keen to integrate PEC within PHC. National policy makers and local administrators need to be brought on board in order to change national curricula for training of health care workers and to ensure that HCWs have access to appropriate equipment and consumables at district level. Sightsavers are piloting integration of eye care into CHPS within two districts in the Eastern region by training community health officers in basic eye health. There is yet to be any data to evidence how effective this has been (for instance, are they managing or referring patients appropriately?). If evaluated to be effective, this may be a good way to both provide a template for roll out of PEC nationally in the future, as well as to facilitate Public Health engagement in eye health at a national level, as CHPS sits under the Public Health Directorate of GHS.

### *Range of provision*

Eye health services in Ghana appear to be focused in curative services rather than prevention, early detection, or rehabilitation. There may be a number of reasons for this, including lack of resources, the longer timescales and difficulties for advocating for investment in prevention rather than treatment, the influence of organisational structures, and where the NECU sits within the GHS, under Institutional Care rather than Public Health.

- Prevention: It is part of the role of an ophthalmic nurse to create awareness both of good eye health and early treatment for eye conditions. However, by the time patients arrive at health facilities, it may be too late to treat effectively, and more needs to be done at national level to prevent eye conditions from occurring in the first place. For instance, eye injuries are common, and advocacy to improve Health & Safety legislation (e.g. mandatory eye protection for occupations such as welding or handling chemicals) may prevent occupational injuries.

- Early detection: could be better, including further awareness raising, and proactive testing, e.g. through training of CHPS and traditional healers, ensuring equipment is available e.g. to test Intra Ocular Pressure for glaucoma, plus more integration with other existing health services e.g. diabetes, hypertension. Also integration with other non-health bodies, such as through integration of eye testing into drivers' eye tests. All drivers have a basic test to check their vision, but could include testing for glaucoma at this stage.
- Treatment: services are adequate (a strength) except for drugs (no supply, or not covered by insurance). Also, treatment is not only drugs, but also optical aids (a weakness).
- Rehabilitation: needs more focus and advocacy. There is a fund at District Assembly level (from central government, 2% of the total money sent to the District Assembly) for all categories of disability, and GFD can access these funds.

## Specific Services

### *Outpatients*

The main role of Ophthalmic Nurses is conducting outpatient clinics and referring complex or surgical patients to the Regional Ophthalmologist. Patients are also referred if the nurse does not have access to appropriate equipment such as a slit lamp to be able to diagnose effectively. Some ONs are trained to do trachoma trichiasis surgery (Northern and Upper West only, due to presence of trachoma in these 2 regions)). Hospital management generally see these hospital-based eye care services as an integrated part of the hospital, as they depend on all the same facilities.

As the majority of District Hospitals only have one ON (and there are a few which do not have any eye care staff), they do not have any cover and so can find it difficult to have time to do outreach.

### *Outreach*

Ophthalmic nurses visit health centres in their districts to undertake outreach and population sensitisation. However, the work of ONs are often seen by hospital management and by DHMTs as a purely hospital-based service. It was reported that many District Health Administration teams did not have much to do with eye health as it was not seen as a community health service. This has implications for funding (transport, consumables) and integration of services.

Where ONs sit in the organisation of district health care needs to be clarified, so that appropriate lines of accountability and funding can be assured. In practice this would mean that hospital and district management teams felt jointly responsible for their ophthalmic nurses, and made adequate funding available for outreach. This might mean that the District Hospital agrees to fund equipment, and the District Administration to fund outreach (transport, consumables), or another local arrangement as long as it is clear.

In some areas where there is a lack of ONs, those from other districts cross district borders to conduct outreach to those patients. This does not appear to be done in a systematic way to ensure needs of populations without access to eye care services are met and so there is likely to be inequalities in access.

Besides outreach, there is a lack of community eye care services, and real gaps in screening and educating the community about eye conditions.

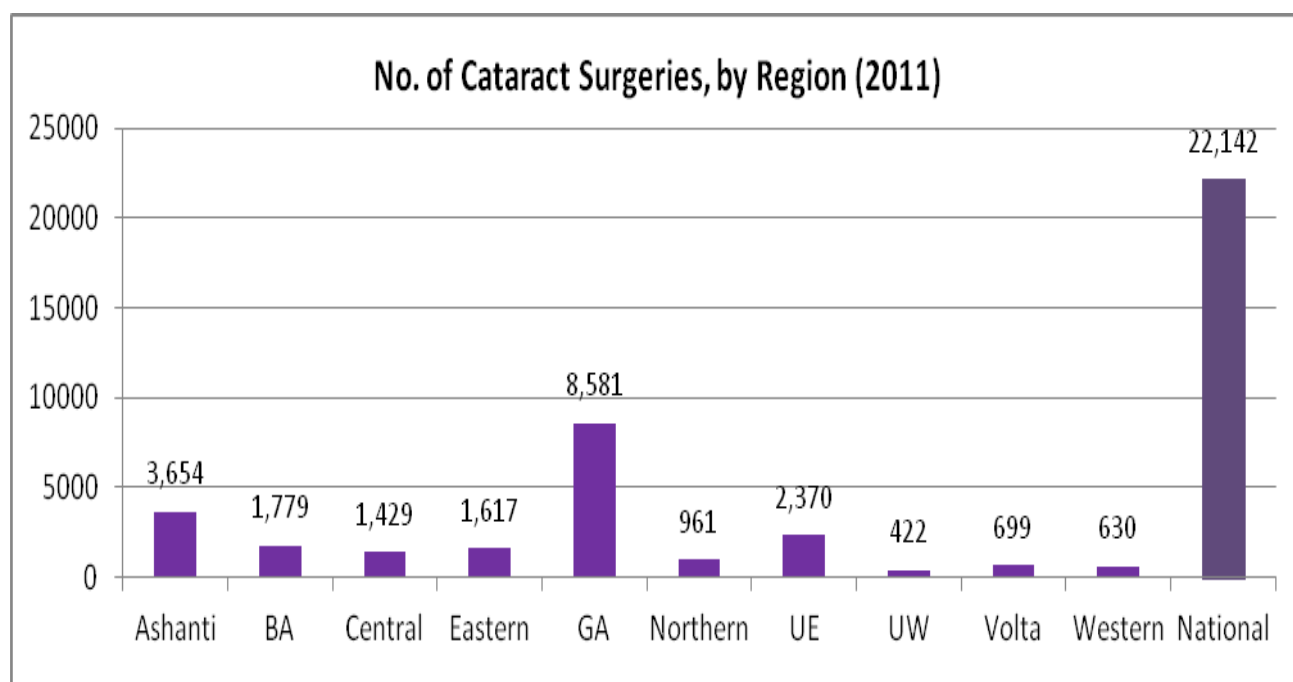
### *Cataract Surgery*

Cataract Surgeries are done by ophthalmologists. The exception is the one cataract surgeon, a CHAG-employed nurse (trained in Kenya) at Bawku Hospital in the Upper East Region.

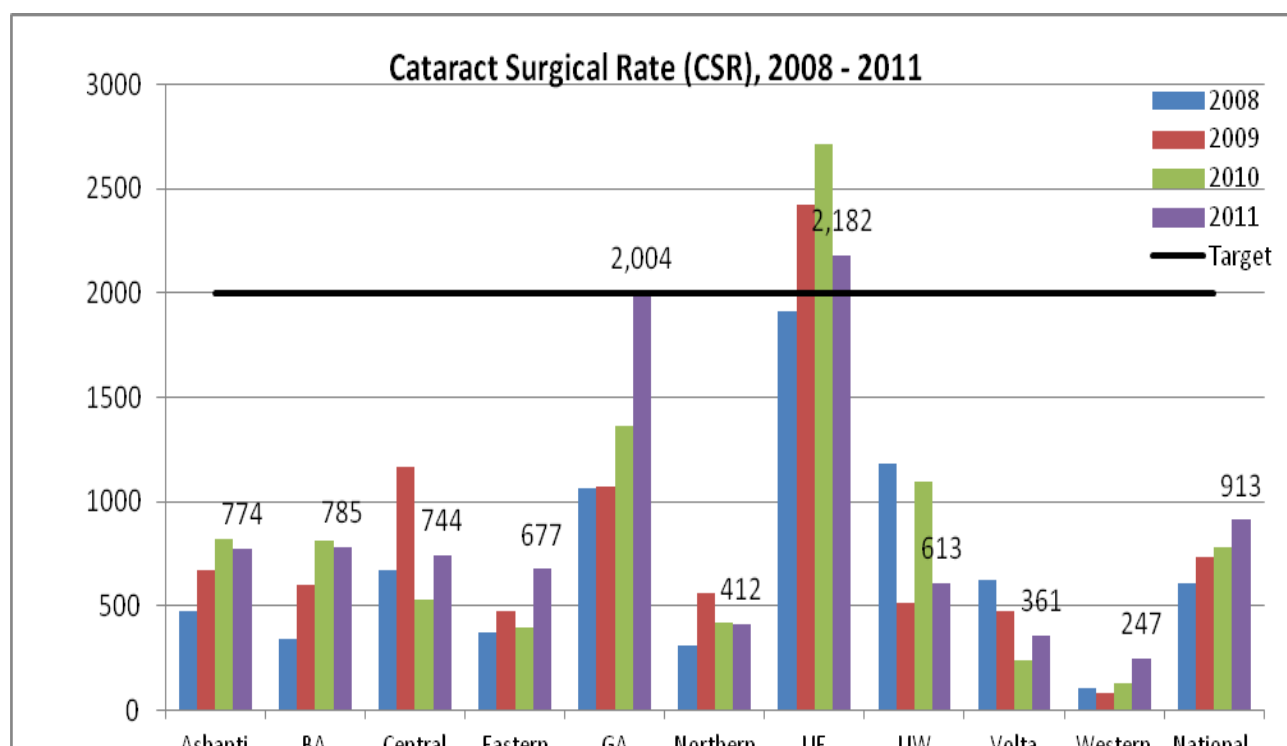
Keeping pace with the incidence of cataract in Ghana's population requires cataract operations on 48,000 eyes per year. However, less than half of that number is being done: around 18,400 in 2010 and 22,000 in 2011 (Source: NECU). The national cataract surgical rate in 2011 was just over 900 surgeries per million population, a year on year increased from around 600 in 2008 but is still a way from the target CSR of 2,000. This is a concern as Ghana is now into the second half of VISION2020.

The CSR varies widely across Ghana, with Greater Accra and Upper East regions reaching the target level, whilst other regions are only undertaking a tenth of those required to meet targets. See Figure 8 and Figure 9.

**Figure 8:** *Number of Cataract Surgeries by Region (Source: NECU Annual Monitoring)*



**Figure 9: Cataract Surgical Rate by Region, compared to the 2,000 target (Source: NECU Annual Monitoring)**



Reasons for the low CSR rates include the low numbers of ophthalmologists, irregularity of cataract surgical outreach to Districts (e.g. once a quarter in the Western region compared to once a month in the Upper East), lack of transport for ophthalmologists to move around, and poor road networks. See Case Study 2 for some of the challenges faced in the Western region.

#### Case Study 2: Reasons for low cataract surgery in Western Region

##### Reasons for low cataract surgical rate (CSR) in the Western Region

- Until recently, the Regional Ophthalmologist has not had a base to carry out surgeries, and so has been unable to perform a single surgery.
- Despite having an ophthalmologist and 2 ophthalmic nurses, there is a lack of basic surgical equipment for hospital work (e.g. microscope, cataract surgical kit), let alone for outreach.
- Even if there was equipment, the hospital only has one suitable vehicle: the road network is poor in the northern part, which requires a 4x4. The lack of transport to travel to the more distant areas means that the few cataract cases that get done in the northern part of the Region are mainly operated on by ophthalmologists from Kumasi or by Operation Eyesight Universal.
- Eight out of eighteen District Hospitals in the Western Region have no Ophthalmic Nurses. The ONs in those hospitals such as Tarkwa that do have ONs allow their nurses to work flexibly and travel beyond their catchment area to do outreach to identify patients, and also use radio to increase awareness.

However, looking objectively at the CSR, the low activity cannot be explained solely by problems of transport and equipment. Even in urban areas where there are sufficient ophthalmologists and equipment, the output is low.

Interviewees reported that the number of cataract surgeries carried out per session can vary widely between ophthalmologists from as low as 3 to as many as 50 in a day.

One of the reasons given for the increase in number of cataract surgeries undertaken in 2011 compared to 2010 was the provision of financial incentives through a Sightsavers/Vodafone funded programme (as part of the 2011 World Sight Day Celebration), and that a weakness with the current system is that ophthalmologists receive a salary regardless of their surgical performance.

This variation in activity between ophthalmologists is also likely to be due to a lack of nationally agreed standards and targets per individual, and of effective supervision, monitoring and benchmarking of activity.

### *Refraction and Low Vision services*

Access to refraction and low vision services is a serious problem in Ghana, both in terms of availability of appropriately trained human resources, of equipment, and of consumables such as spectacles and optical devices, and of affordability of services as refraction and low vision services are not specifically covered by the NHIS and optical aids are definitely excluded. Purchasing items such as spectacles can constitute a significant proportion of individual or household income.

Refractive error is a common and easily treatable condition, yet the majority of the population does not have access to services. Ophthalmic nurses are trained to refract but many do not see it as part of their job and most do not do refraction, instead referring to an optometrist if there is one, or more usually to the regional ophthalmologist. This may also be because of a lack of equipment, for example a refraction set, leading ophthalmic nurses to become de-skilled in refraction even if initially trained.

Low vision patients are referred to a low vision clinic where they exist (for instance, low vision services are available at Korle-Bu Teaching Hospital, and at Koforidua Regional Hospital Eye Unit in Eastern region). Very few hospitals stock refractive products or optical devices. Low vision services have always been part of the NECU workplan, but CBM support for this service finished in 2009. As discussed in EYE HEALTH FINANCING, funds for NECU programmes often do not materialise.

The NECU/Institutional Care Department is currently developing guidelines for refractive services in hospitals, recommending that every regional hospital should in the future have one refractive centre, with provision of cheaper refractive products through national bulk buying.

### *Specialist eye care services*

Specialist paediatric ophthalmology services are available in Korle Bu Teaching Hospital in Accra and Komfo Anokye Teaching Hospital in Kumasi.



### *Childhood eye health*

- Every newborn child should receive prophylactic antibiotic eye drops. Midwives should then refer the child into eye care services if any problems are identified.
- Measles vaccines are delivered by community health nurses as part of the Child Welfare Programme in the community.
- Vitamin A delivery is organised via Districts through school and household visits every 6 months as part of the National Immunisation Programme
- School screening is part of the job description of an ophthalmic nurse. As ONs are stretched between clinic work and outreach, when it can be done, school screening tends to be targeted at those entering school (Class 1, 6 years old) and leaving school (Class 6: 11 years old; Junior High School: 14-15 years old). ONs try to do screening in each school annually but this does not happen systematically. School screenings are often done in partnership with the DHMTs (including, a dental nurse and a public health or community nurse).

### *Integration of eye care with other health services*

How integrated eye health is with other specialities differs from area to area, often dependent on ad hoc local relationships. For instance, in some hospitals in the Western region, any diabetic or hypertensive patient attending clinics for this condition are sent to the eye nurse on their third visit for check up. In the Upper East, there does not appear to be any systematic or proactive integration, apart from the initiative of the local ophthalmic nurse to speak to the diabetic nurses, to speak to pregnant women or to visit the maternity ward to assess every new born. Often patients are only referred to the eye clinic once vision symptoms begin to show, rather than proactively upon diagnosis of a factor (such as diabetes) that increases risk of developing an eye condition.

### *Quality and Quality Assurance*

There is a national quality assurance policy, but no policies specifically on the quality of eye care services in Ghana.

### *National Standards*

There appear to be general national standard treatment guidelines for the health service that include some common eye conditions (for example conjunctivitis, red eye) but a copy could not be found to review. It does not appear that there are any national standard treatment guidelines specifically for eye care: the Regional Ophthalmologist in the Upper East has developed a protocol for basic treatment of common eye diseases for use in the region, but interviewees were unsure whether there were any national standard eye care treatment plans (beyond the content of teaching materials used to train eye care staff in training schools). In 2008, the Swiss Red Cross and GHS developed a QA guideline<sup>31</sup> that was piloted in Brong Ahafo. This guideline could be used as a starting point for NECU to develop the national guideline.

### *Outcomes and monitoring*

There is a lack of outcome data for eye care. The DHIMS system is limited and does not include any outcome data, only activity. A common assertion from interviewees was that what is measured is focused on, and since there is a lack of measurement of outcomes, there is a corresponding lack of focus on outcomes. It is important to monitor quality so that the eye health system and eye health staff know what is working, as well as what is not.

Outcomes of eye care surgery are particularly important, but even when surgeries are counted, there is a lack of standardised quality assessment and most of the time no surgical audit, although recommended by WHO. Patients return to the OPD after surgery to be assessed by the ophthalmic nurse. Sometimes they do not attend, and there may be need to increase information given to patients regarding the importance of post-surgical attendance. In terms of outpatient activity, ophthalmic nurses should be checking Intra Ocular Pressure in all patients seen in the eye clinic in order to improve early detection of glaucoma, but there is no monitoring to check whether this is being implemented. The role of supervision and continuing professional development in quality of service provision is discussed in the following section.

## HUMAN RESOURCES FOR EYE HEALTH

### Key Findings

#### Strengths:

- Regional Ophthalmologists oversee eye care services and carry out cataract surgery in nearly every region
- Ghana has nearly staffed every health district with at least one ON
- There are increasing numbers of nurses applying for ON training, including from rural areas currently under-served by eye care services

#### Weaknesses:

- Poor distribution of Ophthalmologists in the country with most regions under-staffed
- Limited number of doctors interested in studying ophthalmology
- Supervision of eye care staff at every level of the health system is not systematic
- Lack of sub-specialisation except paediatric ophthalmology
- Reporting lines vary from one facility to another
- The introduction of cataract surgeons into the eye health system is delayed

### HReH: Numbers and trends

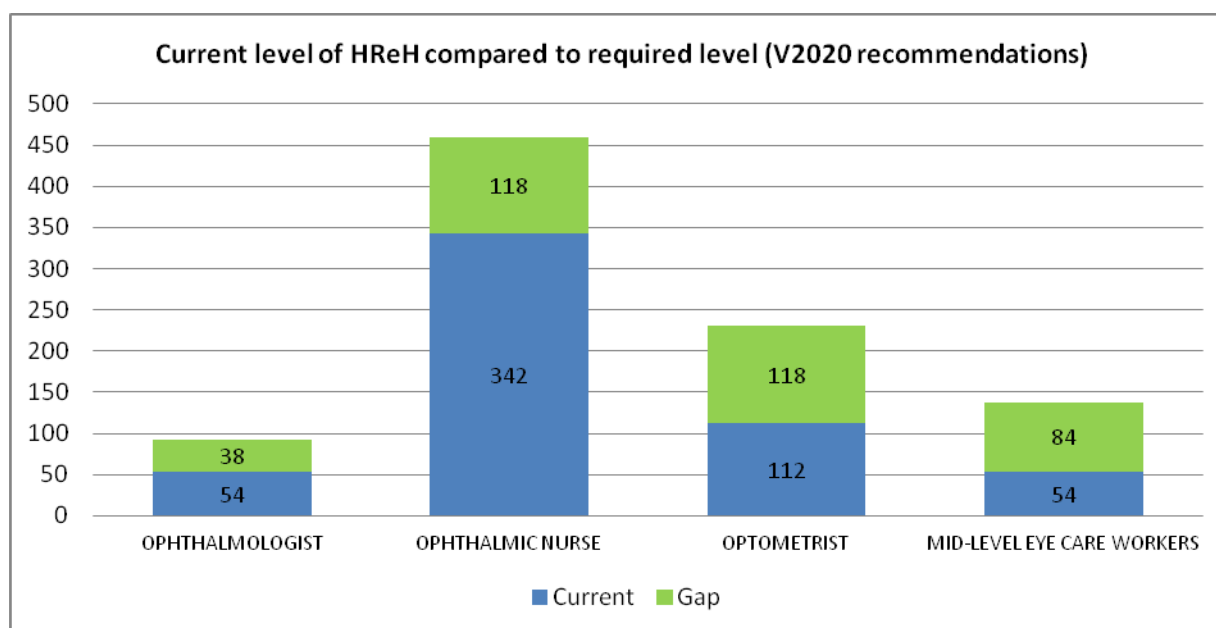
Ghana has a starkly inequitable distribution of eye health care workers, with a bias towards the south and to urban areas. The distribution of ONs has improved over the years with the increase of nurses from rural areas applying for ophthalmic nursing. The national ratio of ophthalmologist stands at about 1:460,000, optometrist 1: 360,000 and that of ophthalmic nurse 1: 96,000, but these figures mask wide regional variations.<sup>23</sup> Table 3 and Figure 10 below give an overview of the gap in HReH to meet V2020 recommendations.

**Table 3:** Eye health service delivery system: human resources (Source: ICEH/AVRI mapping study, 2012)

	Primarily government administered facilities	Primarily mission/NGO	Primarily private for profit	Total
Ophthalmologist	33	14	7	54
Ophthalmic nurse	312	30	0	342
Optometrist	28	0	84	112
Cataract surgeon or equivalent	0	1	0	1
Other mid level eye care workers	9	0	44	53

N.B. the distribution between urban and rural locations is discussed under the paragraph about each cadre.

**Figure 10: Current level of HReH compared to required levels (Source: ICEH/AVRI mapping study, 2012)**



N.B. This includes those working in both public and private facilities as VISION2020 recommendations are based on numbers in country not numbers working in government facilities.

## Training and deployment

### Ophthalmologists

There are at least 54 ophthalmologists in Ghana. The majority are general ophthalmologists, with only 1 with a sub-specialisation in paediatric ophthalmology.

**Registration/Regulation:** Medical and Dental Council

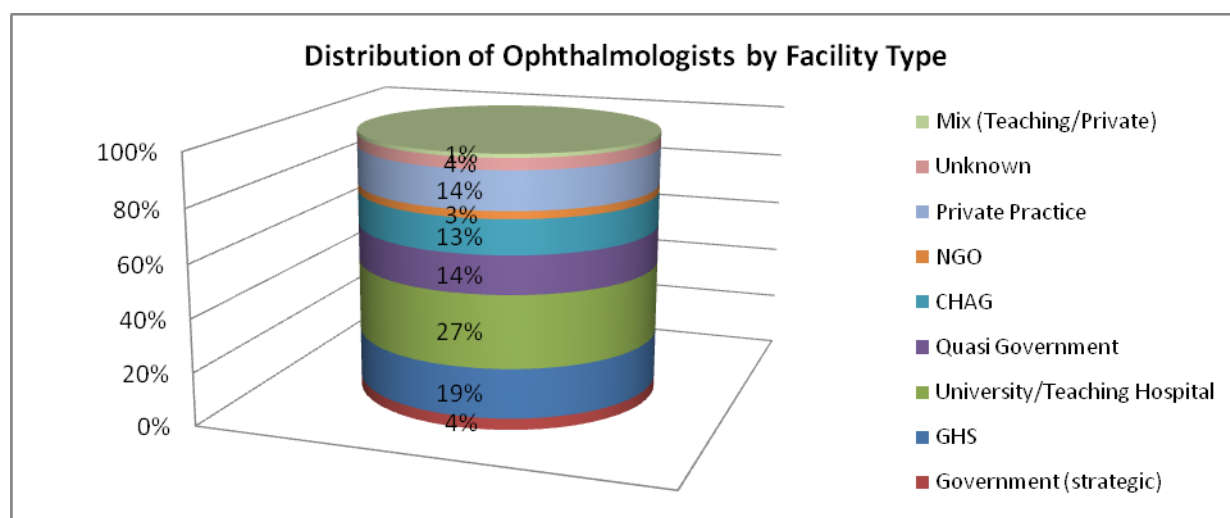
**Training:** Initially, most ophthalmologists practicing in Ghana received a Diploma in Ophthalmology (West Africa College of Surgeons); more recently, the establishment of the Ghana College of Physicians and Surgeons has opened up another opportunity for the training of Ophthalmologists in-country. There are currently 15 ophthalmologists in training in Korle-Bu and Komfo Anokye Teaching Hospitals<sup>23</sup> (although only the 9 residents at Korle Bu are listed on the NECU list of ophthalmologists). The training should be 3-5 years long, but is reportedly longer: only a couple of ophthalmologists graduate each year, partly due to the low numbers entering training, and partly due to the time it takes to exit training. There appear to be both push and pull factors responsible for the low numbers: junior doctors tend not to be posted to eye units and so do not have the opportunity to develop an interest in ophthalmology; in addition, the training is not seen as attractive. Additionally, the government formerly paid scholarships for post-graduate training where as the costs are now met by individuals, and ophthalmology is not seen as a profitable career option. Good quality training of appropriate numbers of ophthalmologists is a weak area which must be addressed as a priority.

**Deployment:** Although it might provide better surgical experience, placements in rural areas are not arranged as standard during training, which reduces the impetus for Ophthalmologists to work in non-urban areas once trained. Once trained, the salary for ophthalmologist posts comes from the MOH, whilst regions provide incentives (e.g. accommodation, vehicles, promotion). The MOH deploys ophthalmologists, but often the doctors

decide to go into private practice rather than take up the posting, and the majority (65%) of those who train remain in urban centres in Accra and Kumasi;<sup>23</sup> Figure 11 highlights that over a quarter remain in teaching hospitals in these areas, employed by the Ministry of Education rather than MOH, with implications for the level of clinical service they provide compared to their teaching duties.

Some interviewees suggested that decentralising HR budgets to Regions would help address distribution problems: if each region had a limited budget based on estimated population need, then there could be no over-recruitment in the central/southern regions, and remaining staff looking for jobs would have to take up postings in other regions where there was a salary. Decentralised budgets would also incentivise regions to make savings from other areas in order to find ways to encourage staff to take up positions.

**Figure 11:** *Distribution of Ophthalmologists by Facility Type (Source: NECU List of Ophthalmologists, 2011)*



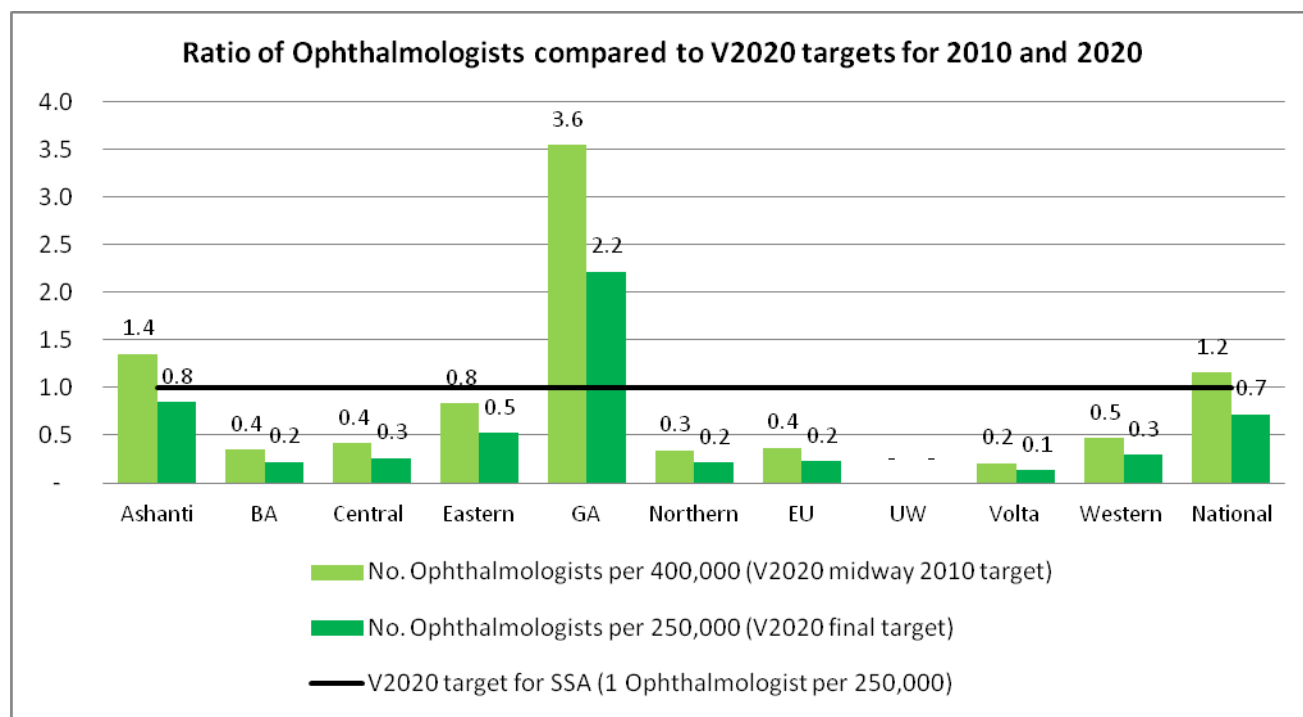
**Regional Ophthalmologists:** The NECU has worked to develop the role of regional ophthalmologists, with nearly one in every region (8/10, excluding Volta and Upper West), to oversee eye services in the region including supervision of ophthalmic nurses in the District Hospitals, and undertake cataract surgery in Regional Hospitals and through outreach to District Hospitals. The cost of performing cataract surgery is covered by NHIS.

**Table 4:** *Distribution of Ophthalmologists by Region (Source: NECU List of Ophthalmologists, 2011)*

Region	Ashanti	BA	Central	Eastern	GA	Northern	UE	UW	Volta	Western
Distribution of Ophthalmologists	23%	3%	3%	7%	55%	3%	1%	0%	0%	4%

NB: according to the NECU Annual Report 2011, there is currently **no** ophthalmologist in either Upper West or Volta Region.

**Figure 12:** Ratio of Ophthalmologists compared to V2020 targets for Sub-Saharan Africa (SSA), by Region (Source: List of Ophthalmologists, 2011)



**Gaps in HReH:** According to this data, Ghana has met the 2010 target at national level, with 1.2 ophthalmologists per 400,000 populations. However, compared to the target for 2020, there are only 0.7 ophthalmologists per 250,000 populations, so an additional 38 ophthalmologists are needed nationally to fill the gap in the next 8 years, at a rate of almost 5 new graduated per year. Estimated population growth also needs to be taken into account.

**Service delivery:** The calculations above also assume that each ophthalmologist carries out appropriate levels of consultations and surgeries (since V2020 targets presumably assume that once staff are in position they are undertaking sufficient activity), but building on Figure 8 and Figure 9 in the previous section, we know that activity varies widely. This impacts on equity of the local population's access to cataract services and means that even if the number, and the distribution, of ophthalmologists improves, VISION2020 targets may still not be achieved.

### Ophthalmic Nurses

Ghana has over 400 ophthalmic nurses,<sup>23</sup> working mainly in eye units at district hospitals or in urban polyclinics where there is no ophthalmologist. At national level, this equates to a ratio of around 1.3 ophthalmic nurses per 100,000 population, just above the V2020 target of 1 per 100,000.

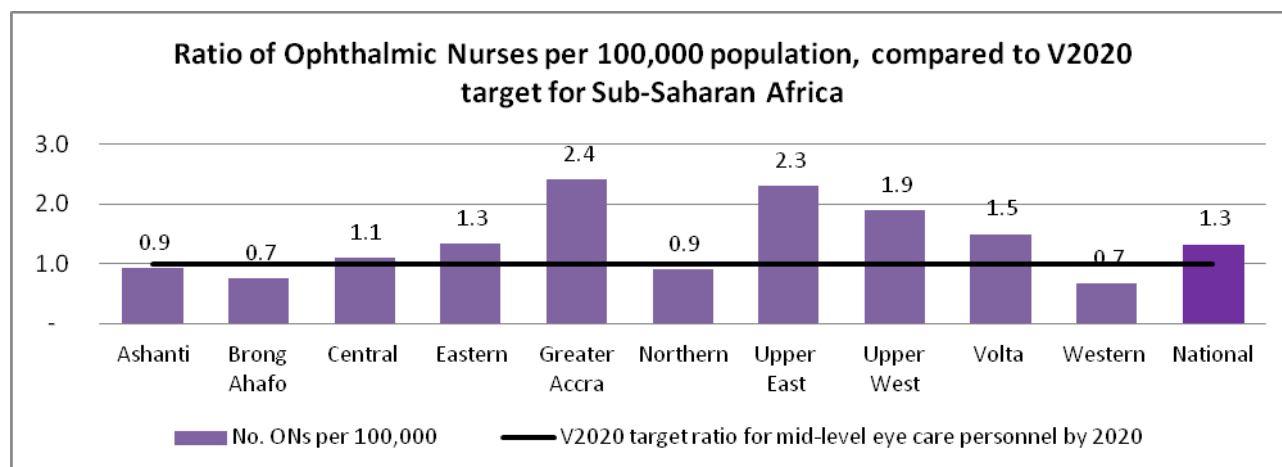
**Registration/Regulation:** Nurses and Midwifery Council of Ghana

**Training and deployment:** Nurses wanting to specialise in ophthalmology undergo an 18-month post-basic training (diploma) at the Korle-Bu Teaching Hospital (KBTH) in Accra. There are about 30-40 training positions

every year. Nurses are chosen by their employing facilities to attend training in those specialities deemed necessary for the local area (e.g. public health, eye health, anaesthesia), and so once trained, nurses return to their home facility. As a result, the distribution of ONs in rural areas is better than that of ophthalmologists, although it depends on facilities perceiving eye care training as a priority. It was suggested by some of the interviewees that CHAG facilities were more proactive in requesting or supporting training for health personnel, including eye staff, than GHS facilities.

**Gaps in HReH (matching need, demand and supply):** As seen from Figure 15 below, although numbers and distribution of ONs are much better than for ophthalmologists, there are still areas where the ratio falls below the VISION2020 recommended target,<sup>34</sup> for instance in Ashanti, Brong Ahafo, Northern, and Western Regions. There are likely to be further disparities in services offered to the local population due to location of District facilities, and transport difficulties of both ONs and prospective patients (poor roads, lack of vehicles for outreach). Also, having a single ON at a facility does not provide any flexibility for outreach or sickness cover. This must be considered *in addition* to aiming for the national (and Regional) V2020 targets for ONs. For instance, population figures by district could be used to plan selective training of ONs from different districts, rather than aiming for an equal distribution of ONs by facility. Strategic planning to meet HReH need must also take into account population growth.

**Figure 13:** Ratio of Ophthalmic Nurses per 100,000 population, compared to V2020 target for mid-level eye care personnel in Sub-Saharan Africa, by Region (Source: NECU List of Ophthalmic Nurses in Ghana, n=322, compared to population estimates)



**Expansion of training numbers:** There are plans to expand the school at KBTH to train more ONs: staff affiliated with KBTH shared how usually there are 30-40 applicants, but this year there were over 100, including a number from areas with low HReH. The underlying reason for the increase in numbers was not clear: suggestions were that they were encouraged by better facilities, or that health facilities were able to sponsor ONs' training. Of those who applied, the Nursing School management team prioritised those from areas with no ophthalmic nurses to be part of the 40 person cohort. Whilst increasing the number of nurses trained in eye care in Ghana is positive, there needs to be oversight of and planning for the likely consequences on the wider eye health system. For instance, in terms of sufficient rotation placements to ensure that each ON is able to see the required variety

of health conditions and numbers of patients during training to meet competencies, and availability of sufficient GHS-funded salaries following completion.

**Career progression:** Some interviewees discussed problems with getting nurses interested in specialising in eye care. There is currently no salary increase for training as an ophthalmic nurse and it was suggested that this may be one reason for previously low uptake of ophthalmic nursing training, and that upgrading the diploma to a degree course or promotion of those with specialist training to the rank of Nursing Officer rather than Staff Nurse would help.

Anecdotally, older ophthalmic nurses are moving into management positions, so the numbers in active clinical service are lower than the number of ophthalmic nurses in Ghana: this should be taken into account when planning ON/population ratios to meet V2020 goals.

### *Optometrists*

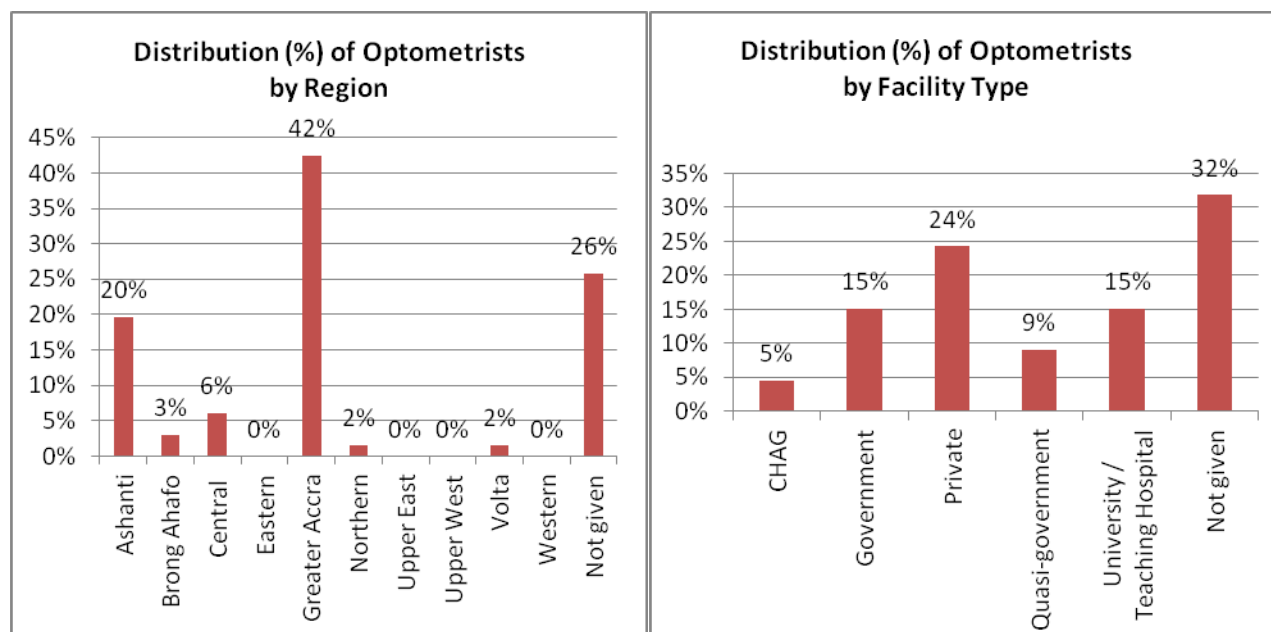
There are around 100 optometrists in Ghana, more than three quarters of whom are in private practice.<sup>23, 35</sup> At the current Ghanaian population of just over 24 million, this equates to a ratio of 0.4 trained optometrists per 100,000 population (the V2020 mid-way 2010 target for trained refractionists is 1 per 100,000<sup>34</sup>).

**Registration/Regulation:** Ghana Optometric Association

**Training:** Between 50-80 students each year undertake a six-year Doctor of Optometry training through Kwame Nkrumah University of Science and Technology (KNUST) or the University of Cape Coast (UCC). In 2011, 51 newly qualified Doctors of Optometry graduated, and have been posted, through a national scheme, to various eye units in the country for their one-year post-qualification internship programme, necessary prior to taking exams and qualifying as an optometrist.<sup>23</sup> Accredited units must have either an optometrist or an ophthalmologist to give supervision to the interns. The training curriculum does not currently include community eye health,<sup>24</sup> and including this, along with a diversity of placements (limited by the distribution of practicing optometrists/ophthalmologists), may encourage optometrists to consider a career in rural areas.



**Figure 14:** Distribution of Optometrists by Region (left) and by Facility Type (right) (Source: NECU List of Optometrists, taken from List of Members of Ghana Optometric Association in Good Standing 2012 <http://ghanaoptometry.org>)



**Deployment:** The majority of optometrists are in private practice, and mainly in the south of the country and urban centres making distribution highly uneven and leaving many areas of the country without optometry services. In 2011, GHS employed and deployed 20 optometrists to some public eye care facilities although 5 did not take up their postings;<sup>23</sup> however, since then, there has been no agreement on GHS-funded salaries for optometrists going forward, and so despite optometrists being trained, and population need for optometrist services, optometrists are not available in most areas in Ghana. In addition, refractive services and optical aids such as spectacles are not covered by NHIS, so there is an unmet need for both accessible and affordable refraction services.

**Gaps in HReH (matching need, demand and supply):** Assuming 100 optometrists are in clinical practice, that 50-80 optometrists continue to be trained each year until 2020, and a year on year population growth of around 2.33%,<sup>36</sup> Ghana is just on track to meet the V2020 target of 1 trained optometrist per 50,000 population. However, this masks serious problems with geographical and financial access to services which must be addressed. The training of optometrist assistants and/or refractionists is critical to tackle the problem of refractive services in underserved areas, and it may be that, given the encouraging coverage of ophthalmic nurses, that ONs should receive further training as refractionists to meet the need.

### *Opticians (Optical Technicians)*

**Headline:** there are around 100 opticians in Ghana, the vast majority of whom are employed in private practice (although GHS has plans to recruit around 15 Dispensing Opticians upon graduation in 2012)

**Training:** Secondary school graduates undergo a 3-year training at the Optical Technician Training Institute (OTTI) at Oyoko in the Ashanti Region, with an intake of 20-30 per year. The school was built and equipped by the Swiss

Red Cross, but is run by the Ministry of Health, although Opticians are currently not routinely absorbed into GHS employment, for similar reason as for Optometrists.

### *Other cadres of HReH*

There are no refractionists, a single Senior Ophthalmic Medical Assistant (cataract surgeon), very few Optical Technicians, and a deficit of Equipment Maintenance Technicians. Given the inequitable distribution of HReH, there is room for advocacy for the training of alternative cadres.

Discussions between the NECU and the MOH Director of HR are well underway to arrange future training of ophthalmic nurses as cataract surgeons, although there were several points of view raised about this issue. Although it is likely that training cataract surgeons will be implemented as national policy, the situation needs to be carefully managed as ophthalmologists will be vital in training this new cadre of eye staff. Supervision of this new cadre is also likely to be an issue, as there are already problems with the capacity of regional ophthalmologists to undertake supervision of existing eye care staff. There is also feeling that the problem should be approached from another point of view: unlike somewhere like The Gambia, Ghana does not lack ophthalmologists, however they prefer to work in urban areas.

In addition, there is a lack of eye care staff working below District Hospital level, apart from the outreach provided by ONs: there is need for PEC workers (volunteers/midwives who have received 1-2 hours basic training). All community health nurses<sup>4</sup> should have some eye training: all should get the same basics as PH nurses. Other interviewees suggested a cadre of specialist Physician Assistants for eye care, or community Eye Care Assistants (similar way to Community Psychiatry, could undertake 2 years training in Community Eye Care).

### **Strategic workforce planning**

There is a national HR Plan (2007-2011)<sup>32</sup>, which covers eye care, but ophthalmologists are grouped under “specialists”, and eye care nurses not separated from “nurses”, and optometrists and opticians are grouped together. The new strategic plan is currently being drafted by MOH/GHS. Eye care has not specifically been included in the process of policy revision. There is need to develop a specific sub-plan specifically for V2020 workforce to inform the Ministry of Health and its two agencies. An HR database is being developed by GHS, and being piloted in some areas. This will reportedly include separate eye care staff cadres.

### **Curriculum development and relationships with training institutions**

Relationships between the NECU, regulatory bodies and training institutions were felt to be good, with relatively regular meetings. Course content for ophthalmic nursing in particular was held to be good, although the ophthalmic nurses interviewed and those from the NECU felt that low vision/refraction training should be more fully included, to meet the shortfall in public service optometry services.

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<sup>4</sup> [N.B. Community Health Nurse is like an auxiliary nurse (i.e. a level below an SRN). This is not part of the pathway to be an SRN: would need better grades to be accepted for SRN training.]

However, in common with the general health system,<sup>22</sup> this present EHSA highlighted a lack of responsive feedback loop between numbers entering training vs. numbers needed post-training, underlining the need for a V2020 strategic workforce plan for Ghana which involves all stakeholders, from the MOH who pays the salaries to the training schools with their course numbers.

### **Continuing Professional Development (refresher training)**

Relevant but general refresher courses (e.g. on diabetes, hypertension, drug treatments and adverse reactions) tend to be run by facilities or professional bodies: there are far fewer eye care specific refresher courses.

For ophthalmic nurses, a 5 day course has been run once or twice a year for the past 6 years by NECU. This is funded by contributions from the hospitals sending their nurses. The training is open to those working in the private sector as well as the public health service: as there are limited spaces, the 40 places on each course are targeted at those ONs working on their own, and those whose last attendance was more than 3 years ago. Based on 400 nurses at 80 nurses a year, this means that each nurse received eye care-specific refresher training roughly every 5 years. Although there is evaluation of the training itself, there is no audit regarding whether the training is being put into practice.

Some of the INGOs and CHAG hospitals organise their own courses locally in Districts or Regions: for instance, Bawku Presby hospital (CHAG funded, and previously CBM funded) runs a series of eye courses for its nurses.

### **Reporting and supervision**

Clinical supervision is generally reported to be lacking, mainly due to gaps in numbers and distribution of HReH, a lack of standard specifications for what clinical supervision of different cadres should entail, and lack of audit and reporting against these standards.

#### ***Ophthalmologists***

There are different reporting structures for ophthalmologists depending on where they are employed: where ophthalmologists are employed by teaching hospitals, the reporting structures are via the Ministry of Education rather than GHS. In the regions, clinical supervision of all eye care staff by regional ophthalmologists is not a specified part of their job description, and there is no provision for the travel necessary to effectively perform these duties on a regular basis e.g. once a month.

#### ***Ophthalmic Nurses***

Nurses are trained in one location but then move back to their regions to work, so it is difficult for trainers to follow up to see if they are still using the skills they were taught.

Supervision can be relatively ad hoc: if ONs have a good relationship with their regional ophthalmologist, they can pick up the phone and call them for advice whilst a patient is in the room. Regional ophthalmologists also reported that they would discuss with ONs any inappropriate referrals. Supervision and support must be systematically undertaken and be a two-way process: advice and support where necessary, as well as objective supervision of quality of clinical care. It was apparent through the assessment that where facilities have not had an ON before, especially where an ON is brought into a facility where they have not previously worked, it can

take a while for the facility to see the nurse as 'theirs', and to assimilate them into supervision arrangements. This is likely to improve as more nurses are chosen for speciality training by facilities. However, there is still a lack of specialist eye care supervision, in addition to general day to day supervision of general clinical duties, as ROs are not based in the same facility.

Nurses are often the only eye staff in a district, and reported that they would be keen to have peer-support, where they could get together with other eye nurses in the region to discuss cases, share learning and reduce isolation.

### *Other staff*

Even if optometrists were in the future employed through GHS to work in Districts, they should practice under the supervision of an ophthalmologist but there is a constraint on the number of available ophthalmologists, discussed above. The same is true for any new cadres of eye care staff, such as cataract surgeons: to ensure acceptance by existing eye staff and good quality practice, their work will need to be effectively supervised.

### *Quality*

There is a manual tally sheet for cataract surgical outcomes monitoring, which ONs generally fill in and return to the regional ophthalmologists. WHO recommends that it be a requirement for all eye surgeons to monitor their own results, and identify and address causes of poor outcome. Monitoring outcomes should be a core part of eye care staff training, and part of routine practice,<sup>30</sup> and data on outcomes collated for use at individual, peer-review, regional and national level.

## MEDICINES, PRODUCTS AND EQUIPMENT FOR EYE HEALTH

### Key Findings

#### Strengths

- Eye care drugs are included on the Ghana NEML, and over 50% of drugs prescribed covered by NHIA Scheme
- MOH has funded glaucoma equipment in 2011

#### Weaknesses

- Some key medicines missing from NEML and not reimbursed by NHIA
- Refraction/Optical Devices are not reimbursed by NHIA
- Lack of monitoring regarding effective prescribing practices in eye care
- Maintenance and assessment of eye care equipment is erratic

### Expenditure on eye care medicines and equipment

No data was available on the total expenditure on pharmaceuticals or equipment, or activity by pharmacy/facility, let alone the spend on eye-related drugs and products, from either the MOH, GHS or the NHIA. Therefore it is not possible to estimate government vs. private spend on eye care drugs, for instance, or to discuss in any detail the likely scale of OPP for eye care drugs. There does not appear to be any mechanism to collect data on eye care medicines, so there is a lack of information about prescribing practices or spend.

### Eye Care Drugs

#### *Pharmaceutical policies*

There is both a National Drugs Policy (last updated in 2004)<sup>37</sup> which covers the selection, procurement, storage, distribution, financing, quality assurance and rational use of all drugs in Ghana, and a Ghana National Essentials Medicines List (NEML), last updated in 2010,<sup>38</sup> which includes a number of eye drugs (see Table 6).

The current Head of the National Eye Care Unit, Dr Debrah, is acknowledged as one of the contributors to the latest edition of the Ghana NEML, which is updated every 2 years.

Out of the 39 ophthalmology drugs listed in the NEML, just over 50% of them are covered by the National Health Insurance scheme. It does not appear that any ophthalmic diagnostic drugs are covered by the NHIS, so patients requiring slit lamp diagnostics will have to pay for an accompanying diagnostic drug (e.g. Fluorescein), as well as

for any treatment of dry eyes (for instance with artificial tears),<sup>5</sup> and since Tropicamide eye drops for dilation are not reimbursed, patients such as diabetics and the elderly are at a financial disadvantage. In terms of anti-infective agents, the broader spectrum antibiotics tend to be covered by the NHIS where as the more specific antibiotics are not reimbursed.

There are some eye drugs listed on the NHIS Medicines List which do not appear on the NEML. These include Betaxolol HCL Eye Drops (0.5%), Homatropine Eye Drops (2%), Prednisolone Eye Drops (0.5% and 1%), Sulphacetamide Eye Drops (10%) and Tetracaine Eye Drops (0.5%). The NECU should ensure that eye care staff is well informed about which drugs are covered by NHIS, and where there is an equally effective choice of drugs, that staff prescribe those covered by Insurance, to reduce financial barriers to access to eye care.

Combination drugs for glaucoma are not mentioned either on the NEML or on the NHIS Medicines List. These are expensive but also are more effective, and some may only need to be used once per day which would increase compliance, a recognised problem with glaucoma treatment. The cost-effectiveness implications for increased compliance and better outcomes if these drugs were used should be considered and potentially used by NECU for advocacy with GHS/MOH in their discussions with the NHIA, especially since Ghana is recognised to have such a relatively high glaucoma prevalence.

Another issue of note is that as there is evidence that the introduction of the NHIS has led to increased inappropriate prescribing (due to the fee-for-service method of payment).<sup>14</sup> This is something that should be investigated within eye care, to ensure appropriate and efficient prescribing practice. A couple of interviewees also raised the issue that unless the drug prescription includes the drug name written exactly as it appears on the NHIS Medicines List (for instance the generic rather than the brand name), then it will not be reimbursed by NHIA. If this is the case, this raises an important training issue for eye care, and other staff, in order to ensure full reimbursement for prescribed drug.

Regarding drug safety and adverse affects, the Food and Drug Board test a sample of every pharmaceutical (including eye drugs) through the procurement process, according to national standards. However, some drugs are imported illegally, and as these products do not pass through the legal channels, they do not get tested. If there is a reaction after dispensing, then the Board will undertake further tests. There is a reactive system for reporting adverse events, which covers all drugs including eye care.

### *Budgeting and stock control*

Investigations at national and district level suggest that budgets for all pharmaceuticals (including eye care drugs) at facilities appear to be based on headline historical spend: the facility drugs budgets do not seem to be broken down by drug or specialty, and there does not seem to be any forecasting. The budgeted amount from GHS does not always arrive at the start of the year, and NHIA reimbursements are often not timely, so facilities may have to rely on credit or on IGF (from previous GHS or NHIA payments, or donations). This is likely to have

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<sup>5</sup> Although the NHIS Medicines List and the Ghana NEML do not match 100%, and it may be that Methylcellulose Eye Drops are now reimbursed (since March 2011 when the new NHIS Medicines List was published)

the knock-on impact that there is less available money at a hospital-level for equipment or outreach, which impacts on equity and access to services. Some donors donate drugs, although they are not always the ones most in demand by facilities.

Consumables such as drugs are requested from Central or Regional Medical Stores. If the item is unavailable, it can be purchased on the open market. Stock control appears to be demand-driven based on consumption: as drugs are used, so they are replenished. The bulk of the budget goes on drugs for malaria, coughs and colds, i.e. those consumables which are used the most, rather than those which are most useful.

If a drug is covered by the NHIS but the facility does not have the necessary drug in stock, the patient can get it free at the point of access from any NHIA-accredited local pharmacy.

### *Appropriate use*

Most hospitals have their own protocols for appropriate use of drugs, and staff depend on their training and on refresher courses for up to date knowledge about best prescribing practice. As there is a lack of prescribing data by facility, it is difficult to monitor appropriate use of drugs for eye care, or other specialities, and the only way to stop staff from using inappropriate drugs is to withdraw them altogether at a national level.

Apparently there is a standard protocol for common eye conditions that the previous Head of the Eye Care Programme, Dr Maria Hagan, put together, but staff in districts were not aware of this. Some regions such as Upper East have developed their own protocols.

### **Eye Care Products (IOLs etc)**

The costs of IOLs and other eye care products are included in the price for cataract surgery. Facilities are responsible for procuring IOLs.

### **Eye Care Devices (e.g. optical devices)**

Low vision devices are not covered by insurance. The Ghana Blind Union runs an income-generating Low Vision clinic where optical devices can be purchased.

### **Eye Care Equipment**

Quantity and maintenance of eye care equipment is generally low, and varies in facilities across Ghana. There is no national list of the quantity or state of eye care equipment across the country. Eye care equipment forms a negligible proportion of the equipment budget at both national and local levels. The GHS Stores, Supplies and Drugs Management Department reported to the assessment team that in the last 10 years, the government have only overseen one purchase of equipment for eye care nationally, and that was the recent purchase of glaucoma screening equipment as a result of strong advocacy by NECU. The equipment will go to each regional hospital and some selected districts, and should be in situ by the end of 2012. There is the perception throughout MOH/GHS that donors will step in to buy eye care equipment, so it appears that the responsibility has been divested (even if not formally acknowledged), which poses a threat to sustainability of funding for new

equipment or maintenance of existing equipment going forward. This ties in with the wider perception that eye care as a whole received a large amount of funding from international donors.

At facility level, the same tends to be seen: eye care equipment is often not a priority, and/or funds are limited for all equipment. Many eye care staff are operating with no more than the basic instruments they received through training, and lack of appropriate equipment impacts negatively on staff morale and ability to keep practical skills up-to-date. Eye care equipment can be very expensive (for example a cataract set can cost \$6,000, and more than one is ideally needed so one can be sterilised whilst the other is in use). Some facilities do buy eye care equipment but this is generally not reported outside the facility.

#### *Case Study 3: Example of the priority given to eye care equipment in some facilities*

GHS donated a slit lamp to a district hospital in Upper East, but no swivel chair was provided with the slit lamp. However, despite the comparatively low cost of a chair compared to the price of the new equipment, the hospital has not made it a priority to purchase one to go with the lamp, which makes it difficult to use.

Following a needs assessment conducted in 2010, Operation Eye Sight Universal and Standard Chartered Bank (through the Seeing is Believing project) provided eye equipment such as slit lamps, refraction kits and ophthalmoscopes to 21 selected eye care facilities in Greater Accra, Ashanti, Central, Volta, Northern and Upper East regions. Each regional eye care team was also given an operating microscope, four cataract sets and 100% stock of consumables for the first year, reducing to 50% in 2012, 25% in 2013 and 5% in 2014.<sup>25</sup>

#### *Monitoring and maintenance*

A few nurses have been trained in preventative maintenance but this is not being done in a systematic way.. The scale of the problem is difficult to quantify as there is no national list of eye care equipment, compared to an acceptable minimum, and a lack of monitoring of the state of equipment. Lack of equipment inhibits access to certain eye care services, even when there are human resources available. A lack of the right equipment results in poor quality outcomes.



**Table 5: Ophthalmological Medicines included in Ghana Essential Medicines List (6<sup>th</sup> Edition, 2010)<sup>38</sup>**

THERAPEUTIC CLASS		NAME OF DRUG, DOSAGE FORM AND STRENGTH	LEVEL OF CARE	NHIA STATUS
DIAGNOSTIC AGENTS	OPHTHALMIC DRUGS	Fluorescein Solution, 2%	C	NR
		Fluorescein Strips	C	NR
		Methylcellulose Eye Drops, 1%	D	NR <sup>6</sup>
		Rose Bengal Minims, 1%	D	NR
		Tropicamide Eye Drops, 1 %	C	NR
OPHTHALMOLOGICAL PREPARATIONS	ANTI-INFECTIVE AGENTS	Acyclovir Eye Ointment, 3%	C	R
		Chloramphenicol Ear, Eye Drops, 0.5 %	B1/M	R
		Chloramphenicol Eye Ointment, 1 %	B1/M	R
		Ciprofloxacin Eye Drops, 3 %	C	R
		Erythromycin Ointment, 0.5 %	B1	NR
		Fluconazole Ophthalmic Solution	SD	NR
		Gentamicin Eye Drops, 0.3 %	B1	R
		Gentamicin Ointment, 0.3 %	B1	NR
		Natamycin Eye Drops, 5 %	SD	NR
		Tetracycline Eye Ointment, 0.5 %	B1	R
		Tetracycline Eye Ointment, 1 %	B1	R
	ANTI-ALLERGIC	Lodoxamide Eye Drops, 0.1 %	C	R
		Sodium Cromoglycate Eye Drops, 4 %	C	NR
	MYDRIATICS AND CYCLOPLEGICS	Atropine Sulphate Eye Drops, 0.5 %	C	NR
		Atropine Sulphate Eye Drops, 1 %	C	R
		Cyclopentolate Eye Drops, 0.5 %	SD	NR
		Cyclopentolate Eye Drops, 1 %	SD	R
		Cyclopentolate Eye Drops, 2 %	SD	NR
		Phenylephrine Eye Drops, 10 %	SD	NR
		Phenylephrine Eye Drops, 2.5 %	SD	NR
	ANTI-INFLAMMATORY AGENTS	Corticosteroid + Antibiotic Eye Drops	C	R
		Corticosteroid + Antibiotic Eye Ointment	C	R
		Dexamethasone Eye Drops, 1 %	C	R
		Dexamethasone Eye Ointment, 1 %	C	R
		Hydrocortisone Eye Drops, 1 %	C	R
		Hydrocortisone Eye Ointment, 1 %	C	R
	MIOTICS AND DRUGS USED IN GLAUCOMA	Acetazolamide Injection, 500 mg	C	R
		Acetazolamide Tablet, 250 mg	C	R
		Bimatoprost Eye Drops, 300 micrograms/ml	SD	NR
		Latanoprost Eye Drops, 50 micrograms/ml	SD	NR
		Pilocarpine Eye Drops, 2 %	C	R
		Pilocarpine Eye Drops, 4 %	C	R
		Timolol Maleate Eye Drops, 0.5 %	C	R

<sup>6</sup> Methylcellulose Eye Drops 0.3% is listed in the NHIS Medicines List (Mar 2011) so may have been included ('R') since the NEML (2010)

KEY	<p><b><u>Level of Care:</u></b></p> <p>Level A - Community</p> <p><b>Level M - Midwifery</b></p> <p><b>Level B1 - Health Centre without Doctor</b></p> <p>Level B2 - Health Centre with Doctor</p> <p><b>Level C - District Hospital</b></p> <p><b>Level D - Regional/Teaching Hospital</b></p> <p><b>Level SD - Specialist Drugs</b></p> <p>Level PD - Programme Drugs</p> <p><b><u>National Health Insurance Authority (NHIA) Status:</u></b></p> <p><b>NR</b>      Drugs that are not reimbursed by National Health Insurance Authority (at the time of publication in 2010)</p> <p><b>R</b>        Drugs that are reimbursed by the NHIA based on the benefits package.</p>
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## HEALTH INFORMATION SYSTEMS FOR EYE HEALTH

### Key Findings

#### Strengths

- Eye health indicators collected at district level
- NECU conducts quarterly monitoring
- INGOs collect detailed data in regions where they work

#### Weaknesses

- Lack of accurate national baseline for prevalence of different eye conditions
- At district level, data collected is not used to inform decision makers and for planning
- The existence of different systems of data collection (NECU, INGOs, DHIMS) create a reporting burden on staff, with consequences for quality and comparability of data.
- Data not fed back to eye care staff
- Data is not analysed and performance of eye care facilities is not compared with each other

Prioritisation of resources is as important in health information systems as it is in other parts of the health system; however, it is important to ensure that a broad enough range of conditions is reported on in order to ensure that different types of needs are met across a population. Generally, data available for eye care is very limited.

### Indicators

The four major domains of health information include: *health status*, *service coverage*, *risk factors* and *health system* indicators. None of these domains are comprehensively, systematically or effectively reported on by GHS at national level for eye health, although the NECU does collect some data to supplement. The lack of focus on eye indicators at national level may well be due to the fact that eye health is not an MDG.

The national GHS 5-Year Strategic Plan 2007-2011<sup>22</sup> does mention blindness in the following context, as one of the priorities for the health sector: “*Strengthening clinical management of diseases as well as prevention and management of blindness and promotion of mental health*”. There are a couple of associated indicators given, but detail to make these indicators useful is lacking. For instance, the Summary Logical Framework Matrix gives the following as an Objectively Verifiable Indicator (to be measured from 2006 baseline to 2011 target): “*Reduce avoidable blindness from... to... (Baseline to be established)*”. Since no prevalence survey has yet been carried

out and prevalence of blindness in Ghana is still only available as an estimate (1% of the total population), this indicator is not useful, and the impact of any health system activities on prevalence cannot be measured. There are a couple of other more useful eye-related indicators, including “Coverage of Vit A supplementation among children 6-59 months” (Survey/GHS Reports) and those shown in Figure 15: as far as this assessment could determine, the data underpinning the ones in Figure 15 are collated by the NECU rather than through any systematic national health information system.

**Figure 15: Indicators relevant to eye health in the GHS 5-Year Strategic Framework for Service Delivery 2007-2011<sup>22</sup>**

Strategic objective II-Health, Reproduction and Nutrition Services cont'						
Expected Result 2: High impact reproductive and sexual health and nutrition interventions rapidly scaled up for improved, sustained and quality coverage of services						
Operational Strategies	Time-Frame					M & E Indicators
	Yr1	Yr2	Yr3	Yr4	Yr5	
2.5 Improve prevention,early detection, management and rehabilitation of non communicable diseases						
a. Institutionalize Screening programmes for early detection of risk factors and selected diseases	X	X	X			▪# of facilities with screening and counseling services
b. Promote self screening and monitoring		X	X	X	X	▪# of health educational activities which promotes self screening and monitoring
c. Promote surveillance of risk factors for NCDs	X	X	X	X	X	▪Incidence of schizophrenia ▪Incidence of substance abuse
d. Strengthen clinical management for NCDs			X	X	X	▪# of psychiatric rehabilitated ▪Prevalence of speech and hearing impairment ▪Prevalence of locomotion impairment ▪Prevalence of avoidable blindness ▪Proportion of facilities with NCD treatment centres ▪Case fatality of strokes and diabetic coma ▪Prevalence and incidence of Hypertension ▪Incidence of breast and cervical cancers ▪Prevalence of childhood and adult obesity ▪Incidence of diabetes mellitus ▪Proportion of facilities with NCD treatment centres
2.9 Improve access and quality of eye care services						
a. Develop and deploy appropriate HR for eye care	X	X	X	X	X	▪ Ophthalmologist-population ratio (total of 48) ▪ Ophthalmic -nurse- population ratio
b. Strengthen cataract surgical services		X	X	X	X	▪ Cataract surgical rate
c. Provide continuous professional development for staff	X	X	X	X	X	▪ # of staff retrained

Figure 16 shows the type of data systematically collected in Ghana across the health system to reflect the four domains, as well as example of indicators that could be collected for eye health (which on the whole are not collected proactively, except when they overlap with general health indicators e.g. smoking, demographics).

Figure 16: Domains of health information systems, with suggested indicators for eye health

Health Info Domain	Example Indicators (general health system)	Example Indicators that could be collected for the eye health system
Health Status	• Child mortality	• Blindness prevalence, by cause
	• Maternal mortality	• Blindness incidence, by cause
	• HIV prevalence	
Health Service Coverage	• Measles coverage	• Proportion of people with glaucoma receiving drugs
		• Vitamin A supplementation coverage
	• Proportion of children sleeping under bed nets	• Proportion of people with cataract receiving surgery
	• % births attended by a skilled birth attendant	• Proportion of people with access to refraction services
Risk factors	• Condom use	• Age
	• Smoking prevalence	• Smoking prevalence
Health system	• Total health expenditure (per capita)	• Total expenditure on eye health (per capita)
	• Health worker density	• Eye health worker density (overall, by cadre, by region)

In terms of information on health status or health service activity, a minimum dataset is collected monthly at facility level, validated at DHMT level and then inputted to the DHIMS system, to which DHMTs and RHMTs have access. The paper-based reporting template used at facility-level is shown in Picture 2, and captures number of outpatient attendances, by age, gender and condition. It is not recorded whether these are unique patients or repeat attendances.

A few of the 70 conditions included in the outpatient morbidity reporting template are specific to eye health:

- Acute Eye Infections (under ‘Specialised Conditions’)
- Cataracts (under ‘Specialised Conditions’)
- Trachoma (under ‘Specialised Conditions’) – *only relevant in endemic areas*
- Onchocerciasis (under ‘Communicable Non-Immunisable Diseases’) – *only relevant in endemic areas*

“Acute eye infections” can be due to a various causes, so this is not a very informative indicator. Data is also collected on some categories of ‘Accidents & Injuries’, but cause or site of injury is not given so it is impossible to know what proportion of these is eye-related. In addition, all eye surgery activity is grouped under “minor surgery”, a category not exclusive to surgery for eye conditions but also for minor tumours etc. It may be that this makes sense for purposes of NHIS reimbursement (as these surgeries may use the same amount of healthcare resource), but is not useful when analysing data by speciality or for planning.

The Head of the NECU has been included in discussions at national level regarding the elaboration of a new list of indicators for the DHIMS system, but no timescales have been given as to how long it will take to get eye service information included.

In order to be a useful tool for capturing data on eye health, for monitoring, planning and advocacy purposes, the minimum set of indicators to be captured should include:

- Acute eye infection (split by cause)
- OPD visits (all eye conditions, including glaucoma)
- Surgeries (split by all eye conditions, including cataract)
- Trauma to the eye (accident/injury), by cause

Together with data on population served by the facility (or aggregated to district or regional level), this information could be used to look at eye health service activity, and potentially used to estimate prevalence.

**Picture 2:** *Monthly Outpatient Morbidity Returns from Builsa District Hospital*

The image shows a 'MONTHLY OUTPATIENTS MORBIDITY RETURNS' form. The form has a header section with fields for 'NAME', 'ADDRESS', 'PHONE', 'FACILITY', 'MONTH', and 'YEAR'. Below this is a large grid with columns for months (JAN, FEB, MAR, APR, MAY, JUN, JUL, AUG, SEP, OCT, NOV, DEC) and rows for various medical conditions. Handwritten data is visible in the grid cells.

At regional level, any data is grouped under “eye diseases” which is not very useful for planning services/advocacy. At local district level, there is no data mapping eye care service availability, or data on need, to investigate how need matches demand or supply.

As there is a lack of relevant information systematically collected for eye care, the NECU collects its own data quarterly, directly from ophthalmologists (number of cataract surgeries carried out) and ophthalmic nurses (outpatient activity split by new/follow-up, also outreach and school screening, as well as numbers of eye care staff) – see Picture 3. Private facilities providing eye care also report CSR to NECU, so data is relatively complete.

**Picture 3: NECU reporting template for eye care staff (usually completed by ophthalmic nurses in facilities)**

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
1	<b>EYE CARE REPORTING FORMAT</b>																
2																	
3	HOSPITAL/CLINIC.....		FIRST QUARTER			YEAR: 2012											
4																	
5	DISTRICT/REGION.....																
6																	
7	ATTENDANCES.....																
8																	
9	<b>1. OPD ATTENDANCE</b>																
10																	
11	<b>EYE DISEASES</b>		<b>CHILDREN 0-15 YRS</b>		<b>ADULT MALE</b>		<b>ADULT FEMALE</b>		<b>TOTAL</b>								
12			New	Old	New	Old	New	Old	New	Old							
13	1. Trachoma																
14	TF																
15	TT																
16	2. Cataract																
17	3. Glaucoma																
18	4. Refractive Error																
19	5. Others																
20	6. Normal																
21	<b>TOTAL</b>																
22																	
23	<b>2. SURGERIES</b>		<b>CHILDREN 0-15 YRS</b>		<b>ADULT MALE</b>		<b>ADULT FEMALE</b>		<b>TOTAL</b>								
24																	
25	1. Cataract																
26	2. Glaucoma																
27	3. TT																
28	4. Others																
29	<b>TOTAL</b>																
30																	
31																	
32	<b>3. AVAILABLE HUMAN RESOURCE</b>																
33																	
34	Category	Number															
35	Ophthalmologist																
36	Optometrist																
37	Ophthalmic Nurses																
38	Trained Primary Eye Workers																
39	Health Personnel																
40	Teachers																
41	Volunteers																
42																	

## Data sources

Figure 17 shows the source and type of information relevant to eye health and eye health services, available at each level of the Ghana health system.

**Figure 17: Health information data available at different levels of the system relevant to eye health**

Level	Type of information available on eye health (or relevant to eye health)	Source
Global	• Global Burden of Disease (estimates)	WHO GBD
	• Glaucoma	NECU
National	• Blindness prevalence & Incidence estimates	Based on WHO estimates (no national prevalence survey: planned for 2013 if funds available)
	• Glaucoma	NECU estimates based on individual facility data (Bawku)
	• Onchocerciasis	Disease surveillance reports
	• CSR	NECU Quarterly Monitoring
Regional	• Avoidable Blindness estimates (Eastern only)	Eastern Region RAAB
	• Onchocerciasis	Disease surveillance reports
	• Outpatient morbidity data*	DHIMS
	• CSR	NECU Quarterly Monitoring
District	• Outpatient morbidity data*	DHIMS
	• Outpatient morbidity data	NECU Quarterly Monitoring
Facility	• Outpatient morbidity data*	DHIMS
	• Prescribing data	potentially available through NHIA
	• National Health Insurance data	potentially available through NHIA

Community	• Community attitudes surveys	INGOs (No KAP studies undertaken)
	• Membership surveys	Ghana Blind Union (GBU)

*\*although this is not used by NECU as indicators not useful and does not differentiate between new and follow up patients (hence NECU quarterly/annual monitoring data collected directly from ophthalmologists and ophthalmic nurses instead)*

There are very few models or estimates of eye disease burden at national or sub-national level, apart from a few studies, for instance the RAAB carried out in Eastern region supported by Sightsavers. Discussions are underway with GHS regarding a National Blindness Survey to be undertaken in 2013, supported by Operation Eyesight. The preferred option would be a full prevalence survey, but if funds are not available, a national RAAB may be undertaken instead.

At national or regional level, vital registration, census, or national household surveys do not include eye-health specific information (apart from demographic information used to calculate CSRs, or information on average household income/expenditure which would help to determine relative affordability of eye health services). Information is not directly collected on determinants of eye health, apart from when this overlaps with other data (e.g. demographic information such as age, gender, socio-economic status).

Due to the lack of data on eye health, some INGOs have developed their own reporting templates for use in their projects, alongside the NECU data collection and the DHIMS system. Picture 4 shows an example from Operation Eyesight Universal.

Although these additional monitoring systems mean that more data is available on eye health services in some areas, and particularly on outcomes, it also adds a reporting burden onto eye care staff and data collected may not be directly comparable if staff are collecting data in a different way or to different timescales as NECU or DHIMS data.

### Information products

Weekly disease surveillance reports (collated at the District Health Administration level and sent to the national disease surveillance unit) are available only for a limited number of eye conditions (for eyes, the infectious diseases of Onchocerciasis and Trachoma, and only in those Regions where they are a problem). Data appears to be timely and of good quality.

The data collected at facility level is available for use in reporting at District, Regional and National level. However, eyes are rarely included in these reports. For instance, Districts may be asked to pick 5 indicators that have performed well and 5 that have not, to report on in an annual report to the region. There are district control targets for Immunisations, Reproductive & Child Health, and TB detection, but not for chronic diseases or other conditions such as eyes, so eye care would never be included in one of these reports.

The data collected by the NECU is compiled into an annual report. Reports and evaluations are carried out by each INGO, and shared with key partners such as NECU.



Picture 4: Operation Eyesight Universal 'Seeing is believing' Reporting Template



OPERATION EYESIGHT UNIVERSAL'S QUARTERLY ACTIVITY REPORT

SEEING IS BELIEVING

HOSPITAL:

DISTRICT:

QUARTER:

YEAR:

OPD ATTENDANCE

No.	EYE DISEASES	CHILDREN (0 – 15)				ADULT				TOTAL
		MALE		FEMALE		MALE		FEMALE		
1	Trachoma	OLD	NEW	OLD	NEW	OLD	NEW	OLD	NEW	
	TF									
	TT									
2	Cataract									
3	Glaucoma									
4	Refractive Error									
5	Others									
6	Normal Eye									

REFRACTION/GLASSES

Number refracted	
Number of glasses prescribed	
Number of glasses dispensed	

SURGERIES

No.	DISEASES	CHILDREN (0 – 15)		ADULT		TOTAL
		MALE	FEMALE	MALE	FEMALE	
1	Cataract					
2	Major Surgeries					
3	Foreign Body Removal					
4	Others					
	TOTAL					

SURGERIES PER SURGEON

Name of Surgeon	Surgery Date	No. of Surgeries

SURGICAL OUTCOMES & COMPLIANCE RATES

# patients for follow-up within 6-12 weeks of surgery	
# patients developing complications within 48 hrs	
# patients 6-12 weeks post-op with V.A. of 6/12 or better *	
# patients 6-12 weeks post-op with V.A. between 6/12 and 6/60 *	
# patients 6-12 weeks post-op with V.A. below 6/60 *	

SURGERIES

No.	DISEASES	CHILDREN (0 – 15)		ADULT		TOTAL
		MALE	FEMALE	MALE	FEMALE	
1	Cataract					
2	Major Surgeries					
3	Foreign Body Removal					
4	Others					
	TOTAL					

SURGERIES PER SURGEON

Name of Surgeon	Surgery Date	No. of Surgeries

SURGICAL OUTCOMES & COMPLIANCE RATES

# patients for follow-up within 6-12 weeks of surgery	
# patients developing complications within 48 hrs	
# patients 6-12 weeks post-op with V.A. of 6/12 or better *	
# patients 6-12 weeks post-op with V.A. between 6/12 and 6/60 *	
# patients 6-12 weeks post-op with V.A. below 6/60 *	

## Health information system resources

International donors have funded work on Health Information Systems in Ghana, but not for eye care specifically. For instance, donors of malaria, HIV and family planning programmes have provided funding to the DHIMS Indicator Development process, and their indicators have been included in the latest DHIMS2 update. Although the DHIMS system does cover eye care services, it is not in the required detail. INGOs involved in eye care to date have not specifically funded health information systems.

## Data management, dissemination and use

### *Facilities*

Although eye care staff at facilities collect data both for DHIMS and NECU, staff do not generally use the data for planning or setting targets, and data does not appear to be fed back down the chain to hospitals or units within the hospitals. There are a few exceptions: for instance, Bawku Presby hospital, a CHAG-supported facility, collects data and compiles it into reports for donors and uses the information to advocate for more funds for particular projects. In general though, eye care staff lack data analysis skills.

District Health managers reported that there was a lack of strategic planning, and that decisions were often made with a ‘fire-fighting’ approach rather than proactively based on needs. District staff were not able to say empirically whether existing eye care services were meeting the needs of the population, or what the level of unmet need was likely to be locally. The suggestion was made by a number of interviewees that having time and resources to get the right people together in a room (e.g. Regional Health Director, Hospital administration, district heads and representatives from national bodies and INGOs) would facilitate strategic planning and use of data.

### *District*

Raw activity data is either uploaded directly to the DHIMS computer system by facilities, or collected in paper form from facilities, and then inputted to DHIMS by a Health Information Officer at the DHMT. DHMTs and RHMTs have access to the system and can view and download data for reporting. However, from discussions at these levels, it appears that only those priority areas (such as HIV or immunisations) are analysed, and otherwise there is very basic analysis carried out, limited to checking that all facilities have returned their submissions, or any obvious numerical errors. DHIMS may have facility for analysis that is not being used to its full potential.

Although data on eye care is collected at the facility level, as the data gets amalgamated for reporting, eyes tend to get left out from any district or regional reports, and so information on eyes from DHIMS is not seen at higher levels. DHIMS will be under-reporting eye conditions, which may have a knock-on impact on the priority given to eye care. There is also no data on co-morbidities included, which may hinder the integration of eye services with other parts of the health system, for instance long term conditions such as hypertension and diabetes.

## *NECU*

In terms of the NECU data collected directly from eye care staff, it is compiled into the annual report, which is sent to ICD, although (as discussed in the section on Governance), by the time the GHS annual report is put together from departmental reports, eye care is not a priority and so is not reported on.

The NECU annual report is also sent to regional ophthalmologists, and to partners when requested. There is the opportunity to standardise the data (using tables) to make it more user friendly, and comparable, and send to more stakeholders, for instance, ophthalmic nurses, and the Ghana Blind Union. Eye care staff at facilities reported that they never hear any feedback about the data that they submit, either via DHIMS or NECU, and did not know what it was used for. They suggested that it would be helpful to see how they compared to their peers in different districts or regions in terms of both activity and outcomes.

In the past, NECU have conducted Annual Eye Care Review meetings to bring relevant people together from the 10 regions (regional ophthalmologists, eye nurses, optometrists, regional directors, as well as the ICD Director ICD and representatives from CHIM). However, no funds were available to conduct it in 2012.

## *INGOs*

INGOs report conducting review meetings in their geographical areas. For instance, Sightsavers and Swiss Red Cross conducts half-yearly 2-3 day review meetings in the regions in which they work, which gives staff from districts to report about eye health at regional level, and triggers improved collection and reporting on data. During the meetings, information gets queried and validated which generates discussions and sharing of best practice. The importance of this forum for data quality was illustrated when last year Sightsavers did not hold review meetings due to an internal organisational restructure: without the annual review, reporting dropped off and data quality worsened.

There is limited evidence on data on eyes being used, in large part due to the lack of useful data on eye health. It appears that some data may be there (especially via DHIMS), but that it is not being proactively distributed back to departments and staff who compiled it. For instance, the NECU discussed that the ideal situation would be if PPME (where CHIM sits) came to NECU with CSR data asking “why is your CSR so low?” i.e. that it would be actively monitoring the numbers needed to meet incidence.

## 5. Summary of Findings

### Overview of the eye health system

#### Strengths

- Dedicated National Eye Care Secretariat/Unit with a National Coordinator and fully funded GHS salaries.
- Long-term support from national (e.g. CHAG) and international donors which has improved and sustained service coverage and quality.
- Almost every district hospital has an ophthalmic nurse
- NHIS covers most diseases, including eye care, reducing financial barriers to access.
- Very active private sector in eye care, especially opticians and optometrists

#### Weaknesses

- Lack of national baseline for prevalence of blindness and low vision
- NECU has lack of resources for programmes
- The integration of eye care services is not fully effective in every district
- Inequitable distribution of HReH with a concentration of professionals in the south of the country
- Low Cataract Surgical Rates
- Limited provision of refraction and low vision services
- The information system focuses on outputs (number of cataract surgeries and consultations). No data on quality

### Governance of the eye health system

#### Strengths

- Presence of a NECU to oversee eye care in Ghana, with dedicated staff
- Active DPOs e.g. GBU and GFD, with evidence of changes to policy brought about by advocacy
- Good collaboration between NECU and international NGOs

#### Weaknesses

- There are quite a few hierarchical levels between MoH and NECU to make eye care organisations' voice to be heard at policy level
- No eye-care specific feedback on how beneficiaries experience eye health services and perceive the quality of service
- There is no data publicly available comparing the various eye care providers in terms of quality and performance

## Eye Health Financing

### Strengths

- Fully funded NECU team (staff salaries from core GHS funding)
- Salaries of the majority of front-line eye care staff in public facilities are MoH/GHS-funded, a sign of sustainable integration of eye care services into general health care
- NHI scheme includes several eye care interventions such as cataract surgery

### Weaknesses

- MoH/GHS financial commitment to eye care is limited compared to international donors' funding
- Public funds are disbursed with delays at facility level constraining the purchase of drugs and consumables
- Key eye care services and devices are excluded from NHI e.g. refraction and optical aids; glaucoma visual field and some glaucoma drugs; retinal detachment, laser treatment
- Lack of clarity around who is responsible for funding outreach and school screenings: DHMT or facilities?

## Eye Health Service Delivery

### Strengths

- The majority of district hospitals in the country are staffed by ONs
- ONs in some areas have developed integrated relationships with other speciality professionals

### Weaknesses

- Historical provision of eye care services as vertical programmes funded by national or international NGOs means that eye care services are sometimes not as integrated as they should be
- Primary Eye Care (PEC) is not integrated within PHC
- Outreach consultations organised by ONs are often constrained by the lack of consensus between DHMTs and hospital managers
- Lack of refraction/low vision services in many parts of the country
- The quality of eye care services is not assessed

## Human Resources for Eye Health

### Strengths

- Regional Ophthalmologists oversee eye care services and carry out cataract surgery in nearly every region
- Ghana has nearly staffed every health district with at least one ON
- There are increasing numbers of nurses applying for ON training, including from rural areas currently under-served by eye care services

## **Weaknesses**

- Poor distribution of Ophthalmologists in the country with most regions under-staffed
- Limited number of doctors interested to study ophthalmology
- Supervision of eye care staff at every level of the health system is not systematic
- Lack of sub-specialisation except in paediatric ophthalmology
- Reporting lines vary from one facility to another
- The introduction of cataract surgeons in the eye health system is delayed

## **Medicines, products and equipment for eye health**

### **Strengths**

- Eye care drugs are included on the Ghana NEML, and over 50% of drugs prescribed covered by NHIA Scheme
- MOH has just funded in 2011 glaucoma equipment

### **Weaknesses**

- Some key medicines missing from NEML and not reimbursed by NHIA
- Refraction/Optical Devices are not reimbursed by NHIA
- Lack of monitoring regarding effective prescribing practices in eye care
- Maintenance and assessment of eye care equipment is erratic

## **Health information systems for eye health**

### **Strengths**

- Eye health indicators collected at district level
- NECU conducts quarterly monitoring
- INGOs collect detailed data in regions where they work

### **Weaknesses**

- Lack of accurate national baseline for prevalence of different eye conditions
- At district level, data collected is not used to inform decision makers and for planning
- The existence of different systems of data collection (NECU, INGOs, DHIMS) create a reporting burden on staff, with consequences for quality and comparability of data.
- Data not fed back to eye care staff
- Data is not analysed and performance of eye care facilities is not compared with each other

## Annex A: Map of Ghana with Regions and Regional Capitals



## Annex B: National Health Insurance Tariffs for Ophthalmological procedures in different facilities

**Table 6: National Health Insurance Tariffs (GH¢) for Ophthalmological procedures in different facilities** (Source: taken from the 2011 NHIS Tariff Lists for different facility types)

Type of health facility		CHPS Compounds, Clinics & Health Centres				District Hospitals			Regional Hospitals		Teaching Hospitals
Ghana-Diagnosis Related Groupings		Public Health Centres <sup>7</sup>	CHAG Health Centres & Clinics	Private Health Centres <sup>8</sup>	Private Clinics <sup>d</sup>	Public (with catering)	CHAG	Private <sup>d</sup> (with catering)	Public	Private <sup>d</sup>	Public
General	General OPD (Adult)	2.38	3.21	5.71	8.78	6.16 (6.16)	8.30	(11.72)	9.66	14.94	-
	General OPD (Child)	2.38	3.21	5.71	7.64	5.98 (5.98)	8.09	(11.16)	8.78	13.39	-
	Unbundled Consultation (Adult)	1.83	1.38	4.06	5.08	2.84 (2.84)	2.81	(6.77)		8.15	14.56
	Unbundled Consultation (Adult)	1.83	1.38	4.06	4.89	2.60 (2.60)	2.56	(6.53)		7.78	14.56
Eye OPD	OPD Eye Adult (without procedure)	-	-	-	-	6.34 (6.34)	6.23	9.32 (9.32)	7.35	10.04	11.99
	OPD Eye Child (without procedure)	-	-	-	-	6.15 (6.15)	5.98	8.77 (8.77)	7.35	9.54	11.78
Ophthalmology procedures	Enucleation >=12 Yrs	-	-	-	-	138.84 (141.70)	144.17	(175.37)	158.73	193.70	188.37
	Enucleation <12 Yrs	-	-	-	-	104.52 (107.38)	109.85	(130.39)	146.12	150.28	154.05
	Evisceration >=12 Yrs	-	-	-	-	155.48(158.34)	160.81	(194.74)	175.50	212.16	205.01
	Evisceration <12 Yrs	-	-	-	-	108.29(111.15)	113.62	(134.68)	163.15	153.53	157.82
	Removal of superficial foreign body >=12 Yrs	-	-	-	-	9.49 (9.49)	9.36	(10.01)	10.14	11.05	14.17
	Removal of superficial foreign body <12 Yrs	-	-	-	-	7.15 (7.15)	7.02	(7.54)	8.58	8.71	11.96
	Removal of intraocular foreign body >=12 Yrs	-	-	-	-	76.57(85.02)	86.58	(114.01)	102.96	125.06	153.40
	Removal of intraocular foreign body <12 Yrs	-	-	-	-	69.29 (77.61)	79.30	(98.54)	86.32	114.01	146.12
	Removal of intraorbital foreign body >=12 Yrs	-	-	-	-	143.39 (151.84)	153.40	(197.08)	169.78	208.13	220.22
	Removal of intraorbital foreign body <12 Yrs	-	-	-	-	105.30 (113.75)	115.31	(144.04)	151.32	159.51	182.26
	Eyelid surgery >=12 Yrs	-	-	-	-	48.75 (48.75)	49.01	(67.08)	63.96	83.98	85.67
	Eyelid surgery <12 Yrs	-	-	-	-	43.94 (43.94)	44.20	(58.63)	53.43	75.53	80.86
	Scleral and Corneal surgery >=12 Yrs	-	-	-	-	76.70 (85.15)	83.98	(111.54)	101.01	121.42	150.02

<sup>7</sup> Including health centres, maternity homes, clinics and CHPS compounds level

<sup>8</sup> Tariffs are higher for private facilities as they have to cover staff as well as service costs. Public sector facilities (whether GHS/CHAG) only have to cover service costs (salaries met centrally by MOH)



Scleral and Corneal surgery <12 Yrs	-	-	-	-	67.21 (75.66)	74.49	(93.86)	82.94	108.16	140.53
Anterior chamber washout >=12 Yrs	-	-	-	-	57.46 (60.19)	60.06	(75.53)	75.27	89.44	103.35
Anterior chamber washout <12 Yrs	-	-	-	-	50.96 (53.69)	53.56	(65.13)	62.40	80.47	96.85
Glaucoma surgery >=12 Yrs	-	-	-	-	63.83 (69.42)	68.77	(91.65)	84.76	103.48	123.37
Glaucoma surgery <12 Yrs	-	-	-	-	56.42 (62.01)	61.36	(78.00)	70.07	92.69	116.09
<b>Cataract surgery &gt;=12 Yrs</b>	-	-	-	-	<b>111.67 (117.26)</b>	<b>116.61</b>	<b>(137.54)</b>	<b>132.73</b>	<b>149.50</b>	<b>171.34</b>
<b>Cataract surgery &lt;12 Yrs</b>	-	-	-	-	<b>94.77 (100.36)</b>	<b>99.71</b>	<b>(114.79)</b>	<b>108.29</b>	<b>129.48</b>	<b>154.31</b>
Strabismus surgery >=12 Yrs	-	-	-	-	192.40 (200.85)	202.67	(252.72)	233.35	281.84	301.47
Strabismus surgery <12 Yrs	-	-	-	-	144.04 (152.49)	154.31	(186.42)	211.12	219.96	253.11
Incision and curettage of eyelid >=12 Yrs	-	-	-	-	60.32 (60.32)	63.31	(64.74)	77.09	84.11	96.20
Incision and curettage of eyelid <12 Yrs	-	-	-	-	56.94 (56.94)	59.93	(61.10)	67.60	80.47	92.82
Reconstructive surgery of eyelid >=12 Yrs	-	-	-	-	41.60 (50.05)	48.88	(74.10)	65.91	83.98	114.92
Reconstructive surgery of eyelid <12 Yrs	-	-	-	-	39.13 (47.58)	46.41	(63.96)	54.86	78.13	112.45
Nasolacrimal drainage system surgery >=12 Yrs	-	-	-	-	97.24 (97.24)	97.24	(122.46)	135.72	162.63	102.05
Nasolacrimal drainage system surgery <12 Yrs	-	-	-	-	52.13 (52.13)	52.13	(67.21)	127.66	107.38	56.94
Incision and drainage of abscesses >=12 Yrs	-	-	-	-	55.64 (55.64)	58.50	(62.14)	76.70	86.97	101.53
Incision and drainage of abscesses <12 Yrs	-	-	-	-	51.35 (51.35)	54.21	(57.20)	66.04	82.03	97.24
Examination under anaesthesia >=12 Yrs	-	-	-	-	17.03 (17.03)	16.90	(22.62)	18.33	25.87	21.71
Examination under anaesthesia <12 Yrs	-	-	-	-	15.21 (15.21)	14.95	(19.50)	16.90	22.88	21.06

All prices given are in Ghana Cedis (GHC)

## Annex C: Eye Health System Assessment Team

Contact name	Title and organisation	Team role
Dr. Oscar Debrah	National Eye Care Coordinator, Ghana Health Service	Team Leader
Mrs. Amy Potter	Public Health Specialty Registrar / Health Systems Researcher, International Centre for Eye Health, London School of Hygiene & Tropical Medicine	Technical Support
Mrs. Gifty Boafo	Executive Officer, National Eye Care Unit, GHS	Team member (data collection and analysis)
Mrs. Mary Naa Koram	Gender Advocate, PPME, GHS	Team member (data collection and analysis)
Mr. Amatus Montii	Low Vision Coordinator, National Eye Care Unit, GHS	Team member (data collection and analysis)
Ms. Regina Teye	Ophthalmic Nurse, Korle Bu	Team member (data collection and analysis)
Ms. Jessie Ankrah	Ophthalmic Nurse (retired)	Team member (data collection and analysis)
Ms. Gifty Nagai	National Eye Care Unit – Secretary	Administrative Support

## Annex D: Ghana EHSA Schedule: 29 Oct to 09 Nov 2012

	Date	Activity
Pre-meet	Fri 26 <sup>th</sup> Oct	<b>EHSA pre-meeting with Head of the NECU and Country Director, Sightsavers</b> <i>[initially planned to be Day 1 of the assessment, but a public holiday was declared]</i>
Weekend		
WEEK 1	Mon 29 <sup>th</sup> Oct	<b>EHSA team meeting:</b> <ul style="list-style-type: none"> <li>Introduce the EHSA concept and the EHSA modules</li> <li>Schedule and logistics for the 2 week EHS Assessment</li> <li>Team roles and expectations (data collection, analysis and report-writing)</li> <li>Practical aspects of interviewing (protocol, consent, techniques, probing questions)</li> <li>Discuss plans for data collection (interviews, document review) and analysis</li> </ul>
	Tues 30 <sup>th</sup> Oct	<b>Data collection:</b>
	Wed 31 <sup>st</sup> Oct	<ul style="list-style-type: none"> <li><b>Greater Accra:</b> document review and interviews with national stakeholders</li> </ul>
	Thurs 1 <sup>st</sup> Nov	<ul style="list-style-type: none"> <li><b>Western Region:</b> interviews with Regional and District stakeholders</li> </ul>
	Fri 2 <sup>nd</sup> Nov	<ul style="list-style-type: none"> <li><b>Upper East Region:</b> interviews with Regional and District stakeholders</li> </ul>
Weekend		
WEEK 2	Mon 5 <sup>th</sup> Nov	<b>EHSA team meeting:</b> <ul style="list-style-type: none"> <li>Summary of data collection so far and what data still needs to be collected</li> <li>Review of analysis tools</li> </ul> <b>Continue data collection in Greater Accra</b> <ul style="list-style-type: none"> <li>Gaps in data collection filled via interviews and document review</li> </ul>
	Tues 6 <sup>th</sup> Nov	<b>Ongoing data collection and analysis:</b> <ul style="list-style-type: none"> <li>Document review</li> <li>NGO group discussion</li> </ul> <b>Team meetings to analyse data:</b> <ul style="list-style-type: none"> <li>EHSA team members present findings by module</li> <li>Summarise findings as a group, using SWOT Analysis</li> <li>Consider impact on health system performance</li> </ul> <b>Report writing:</b> <ul style="list-style-type: none"> <li>EHSA team members start to draft assigned chapters</li> </ul> <b>Final EHSA team meeting:</b> <ul style="list-style-type: none"> <li>Summarise data analysis and discuss next steps (including stakeholder workshop)</li> <li>Ensure all draft report chapters, interview notes/transcripts collated</li> </ul>
	Wed 7 <sup>th</sup> Nov	
	Thurs 8 <sup>th</sup> Nov	
	Fri 9 <sup>th</sup> Nov	<b>Report writing:</b> <ul style="list-style-type: none"> <li>Technical expert collates all data so far</li> <li>EHSA team members finalise draft report chapters</li> </ul>

## Annex E: List of Interviews conducted and sites visited

Contact name	Title (role)	Organisation
<b>NATIONAL</b>		
Dr. Ebenezer Appaiah-Denkyira	Director, Human Resources for Health Development <sup>9</sup>	Ministry of Health
Dr. Afisah Zakariah	Director of Policy, Planning, Monitoring and Evaluation (PPME) Division (Acting)	Ministry of Health
Mrs. Joyecelyn Aziz	Head of Procurement Unit	Ministry of Health
Mr Daniel Osei	Deputy Director of Planning and Budgeting, PPME	Ghana Health Service
Ms. Anna Plange	Senior HR Manager, HR Directorate	Ghana Health Service
Mrs. Ramatu Ude Umanta	Director of Finance	Ghana Health Service
Dr Kwasi Addae-Donkoh	Director of Stores, Supplies and Drugs Management (SSDM) Division	Ghana Health Service
Mr Philip Anum	Director of Pharmaceutical Services (Acting)	Ghana Health Service
Mr. Daniel Darko	Chief Biostatistician, Centre for Health Information Management, PPME	Ghana Health Service
Dr. Oscar Debrah	National Eye Care Coordinator	Eye Care Unit, Ghana Health Service
Mr. Amatus Montii	Low Vision Coordinator	Eye Care Unit, Ghana Health Service
Mr Anthony Gingong	Director of Operations (Acting)	National Health Insurance Authority
Mrs. Joyce Ashun	Country Director	Sightsavers
Mr. George Akanlu	Programme Officer	Sightsavers
Mr. Emmanuel Kwasi Kumah	Project Officer	Operation Eyesight
Mr Peter Obeng Asamoah	Executive Director	Ghana Blind Union
Mr Alex	Director	Ghana Federation of the Disabled
Mrs. Ellen Clegg	Principle	Ophthalmic Nursing Training School, Korle Bu
Dr Thomas Tontie Baah	Ophthalmologist (private)	Save the Nation's Sight (private eye clinic)

<sup>9</sup> Has just become Director General of GHS, but was interviewed in his previous capacity as Director of HR for the MOH

<b>WESTERN REGION</b>		
Dr.Kweku Karikari	Regional Director of Health Services	Regional Health Directorate, Sekondi/Takoradi
Dr Atsu Dordor	Deputy Director of Clinical Care	Regional Health Directorate, Sekondi/Takoradi
Ms. Beatrice Mochia	Deputy Director of Nursing Services	Effia Nkwanta Regional Hospital, Sekondi/Takoradi
Dr. Amoabeng	Regional Ophthalmologist	Effia Nkwanta Regional Hospital, Sekondi/Takoradi
Ms. Elizabeth Kwayisi	Ophthalmic Nurse	Effia Nkwanta Regional Hospital, Sekondi/Takoradi
Dr. Robert Boateng	Optometrist	Effia Nkwanta Regional Hospital, Sekondi/Takoradi
<b>TARKWA DISTRICT</b>		
Rev. Joseph Dzumo	District Director (Acting)	Health Management Team, Tarkwa Nsuaem District
Dr. Ebenezer Aboagye	Medical Superintendent	Tarkwa Govt. Hospital (District Hospital)
Mrs. Mary Amissah*	Deputy Director of Nursing Services	Tarkwa Govt. Hospital (District Hospital)
Sampson Yarley	Ophthalmic Nurse	Tarkwa Govt. Hospital (District Hospital)
Dr. Emmanuel Larney	Optometrist	Tarkwa Govt. Hospital (District Hospital)
<b>WASA MPOHOR EAST DISTRICT 2</b>		
Dorcas Sackey	District Director / District Public Health Nurse	District Health Service
Mr. Harrison Ackon	District Administrator	District Health Service
Ms. Regina Oppong Da-Costa	District Storekeeper	District Health Service
Mr. Eric Asare	Mental Health Nurse (in charge of facility)**	District Health Post, Daboase
<b>UPPER EAST REGION</b>		
Lucio Gbeder Dery	Deputy Director – Administration	Regional Health Directorate, Bolgatanga
Dr. James Akpablie	Deputy Director Public Health (DDPH)	Regional Health Directorate, Bolgatanga
Dr Hornameter Afake	Regional Ophthalmologist	Upper East Region
Ayine Roland	Scheme Manager	National Health Insurance, Bolgatanga
<b>ZEBILLA DISTRICT</b>		

Mary-Stella Adapesa	District Director of Health Services	District Health Service, Zebilla District
Bentue Abubakari	Health Service Administrator	Zebilla District Hospital
Lydia Atanga	Ophthalmic Nurse	Zebilla District Hospital
<b>BUILSA DISTRICT</b>		
Juliana Abiale	District Director of Health Services (Acting)	District Health Directorate, Sandema
Charity Tanni	Health Information Officer	District Health Directorate, Sandema
Atuba A Samuel	Health Services Administrator	Sandema District Hospital
Mary Azumah Kalim	Ophthalmic Nurse	Sandema District Hospital

\* interviewed as there was no ophthalmic nurse in this district

## Annex F: List of documents consulted

### Government of Ghana

- GHS, *Ghana Demographic and Health Survey, 2008*, Ghana Statistical Service, Editor. 2009, Ghana Health Service: Accra, Ghana.

### Ghana Health Service

- Government of the Republic of Ghana, *Creating Wealth Through Health: The Health Sector Programme of Work 2007-2011*, Ministry of Health, Editor, Republic of Ghana: Accra, Ghana.
- Ghana Health Service, *Five Year Strategic Framework for Service Delivery: 2007-2011*. 2008, Ghana Health Service: Accra, Ghana.
- GHS Organogram (<http://www.ghanahealthservice.org/aboutus.php?inf=Organisational%20Structure>)
- List of Health Care Facilities (Republic of Ghana. *Health Facilities in Ghana*. Ghana Open Data Initiative 15-11-12 [cited 2013 Jan 29]; Available from: <http://data.gov.gh/dataset/health-facility-ghana-1>)
- Ghana Ministry of Health, *Health Sector Programme of Work: Independent Review 2007 [Final Draft Report]*, Ministry of Health, Editor. 2008, Ministry of Health: Accra, Ghana.
- GHS *Quality Assurance Strategic Plan GHS 2007-2011*, Institutional Care Division. 2007, Ghana Health Service: Accra, Ghana.
- GNDP, *Ghana Essential Medicines List (6th Edition)*, Ghana National Drugs Programme, Editor. 2010, Ministry of Health: Accra, Ghana.
- GNDP, *Ghana National Drug Policy (2nd Edition)*, Ghana National Drugs Programme, Editor. 2004, Ministry of Health: Accra, Ghana.

### National Health Insurance

- NHIA, Ghana. 2009. Annual Report of National health Insurance Authority. Ghana: National Health Insurance Authority
- NHIA Tariffs (July 2011) for: Diagnostic Centres; CHAG facilities (District Hospitals, Health Centres); Private facilities (Clinics; District Hospitals (with/without catering); Maternity Homes & Health Centres; Regional); Public facilities (Health Centres, District Hospitals (with/without catering), Regional Hospitals, Teaching Hospitals)
- NHIS Medicines List March 2011

### Eye Care Unit documents

- National Eye Care Unit, *Imagine Ghana Free of Avoidable Blindness: National Eye Health Programme Framework for Action 2004-2008*, NECU. 2004, Ghana Health Service: Accra, Ghana.
- National Eye Care Unit, *National Eye Health Programme: Strategic Plan - A Shared Vision 2009-2013 [DRAFT]*. 2012, National Eye Care Unit: Accra, Ghana.
- National Eye Care Report 1997

- National Eye Care Report 1999
- National Eye Care Report 2001
- National Eye Care Report 2002
- National Eye Care Report 2003
- National Eye Care Report 2004
- National Eye Care Report 2005
- National Eye Care Report 2007
- National Eye Care Report 2009
- National Eye Care Report 2011
- NECU Quarterly/Annual Monitoring data:
  - List of Optometrists (2011)
  - List of Ophthalmologists (2011)
  - List of Ophthalmic Nurses (2011)
- Ghana MOH/Sightsavers/ICEH, *Rapid Assessment of Avoidable Blindness in Eastern Region, Ghana: Draft Preliminary Report*. 2009, Ministry of Health, Ghana, Ghana Health Service, International Centre for Eye Health, and Sightsavers International

#### **Other**

- ICEH/AVRI, *HR mapping study*. 2012, International Centre for Eye Health, London School of Hygiene & Tropical Medicine, and the African Vision Research Institute, University of KwaZulu-Natal. (unpublished)
- Sightsavers, *Ghana Eastern Region Eye Care Programme: Report of the end of cycle evaluation (Project Cycle 2006 to 2010)*. 2010, Sightsavers Ghana Country Office.
- Operation Eyesight Universal: Seeing is Believing Quarterly Reporting Template



## References

1. Islam, M., ed. *Health Systems Assessment Approach: A How-To Manual*. 2007, Management Sciences for Health / US Agency for International Development: Arlington, VA.
2. Health Systems 20/20, *The Health System Assessment Approach: A How-To Manual. Version 2.0*. 2012, USAID / Health Systems 20/20.
3. USAID. *HealthSystems 20/20 - HSA Country Reports*. 2012 [cited 2012 06 December]; Available from: [http://www.healthsystems2020.org/content/resource/detail/528/#Download\\_HSA\\_Country\\_Report](http://www.healthsystems2020.org/content/resource/detail/528/#Download_HSA_Country_Report).
4. Blanchet, K., et al., eds. *EYE HEALTH SYSTEMS ASSESSMENT (EHSA): How to connect eye care with the general health system*. 2012, London School of Hygiene and Tropical Medicine: International Centre for Eye Health.
5. WHO, *Everybody's business: Strengthening health systems to improve health outcomes. WHO's framework for action*. 2007, World Health Organisation: Geneva.
6. Bowling, A. and S. Ebrahim, *Handbook of Health Research Methods: Investigation, Measurement and Analysis*. 2005, New York: Open University Press, McGraw-Hill International.
7. Patton, M.Q., *Enhancing the quality and credibility of qualitative analysis*. Health Services Research, 1999. **34**(5): p. 1189-1208.
8. Denzin, N. and Y. Lincoln, *Handbook of Qualitative Research*. 1994, Sage Publications. p. 202.
9. Mills, A., et al., *Progress towards universal coverage: the health systems of Ghana, South Africa and Tanzania*. Health Policy Plan, 2012. **27 Suppl 1**: p. i4-12.
10. GHS. *Ghana Health Service - About Us - Organisational Structures*. 2012 [cited 2012 04 December]; Available from: <http://www.ghanahealthservice.org/aboutus.php?inf=Organisational%20Structure>.
11. MOH, *List of Healthcare Facilities in Ghana*. 2010, Ministry of Health.
12. Ghana Health Service, *Five Year Strategic Framework for Service Delivery: 2007-2011*. 2008, Ghana Health Service: Accra, Ghana.
13. WHO. *World Health Statistics: Ghana National Expenditure on Health*. World Health Organization National Health Account database 2010 [cited 2012 04 December]; Available from: [http://apps.who.int/nha/database/StandardReport.aspx?ID=REP\\_WEB\\_MINI\\_TEMPLATE\\_WEB\\_VERSION&COUNTRYKEY=84639](http://apps.who.int/nha/database/StandardReport.aspx?ID=REP_WEB_MINI_TEMPLATE_WEB_VERSION&COUNTRYKEY=84639).
14. Oxfam, *Achieving a Shared Goal: Free Universal Health Care in Ghana*. 2011, Oxfam International.
15. Witter, S. and B. Garshong, *Something old or something new? Social health insurance in Ghana*. BMC Int Health Hum Rights, 2009. **9**: p. 20.
16. NHIA. *Summary Statistics (as of June 2010)*. 2010 [cited 2012 03 December]; Available from: <http://www.nhis.gov.gh>.
17. NHIA, *National Health Insurance Scheme Annual Report*. 2009, National Health Insurance Authority: Accra, Ghana.
18. National Health Insurance Scheme, *Medicines List*. 2011, NHIS: Accra, Ghana.
19. National Health Insurance Scheme, *National Health Insurance Tariffs (Ghana Diagnostic Related Groupings)*. 2011, NHIS: Accra, Ghana.
20. Brugiavini, A. and N. Pace, *Extending Health Insurance: Effects of the National Health Insurance Scheme in Ghana*. 2010, European Report on Development.
21. Ghana Health Service, *The Health Sector in Ghana: Facts and Figures 2010*, Ghana Health Service, Editor. 2010, Ministry of Health: Accra, Ghana. p. 26.
22. GHS, *Five Year Strategic Framework for Service Delivery: 2007-2011*. 2008, Ghana Health Service: Accra, Ghana.

23. National Eye Care Unit, *Eye Care Unit Annual Report 2011*. 2011, Ghana Health Service: Accra, Ghana.
24. NECU, *National Eye Health Programme: Strategic Plan - A Shared Vision 2009-2013 [DRAFT]*. 2012, National Eye Care Unit: Accra, Ghana.
25. NECU, *Eye Care Unit Annual Report 2011*. 2011, National Eye Care Unit, Ghana Health Service: Accra, Ghana.
26. Kosoko-Lasaki, O., et al., *Race, ethnicity and prevalence of primary open-angle glaucoma*. J Natl Med Assoc, 2006. **98**(10): p. 1626-9.
27. Republic of Ghana. *Health Facilities in Ghana*. Ghana Open Data Initiative 15-11-12 [cited 2013 Jan 29]; Available from: <http://data.gov.gh/dataset/health-facility-ghana-1>.
28. NECU, *Imagine Ghana Free of Avoidable Blindness: National Eye Health Programme Framework for Action 2004-2008*, National Eye Care Unit, Editor. 2004, National Eye Care Unit, Ghana Health Service: Accra, Ghana.
29. GHS, *Quality Assurance Strategic Plan GHS 2007-2011*, Institutional Care Division, Editor. 2007, Ghana Health Service: Accra, Ghana.
30. Limburg, H., *Manual Tally Sheet for Cataract Surgery*, in "Monitoring Cataract Surgical Outcomes: Methods and Tools". Community Eye Health, 2002. **15**(44): p. 51-53.
31. Blanchet, K., et al., *Quality Assurance in eye care*. 2008, Swiss Red Cross, GHS: Accra.
32. MOH, *Human Resource Policies and Strategies for the Health Sector 2007-2011*, M.o. Health, Editor. 2007, Republic of Ghana: Accra, Ghana.
33. NHIA, *National Health Insurance Tariffs (Ghana Diagnostic Related Groupings)*. 2011, National Health Insurance Authority: Accra, Ghana.
34. VISION 2020, *VISION 2020: THE RIGHT TO SIGHT - Global Initiative for the elimination of avoidable blindness. Action plan 2006 - 2011*. 2007, World Health Organisation: Geneva.
35. ICEH/AVRI, *HR mapping study, 2012*. 2012, International Centre for Eye Health, London School of Hygiene & Tropical Medicine, and the African Vision Research Institute, University of KwaZulu-Natal.
36. World Bank. *World dataBank - Annual % Population Growth (Ghana)*. 2011 [cited 2012 06 December]; Available from: <http://data.worldbank.org/country/ghana>.
37. GNDP, *Ghana National Drug Policy (2nd Edition)*, Ghana National Drugs Programme, Editor. 2004, Ministry of Health: Accra, Ghana.
38. GNDP, *Ghana Essential Medicines List (6th Edition)*, Ghana National Drugs Programme, Editor. 2010, Ministry of Health: Accra, Ghana.