*Editorial*

# Eye Care in Central Africa

**Adrian Hopkins**



**Dr Adrian Hopkins** MBE, an ophthalmologist and expert in neglected tropical diseases, has decades of experience working across Africa delivering primary health care and ophthalmic services after completing his medical studies at St. Andrews University in Scotland in 1971.
From 2008-2016, he was Director of the Mectizan Donation Programme (MDP), which oversees the donation of the drug Mectizan for river blindness (onchocerciasis) and Mectizan and albendazole for lymphatic filariasis elimination in Africa.

**The situation:**

Approximately 26.3 million people across the World Health Organisation Africa Region (WHO AFRO) have some degree of visual impairment of whom 20.4 million have low vision and 5.9 million are considered blind. About 80% of this blindness is preventable or treatable. Major causes include cataracts, uncorrected refractive errors, glaucom and other emerging causes such as diabetic retinopathy and age-related macular degeneration. Added to this, the neglected tropical diseases affecting vision, (onchocerciasis, trachoma and leprosy) are prevalent in many African countries.[1]

In the six countries of Central Africa, with a population of 136 million people, the proportion of the population with all visual loss is estimated at 8.2%, of whom 55% are female. The overall blindness rate is estimated at 0.2% of the population. [2] These countries are amongst the lowest for the Human Development Index (HDI). In 2023 the HDI for Central African Republic (CAR) was the lowest at 0.387 apart from South Sudan at 0.381. Chad was little better at 0.394 and the Democratic Republic of Congo (DRC) was 0.481. Similarly, Pakistan was also low at 0.542. In 2022, GDP per Capita in CAR was $967 and in Burundi $836. In DRC it was better at $1,337 mostly due to mineral exports with little actually going to the population. In Pakistan it was $6,437.[3] Added to these problems most of the countries in the region have very low population density, CAR 9/ $Km^2$, the Congo Republic 19, South Sudan 19, Chad 16 Gabon 10, DR Congo 48. In Pakistan the density is 325.95 /$Km^2$.[4] These financial and development constraints obviously have an impact on health priorities, and it is very difficult to obtain consistent investment apart from a few NGOs who obviously cannot cater to all country needs.

Eye care across Africa varies enormously and is related to geography, language and colonial past. In North Africa, most countries are relatively affluent and offer reasonable services in most big towns and cities with tertiary level care in capital cities. In East Africa, training has improved considerably over the last 20 -30 years and has been well coordinated, now combining with South Africa to form the College of Ophthalmology of Eastern, Central and Southern Africa (COECSA), This is a specialist virtual college with the aim to improve the number and quality of eye care workers in the region. Ophthalmology in Francophone Africa faces more challenges than in many Anglophone countries due to less funding and more acute shortages of qualified personnel. However new institutions are developing in West Africa to gradually fill the gap. In Francophone Central Africa however the situation is even worse.

**Human resources:**

In the 1990s, WHO did an analysis of blindness and

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Ophthalmology personnel in Central Africa. The results are shown below (personal communication Dr D Etya'ale) in Figures 1 to 4.

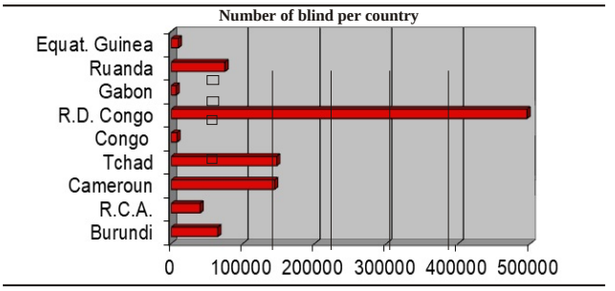


Figure 1. Blindness in Central Africa 1990

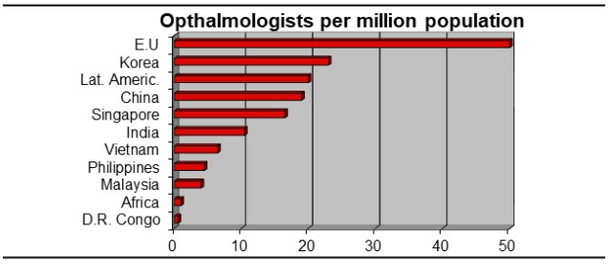


Figure 2. Ophthalmologists in Central Africa 1990

This led to an assessment of needs based on 1 ophthalmologists per 500,000 population and on 2 Medical Assistant per 500,000 as shown below. (Figs 3 and 4).

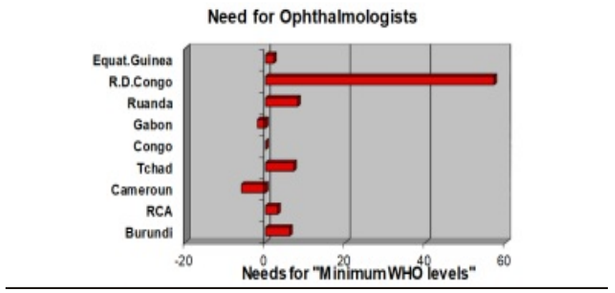


Figure 3. Ophthalmologist needs 1990

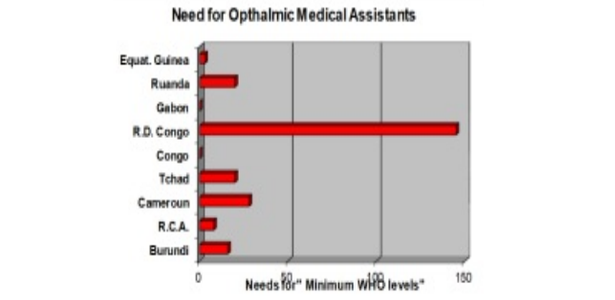


Figure 4. Minimum Needs for OMA

## The Ophthalmology Training Centre for Central Africa CFOAC:

On reviewing this data, and the fact that there were no training centres in Central Africa apart from 1 or 2 medical ophthalmologists per year in Kinshasa in the DRC, meetings were held with WHO and Christian Blind Mission (CBM) to discuss a further training centre in Central Africa to cater principally for mid-level personnel and including the training of non-specialist cataract surgeons. DRC became the first choice because of the greatest need, and after discussion with WHO HQ, WHO AFRO, the Ministry of Health in DRC and other partners it was decided to create the new training centre in Kinshasa, at that time a city of about 9 million people. The first planning meeting was held at the end of 1996 (figure 5).

Figure 5. The first planning meeting in Kinshasa

Due to civil war, the opening was delayed but the first intake was in 1999, in spite of some remaining conflict in the country. The centre is the Ophthalmology Training Centre for Central Africa (or CFOAC abbreviated in French). In 1999 most ophthalmologists in Central Africa were still doing intracapsular surgery so wet lab training was offered to any ophthalmologist who wanted to upgrade their surgery, which unfortunately was not enthusiastically accepted.

**Table 1. Numbers and countries of origin of those trained at CFOAC in the first 5 years.**

**Summary: Personel trained at CFOAC from November 1999 to Sepetember 2005**

| CAT Surgs | 1999-2000 | 2000-2001 | 2001-2002 | 2002-2003 | 2003-2004 | 2004-2005 | Total | |
|---|---|---|---|---|---|---|---|---|
| Certified | 4 | 3 | 4 | 4 | 5 | 5 | 20 | |
| Practical | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Eliminated | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 20 |
| Died | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Returned | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| DRC | 2 | 1 | 0 | 2 | 3 | 3 | 8 | |
| Camer'N | 0 | 0 | 1 | 1 | 1 | 2 | 3 | |
| Congo-B | 1 | 1 | 0 | 0 | 0 | 0 | 2 | |
| RCA | 0 | 0 | 2 | 0 | 1 | 0 | 3 | |
| Gabon | 0 | 0 | 1 | 1 | 0 | 0 | 2 | |
| TCHAD | 1 | 1 | 0 | 0 | 0 | 0 | 2 | |
| Angola | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |

| OMA | 1999-2000 | 2000-2001 | 2001-2002 | 2002-2003 | 2003-2004 | 2004-2005 | Total | |
|---|---|---|---|---|---|---|---|---|
| Certified | 4 | 10 | 12 | 10 | 0 | 0 | 36 | |
| Practical | 0 | 0 | 0 | 6 | 22 | 19 | 47 | |
| Eliminated | 1 | 0 | 0 | 2 | 0 | 0 | 3 | 78 |
| Died | 1 | 0 | 0 | 0 | 0 | 0 | 1 | |
| Returned | 0 | 0 | 0 | 0 | 1 | 0 | 1 | |
| DRC | 8 | 8 | 9 | 15 | 15 | 13 | 68 | |
| Camer'N | 0 | 1 | 1 | 3 | 4 | 2 | 11 | |
| Congo-B | 0 | 0 | 1 | 0 | 0 | 1 | 2 | |
| RCA | 0 | 0 | 1 | 0 | 2 | 0 | 3 | |
| Gabon | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| TCHAD | 0 | 0 | 0 | 0 | 1 | 3 | 4 | |
| Angola | 0 | 1 | 0 | 0 | 0 | 0 | 1 | |

Total OPECATS trained 1999 à 2005 = **15**
Total OPECATS in training 2005 = **5**
Total TSO trained 1999 à 2005 =**36**
Total TSO in training or practicals 1999 à 2005 = **47**

LEGENDE :
Students excluded or died during or after training
Students from DRC
Students in training
Total students trained or in training in each option since 1999

CFOAC has continued to develop and is now offering a university graduate course to the ophthalmic medical assistants, now called allied ophthalmic personnel. The cataract surgical course was suspended as there were increasing numbers of ophthalmologists trained in Kinshasa and the curriculum was changed to allow for more surgical training of specialists at CFOAC (St Jospeh's Hospital) and the Masina Eye Clinic (a joint venture initiated by CBM and Lions Clubs) aiming at higher surgical numbers.Unfortunately this has not continued.

Some education is still rather academic but practical training and competency are also assessed for final qualification.This was particularly the case for training of cataract surgeons who only received a certificate of competence when they were seen to be competent at surgery including the ability to deal with common complications, after a minimum of 50 operations. WHO Africa later arranged a consultation and working sessions to prepare a competency based training system. This is not entirely well followed but it does serve as a source for those designing curricula and practical training.[5]

The development of CFOAC has led to further partnerships (particularly with Rostock University Eye Department) which have helped both for varied research on glaucoma,[6] diabetic retinopathy,[7] childhood blindness.[8,9,10,11] conjunctival tumours.[12] There is very limited capacity both in terms of personnel and equipment to do these research projects elsewhere in DRC. The Maghreb supported hospital in Yaoundé in Cameroon is able to do some studies but otherwise there is virtually no ongoing research being done in Central Africa.St Joseph's Hospital (the hospital associated with CFOAC) has now developed a paediatric service with Rostock University in Germany and is further developing orbital surgery with Dusseldorf University Eye Clinic.

Further developments at CFOAC can be found at https://cfoac.net

**Vison 2020 and Central Africa:**

With the development of the Vision 2020 programme sponsored by WHO and the International Agency for the Prevention of Blindness (IAPB) and its constituent members, plans were developed in all the countries in Central Africa. Unfortunately, due to the instability in many of the countries and other health priorities, the plans developed nationally were little implemented and district eye care programs were hardly developed at all. In fact most 5 year plans were never updated. In the DRC a big effort was made to get feedback from every area of the country including areas held by various rebel groups and these recommendations were included in the plan. However, DRC was going through a period of civil war and the governments health priorities were obviously elsewhere. Various efforts have been made to upgrade the number and quality of ophthalmologists in the region. Training of ophthalmologists is also now available in the Maghrebi ICO Cameroon Eye Institute as well as Kinshasa. Other countries in the region do not have training facilities for ophthalmologists.

In view of the very poor Cataract Surgical Rates (CSR) in most of Central Africa and the poor geographical distribution of ophthalmologists most countries decided to use Ophthalmic Medical Assistants (OMAs) with extra training in cataract surgery to try and fill the gaps. OMA cataract surgeons were trained in Kinshasa and were active in Cameroon, Chad, Angola and Central African Republic. Cameroon also has cataract surgeons trained on the job by Ophtalmo sans frontiers, and a useful analysis of the results show their importance but also the need for improved performance although some of the problems are due to comorbidity.[13] OMAs are competent for uncomplicated surgery and have played a major role in increasing the CSR. Due to lack of funding for equipment and consumable supplies, as well as for supervision and due to country instability, many of these programs have ceased to be functional.

**Where are we now?**

Vision 2020 has been a major catalyst for improving the quality and quantity of eye care services in many parts of the world.[14] However the population has also increased dramatically over the last 25 years in many parts of Africa. Whereas blindness may have reduced a little there are still significant numbers of people with vision loss as seen in figure 6.

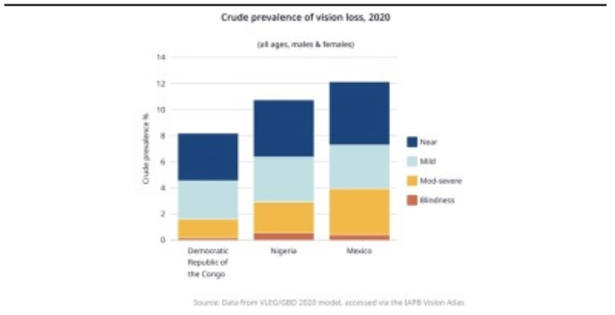


Figure 6. Prevalence of vision loss in DRC compared with Nigeria and Mexico[15]

In the DRC there has been the development of human resources as seen in figure 3. However the ratio of ophthalmologists to the population has hardly changed in the last 20 years.The vast majority of ophthalmologists are still working in the capital Kinshasa. Many provinces have no ophthalmology services at all.

**Table 3. Human resources in the DRC[16]**

| Indicator | Number | Year Last Reported |
|---|---|---|
| Number of Ophthalmologists | 87 | 2015 |
| Ophthalmologists per million | 1.1 | 2015 |
| Number of Optometrists | 4 | 2019 |
| Optometrists per million | 0 | 2019 |
| Number of allied ophthalmic personnel | 166 | 2013 |
| Allied ophthalmic personnel per million | 2 | 2013 |

IN the DRC only two Rapid Assessment of Avoidable Blindness (RAAB) surveys have been done and the results are not yet available for the second one done in 2023. The results in the northeast of the DRC are available in Table 4.

**Table 4. Prevalence of vision loss in N.E. DRC RAAB results [17]**

| | Total | | |
|---|---|---|---|
| | Extrapolated magnitude | % | 95% CI |
| Blind | 3549 | 1.9 | 1.3 - 2.4 |
| Severe | 2868 | 1.5 | 0.9 - 2.1 |
| Moderate | 13093 | 6.8 | 5.7 - 8.0 |

**Causes and management of blindness:**

Cataract has been identified as the major cause of blindness in low-income countries. Africa is no exception although there is the added burden of trachoma and onchocerciasis as well as glaucoma (difficult to manage) and the emerging problems of diabetes and with an ageing population an increase in retinal maculopathy.

**1.Cataract:**

Cataract surgical rates have been improving in parts of Africa, but Francophone Central Africa is sadly lagging. In fact it is difficult to get statistics on any eye care. Several papers following up on Vision targets do not mention any Central African country. The most recent CSR figures for DRC were 157 in 2014.In Pakistan in the same year was 2,819. In fact there were only 2 countries in Africa with a CSR of over 1000 in sub-Saharan Africa and the target figure is 2000.[18] Although a better indicator for cataract surgery is cataract surgical coverage there are no current studies.

**2.Uncorrected refractive error:**

Uncorrected refractive error is a major problem in low-income countries in general including in Central Africa. Spectacle correction for presbyopia is often not available at a reasonable price and those patients who are affected are afraid of buying cheap glasses because they think it will make their eyes worse. However during 6 years working in the Central African Republic where we had spherical corrections in stock at approximately 5 USD. We could offer prescriptions for full astigmatic correction made elsewhere at around 200 USD. All patients apart from 1 in the 6, opted for

the spherical equivalent. Training in Optometry has now started at two different centres in Kinshasa at CFOAC and the Horizon Ophthalmic and Nursing University (HONU) and is also available in Cameroon at the Maghrebi ICO Cameroon Eye Institute

Other blinding Pathologies.

As more cataracts are being treated glaucoma and diabetic eye disease are becoming much more important. As in all populations glaucoma is a difficult disease to manage due to its late diagnosis and life-long treatment.The cost of most medical treatment is beyond the financial possibilities for many households, (1 bottle of eye drops may be equal or more than the basic working wage). My personal experience was that 100% of patients who opted for eye drops went blind due to non-compliance, so that in the end I only offered trabeculectomy in spite of the lack of success in many cases, but perhaps primary trabeculectomy might result in less scarring of the filtration bleb. Research is needed for appropriate management of glaucoma. Diabetes is the next major medical epidemic and is already important in the bigger cities. Most of these cities have facilities with laser or intravitreal injections, but like glaucoma these are life-long conditions that are difficult to manage, not just for economic reasons but also culturally patients expect treatment to be curative and find it difficult to understand they are more of a “controlling, life-long treatment”.

**3.Neglected Tropical Diseases (NTDs):**

Two of the neglected tropical diseases using mass drug administration as a treatment strategy affect the eyes and are found widely throughout Central Africa. These are trachoma and onchocerciasis. In addition leprosy is still a problem in some areas although very few eye problems are being reported and it is impossible ascertain any figures.

Much of Central Africa is covered with tropical rain forest, with water and hygiene not being a problem and therefore little trachoma. However, the north of Cameroon, the Central African Republic (CAR) and Chad are in the Sahel with drier conditions and much greater risk of trachoma. The highest prevalence of trachoma was found in Chad, northern Cameroon and CAR. The current prevalence map figure 7 shows that the prevalence of trachoma has largely been controlled in most countries apart from the CAR where continued conflict has prevented a consistent SAFE program (see below) over many years (figure 7).

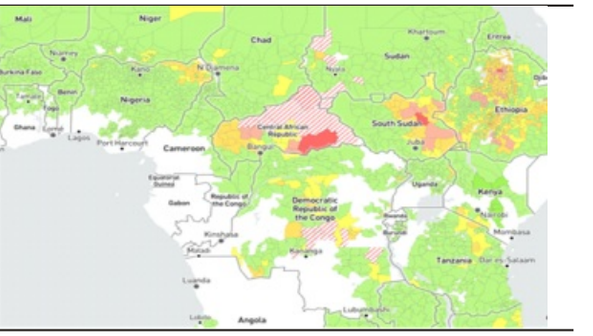


Figure 7. Trachoma in Central Africa, Prevalence of TF in Central Africa Global Trachoma Atlas https://atlas.trachomadata.org/

In the DRC trachoma was thought to exist purely around the northern and eastern borders and was not considered a public health problem. However recent mapping has shown foci of infection extending further into the country. Some of these areas have suffered due to conflict and internal population displacement but not in all areas. This was seen in Burundi where many refugees returning from neighbouring countries imported trachoma, and the instability prevented normal access to water supplies for washing. The SAFE strategy includes **S**urgery for Trachoma Trichiasis, mass distribution of **A**ntibiotic (donated Azithromycin), **F**acial cleanliness to prevent flies being attracted to nasal and lachrymal secretions, and **E**nvironmental improvement to avoid the breeding of flies.

**Onchocerciasis**

Over 95% of onchocerciasis is found in Africa. Its common name River Blindness indicates where you will find the disease i.e. within the proximity of flowing water. It is a parasitic disease caused by Onchocerca volvulus. The black fly vector of the genus

Simulium breeds mostly in fast flowing well oxygenated water in rapids, waterfalls etc. although some species have different breeding habits. Onchocerciasis is found in all the countries of Central Africa. By far the biggest population at risk in the region is found in DRC and great strides have been made in annual treatment with ivermectin. Although onchocerciasis is a skin disease blindness and epilepsy are associated with the disease in highly prevalent areas.[19] The current management is annual or biannual mass distribution of ivermectin. Ivermectin (Mectizan MSD) is donated for treatment of onchocerciasis and lymphatic filariasis by the manufacturer. This has an impact on eye disease, but the treatment must be continued for many years.[20,21]There is the hope with good coverage (> 80%) for 10-15 years depending on the prevalence the transmission of the disease can be eliminated, and this has already been achieved in some areas of Africa. In DRC coverage still needs to be improved if the disease is to be eliminated. Although over 53 million people were treated in 2023 there is still a little way to go as seen in the map Fig 8 and statistics figure 9.[22]

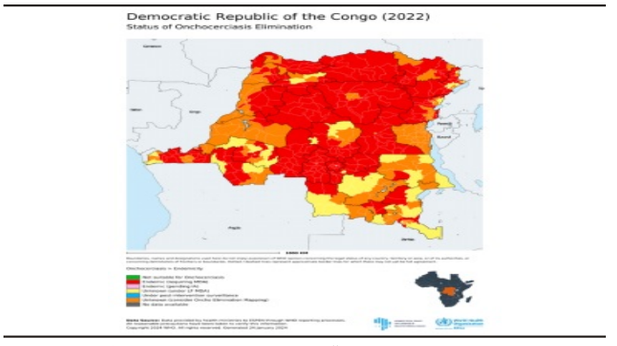


Figure 8. Status of onchocerciasis elimination in DRC[22]

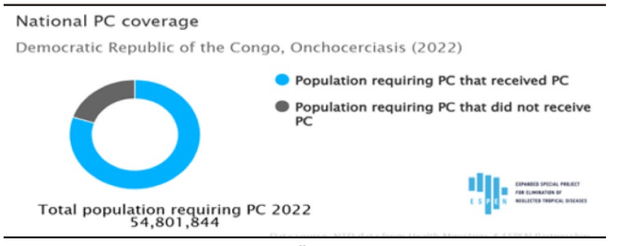


Figure 9. Ivermectin treatment in the DRC 2022[22]

Unfortunately in the Central African Republic civil conflict has resulted in no or very poor coverage for many years, especially in the South east, where the trachoma map also shows the problem. Onchocerciasis was almost eliminated in some areas of the CAR. It is not sure if stability returns whether it will be necessary to go back to zero as at the beginning of treatment in 1993/94 or whether the treatment period could be shortened.

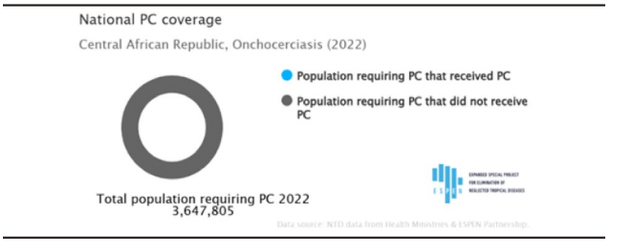


Figure 10. Results of conflict in CAR and abandoned treatment[23]

## Community strategies

The NTD mass drug administration programs depend very much on community ownership but an additional characteristic of some of the eye care programs in Central Africa is an association with community-based rehabilitation (CBR) programmes.[24] There are several barriers that patients must overcome to access health care. It is not automatic that patients with eye problems will present to eye clinics particularly as many just accept visual impairment is an inevitable part of the ageing process. Several of the barriers are widespread in low income countries, costs, geographic accessibility, local customs and understanding of eye disease. This also applies to aspects of childhood blindness.[25] [26] Even in a city where facilities are available the volunteers of CBR programmes are vital to encourage patients to come for treatment and particularly so regarding children, both for identification of problems and follow up.

## Conclusions:

Vison 2020 created some stimulus to eye care in the Central Africa Region.Human resources have developed, more specialized services are available in the larger cities where there has been an impact on eye care. However much of the population in small towns and rural areas still do not have access to eye care. This needs a “bottom up” approach to eye care with integration into Primary Health Care, community

integration into Primary Health Care, community involvement and in many respects the three pillars of Vison 2020 targeting priority diseases, development and supply of suitable equipment as well as building human capacity still need to be developed in the region to make an impact in time for the sustainable development goals in 2030. National ownership and domestic funding are vital for this process. In central Africa. We are far behind Pakistan, and we need to study how achieved in Pakistan.It is also needed to note from any lessons from Central Africa particularly for the more inaccessible populations of Pakistan.

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**Ethical Approval**: Not applicable

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